Revision 1.21 22/11/2016

9392 - PhotoFrame Rock MS-BH07 28.44 C - A14067-189423.xls

TERRA TEK
SITE INVESTIGATION AND LABORATORY SERVICES

Site	PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT	Contract No	A14067
Client		Hole ID	MS\BH07
Engineer		Sample Ref	
		Depth (m)	28.44
		Sample Type	C

Originator	Checked & Approved	PHOTOGRAPHS OF SPECIMEN FAILURE	
SE	[redacted] 28/09/2021		Sheet 1 of 1

Lab Project No A14067

Revision 1.21 22/11/2016

9392 - PhotoFrame Rock MS-BH07 29.00 C - A14067-189424.xls

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site	PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT	Contract No	A14067
Client		Hole ID	MS\BH07
Engineer		Sample Ref	
		Depth (m)	29.00
		Sample Type	C

Originator	Checked & Approved	PHOTOGRAPHS OF SPECIMEN FAILURE	
SE	[redacted] 28/09/2021		Sheet 1 of 1

Lab Project No A14067

Revision 1.21 22/11/2016

9392 - PhotoFrame Rock MS-BH11 35.00 C - A14067-189425.xls

TERRA TEK
SITE INVESTIGATION AND LABORATORY SERVICES

Site	PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT	Contract No	A14067
Client		Hole ID	MS\BH11
Engineer		Sample Ref	
		Depth (m)	35.00
		Sample Type	C

Originator	Checked & Approved
SE	[redacted] 28/09/2021

PHOTOGRAPHS OF SPECIMEN FAILURE

Tk

Lab Project No A14067

Revision 1.21 22/11/2016

9392 - PhotoFrame Rock MS-BH12 25.50 C - A14067-189426.xls

TERRA TEK
SITE INVESTIGATION AND LABORATORY SERVICES

Site	PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT	Contract No	A14067
Client		Hole ID	MS\BH12
Engineer		Sample Ref	
		Depth (m)	25.50
		Sample Type	C

Originator	Checked & Approved	PHOTOGRAPHS OF SPECIMEN FAILURE	
SE	[redacted] 28/09/2021		Sheet 1 of 1

Lab Project No A14067

TERRA TEK
Site Investigation & Laboratory Services

NOTES ON LABORATORY PROCEDURES

Samples of soil and rock taken during the site works are examined in the laboratory and assessments of their characteristics used to supplement field observations, and in-situ and laboratory test results, in the preparation of the borehole records. Preparation and testing is carried out to the requirements of British or other international Standards where applicable, or otherwise in accordance with good practice. UKAS accredited tests are indicated thus : (N). All other tests reported or opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

GEOTECHNICAL INVESTIGATION and TESTING - Laboratory Testing of Soil	STANDARD SPECIFICATIONS
Water Content (N)	BS EN ISO 17892-1: 2014
Bulk density - linear measurement method (N)	BS EN ISO 17892-2: 2014
Determination of particle size distribution - sieving, pipette and hydrometer methods (N)	BS EN ISO 17892-4: 2016
Incremental loading oedometer test (N)	BS EN ISO 17892-5: 2017
Determintation of liquid limit, plastic limit and plasticity & liquidity indexes (N)	BS EN ISO 17982-12: 2018
SOILS for civil engineering purposes	
Moisture content - oven drying method (N)	BS 1377:Part 2: 1990
Liquid limit, plastic limit and plasticity & liquidity indexes (N)	BS 1377:Part 2: 1990
Density - linear measurement (N)	BS 1377:Part 2: 1990
Particle density - gas jar (N)	BS 1377:Part 2: 1990
Particle size distribution - sieving, pipette and hydrometer methods (N)	BS 1377:Part 2: 1990
Mass Loss on Ignition (N)	BS 1377:Part 3: 2018 TP042 using muffle furnace
Dry density/moisture content relationship - 2.5kg rammer, 4.5kg rammer and vibrating hammer methods (N)	BS 1377:Part 4:1990
California Bearing Ratio (N)	BS 1377:Part 4:1990
Moisture condition value - natural moisture and moisture content relation methods (N)	BS 1377:Part 4:1990
One-dimensional consolidation properties (N)	BS 1377:Part 5:1990
Permeability ina triaxial cell (N)	BS 1377:Part 6:1990
Shear strength - small shear box (N)	BS 1377:Part 7:1990
Undrained shear strength - triaxial compression without measurement of pore pressure. Single and multistage loading methods (N)	BS 1377:Part 7:1990
Moisture condition value - natural moisture content (N)	SDD Tech Memo SH7/83. SDD Apps Guide No.1 (Rev 1989) - Withdrawn Standard
AGGREGATES	
Particle size distribution - washing and sieving (N)	BS 812: Part 103: Section 103.1: 1985
Particle size distribution - sieving method (N)	BS EN 933-1: 2012
Particle shape- flakiness index (N)	BS EN 933-3: 2012
Ten percent fines value (dry and soaked) (N)	BS 812: Part 111: 1990
Resistance to fragmentation by the Los Angeles Method (N)	BS EN 1097-2: 2020
Aggregate crushing value - particle size 10mm and greater (N)	BS 812: Part 110: 1990
Magnesium Sulphate Test (N)	BS EN 1367-2: 2009
Particle density and water absorbtion - pyknometer method for aggregate particles between 4mm and 31.5mm (N)	BS EN 1097-6: 2013
Determination of the water content by drying in a ventilated oven (N)	BS EN 1097-5 2008
UNBOUND & HYDRAULICALLY BOUND MIXTURES	
Laboratory reference density and water content - Proctor compaction (N)	BS EN 13286-2 2010
Laboratory reference density and water content - Vibrating hammer (N)	BS EN 13286-4 2003
Moisture condition value (N)	BS EN 13286-46 2003
Determination of California bearing ratio (N)	BS EN 13286-47 2012
Determination of degree of pulverisation (N)	BS EN 13286-48 2005
ROCK	
Point load strength and anisotropy indices (N)	ISRM Commission on Testing Methods, Suggested Method for Determining Point Load Strength: 1985
End preparation of rock specimens for compressive strength (N)	ASTM D 4543-08
Unconfined compressive strength (N)	The Complete ISRM Suggested Methods - Rock Characterization Testing 1974: 2006
Unconfined compressive strength (N)	ASTM D 7012/14 - Method C
Porosity and density - by saturation and calliper techniques (N)	The Complete ISRM Suggested Methods - Rock Characterization Testing 1974: 2006
Determination of water content (N)	The Complete ISRM Suggested Methods - Rock Characterization Testing 1974: 2006
Slake Durability Index (N)	The Complete ISRM Suggested Methods - Rock Characterization Testing 1974: 2006

CHEMICAL AND CONTAMINATION TESTS

An extensive range of UKAS and MCERTS chemical and contamination test procedures is available for the identification and quantification of levels of contamination in the ground. Selection of the test methodology and suite of contaminants to be determined is based upon site history, conditions revealed in the course of the investigation, and intended future use. Procedures are described and referenced as appropriate in the text of this report.

CONCRETE

Samples of conrete taken during the site works are examined in the laboratory and testing is carried out to the requirements of British or other international Standards where applicable, or otherwise in accordance with good practice.

SOIL DESCRIPTION

Laboratory (non-engineering) soil descriptions are generally given in accordance with Clause 41 of BS 5930: 2015

LABORATORY TESTING ENCLOSURE 16

Slag Analysis

(Tested Externally)

Thomas Research Services Ltd.
Tel: +44 (0) 1469 532 929
www.slagtest.co.uk
Unit 7, Tattershall Castle Court, Morgan Way, New Holland,
North Lincolnshire, DN19 7PZ, United Kingdom
A Limited Company registered in England. Company Registration No: 2518421

Phase I - Slag Identification Summary

Client: AEG
Site: Redcar Steelworks AEG Ref:4339
Date Received: 23/08/2021
Report Date: 15/11/2021

TRS Ref	Site Prefix	Site Ref	Mass/kg	Blast Furnace Slag	Basic Steel Slag	Basic Refractory	Al-Si Refractory	Silica Refractory	Coke	Ironstone	Other	Further Testing
BG1H01	MS	BH06-B30	13.6	-	-	-	L	-	-	-	metal (s)	no further testing
BG1H02	MS	BH09-B5	9.6	l	l	-	-	-	-	-		mixed slag
BG1H03	MS	BH12-B6	11.3	l	l	-	-	-	-	-		mixed slag
BG1H04	MS	TP01-LB11	11.9	L	-	-	-	-	-	-		blast furnace slag
BG1H05	MS	TP01-LB20	15.2	L	-	-	-	-	-	-		blast furnace slag
BG1H06	MS	TP03-LB11	17.4	L	-	-	-	-	-	-		blast furnace slag
BG1H07	MS	TP04-LB19	10.6	L	-	-	-	-	-	-		blast furnace slag
BG1H08	MS	TP05-LB7	13.1	m	l	-	-	-	-	-		mixed slag
BG1H09	MS	TP05-LB20	9.4	l	l	-	-	-	-	-		mixed slag
BG1H10	MS	TP07-LB11	13.2	m	l	-	-	-	-	-		mixed slag
BG1H11	MS	TP07-LB20	15.5	m	l	-	s	-	-	-		mixed slag
BG1H12	MS	TP09-LB7	13.8	L	-	-	-	-	-	-		blast furnace slag
BG1H13	MS	TP09-LB20	11.0	l	m	-	-	-	-	-		mixed slag
BG1H14	LF	TP01-LB18	11.4	L	-	-	-	-	-	-		blast furnace slag
BG1H15	LF	TP02-LB13	13.8	l	m	-	-	-	-	-		mixed slag
BG1H16	LF	TP03-LB7	18.0	L	-	-	-	-	-	-		blast furnace slag
BG1H17	LF	TP03-LB20	15.9	L	-	-	-	-	-	-		blast furnace slag

L =very large, l = large, m = medium, s = small, v s= very small amounts.

Futher Testing

Blast furnace slag: TRS accelerated expansion test (14 day duration).
Basic steel slag: TRS accelerated expansion test (28 day duration).
Mixed slag: TRS accelerated expansion test (28 day duration).

Thomas Research Services Ltd.
Tel: +44 (0) 1469 532 929
www.slagtest.co.uk
Unit 7, Tattershall Castle Court, Morgan Way, New Holland,
North Lincolnshire, DN19 7PZ, United Kingdom
A Limited Company registered in England. Company Registration No: 2518421

Phase II - Slag Expansion Summary

Client: AEG
Site: Redcar Steelworks AEG Ref:4339
Date Received: 23/08/2021
Report Date: 03/12/2021

TRS Ref	Site Prefix	Site Ref	Mass/kg	Blast Furnace Slag	Basic Steel Slag	Basic Refractory	Al-Si Refractory	Silica Refractory	Coke	Ironstone	TRS Accelerated Expansion 7 day	14 day	21 day	28 day
BG1H01	MS	BH06-B30	13.6	-	-	-	L	-	-	-	-	-	-	-
BG1H02	MS	BH09-B5	9.6	l	l	-	-	-	-	-	0.61	0.96	1.21	1.46
BG1H03	MS	BH12-B6	11.3	l	l	-	-	-	-	-	0.72	1.09	1.42	1.51
BG1H04	MS	TP01-LB11	11.9	L	-	-	-	-	-	-	0.13	0.16	-	-
BG1H05	MS	TP01-LB20	15.2	L	-	-	-	-	-	-	0.03	0.04	-	-
BG1H06	MS	TP03-LB11	17.4	L	-	-	-	-	-	-	0.06	0.09	-	-
BG1H07	MS	TP04-LB19	10.6	L	-	-	-	-	-	-	0.00	0.02	-	-
BG1H08	MS	TP05-LB7	13.1	m	l	-	-	-	-	-	1.13	1.72	2.04	2.15
BG1H09	MS	TP05-LB20	9.4	l	l	-	-	-	-	-	0.81	1.29	1.50	1.61
BG1H10	MS	TP07-LB11	13.2	m	l	-	-	-	-	-	0.70	1.02	1.25	1.39
BG1H11	MS	TP07-LB20	15.5	m	l	-	s	-	-	-	0.79	1.00	1.10	1.15
BG1H12	MS	TP09-LB7	13.8	L	-	-	-	-	-	-	0.10	0.13	-	-
BG1H13	MS	TP09-LB20	11.0	l	m	-	-	-	-	-	0.46	0.58	0.65	0.67
BG1H14	LF	TP01-LB18	11.4	L	-	-	-	-	-	-	0.09	0.11	-	-
BG1H15	LF	TP02-LB13	13.8	l	m	-	-	-	-	-	0.40	0.61	0.68	0.70
BG1H16	LF	TP03-LB7	18.0	L	-	-	-	-	-	-	0.03	0.05	-	-
BG1H17	LF	TP03-LB20	15.9	L	-	-	-	-	-	-	0.01	0.03	-	-

L =very large, l = large, m = medium, s = small, v s= very small amounts.

APPENDIX I

Specialist Chemical Testing

(Tested Externally)

Certificate of Analysis

Certificate Number	21-16962	*Issued:*	01-Sep-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-16962
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	2 Water samples.
Date Received	12-Aug-21
Date Started	12-Aug-21
Date Completed	01-Sep-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-16962
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1888857	1888858
			.Sample ID	MS\BH17	MS\BH14
			Depth	5.41-20.00	3.50-8.00
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	10/08/2021	10/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	5.2	24
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12	17
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.08
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	0.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	22	16
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.10	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.19	0.41
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.2	5.2
Selenium, Dissolved	DETSC 2306	0.25	ug/l	4.7	3.2
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	59	63
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3
Inorganics					
pH	DETSC 2008		pH	11.2	10.9
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	110	170
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	1020	593
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.35	0.96
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.28	0.79
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.98	0.28
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	890	540
Sulphur as S, Total	DETSC 2320*	10	mg/l	300	180
Total Organic Carbon	DETSC 2085	1	mg/l	16	7.6

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-16962
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1888857	1888858
			.Sample ID	MS\BH17	MS\BH14
			Depth	5.41-20.00	3.50-8.00
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	10/08/2021	10/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	< 10	53
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-16962
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1888857	1888858
			.Sample ID	MS\BH17	MS\BH14
			Depth	5.41-20.00	3.50-8.00
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	10/08/2021	10/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	0.06	0.65
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	0.02
Acenaphthene	DETSC 3304	0.01	ug/l	0.12	2.3
Fluorene	DETSC 3304	0.01	ug/l	0.04	0.52
Phenanthrene	DETSC 3304	0.01	ug/l	0.08	2.6
Anthracene	DETSC 3304	0.01	ug/l	0.02	0.19
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.24
Pyrene	DETSC 3304	0.01	ug/l	0.03	0.14
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	0.02
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	0.02
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	0.01
PAH Total	DETSC 3304	0.2	ug/l	0.42	6.8
Phenols					
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-16962
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1888857	MS\BH17 5.41-20.00 WATER	10/08/21	GB 1L x5, GV x3, PB 1L, PU	pH/Cond/TDS (1 days)	
1888858	MS\BH14 3.50-8.00 WATER	10/08/21	GB 1L x5, GV x3, PB 1L, PU	pH/Cond/TDS (1 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-16494	*Issued:*	13-Aug-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-16494
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	8 Soil samples.
Date Received	13-Jul-21
Date Started	05-Aug-21
Date Completed	13-Aug-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approv [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-16494
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
LF\BH02	56	18.4	1886083	13/08/2021	Brown sandy CLAY
MS\BH09	44	13	1886084	13/08/2021	Brown gravelly SAND
MS\BH17	25	6	1886085	13/08/2021	Brown gravelly, sandy CLAY
MS\BH17	28	7.2	1886086	13/08/2021	Brown gravelly SAND
MS\BH17	45	14.2	1886087	13/08/2021	Brown sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-16494
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1886080	1886081	1886082	1886083	1886084	1886085	1886086	1886087
			.Sample ID	MS\BH16	MS\BH17	MS\BH17	LF\BH02	MS\BH09	MS\BH17	MS\BH17	MS\BH17
			Depth	13.40	3.90	5.00	18.40	13.00	6.00	7.20	14.20
			Other ID	55	18	20	56	44	25	28	45
			Sample Type	ES	ES	ES	ES	ES	ES	ES	ES
			Sampling Date	07/07/2021	07/07/2021	07/07/2021	06/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**								
Metals											
Arsenic	DETSC 2301#	0.2	mg/kg	24	17	44	8.6	7.9	35	6.6	14
Beryllium	DETSC 2301#	0.2	mg/kg	1.1	1.7	1.9	0.8	< 0.2	0.8	< 0.2	0.6
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	5.2	2.2	3.0	3.7	4.3	1.6	0.4	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	2.0	3.6	< 0.1	< 0.1	3.7	< 0.1	0.4
Chromium III	DETSC 2301*	0.15	mg/kg	270	400	340	37	12	170	4.1	36
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	180	80	130	20	12	78	6.6	21
Iron	DETSC 2301	25	mg/kg	57000	54000	73000	38000	11000	38000	6200	26000
Lead	DETSC 2301#	0.3	mg/kg	490	300	720	27	26	400	9.6	57
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.20	0.28	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	50	19	33	27	5.7	30	3.0	21
Selenium	DETSC 2301#	0.5	mg/kg	0.7	5.6	4.7	0.5	< 0.5	1.9	< 0.5	0.7
Vanadium	DETSC 2301#	0.8	mg/kg	49	850	1000	61	30	260	15	55
Zinc	DETSC 2301#	1	mg/kg	720	790	710	75	42	1000	21	160

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-16494
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1886080	MS\BH16 13.40 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1886081	MS\BH17 3.90 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1886082	MS\BH17 5.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1886083	LF\BH02 18.40 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Mercury (28 days)	
1886084	MS\BH09 13.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Mercury (28 days)	
1886085	MS\BH17 6.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Mercury (28 days)	
1886086	MS\BH17 7.20 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Mercury (28 days)	
1886087	MS\BH17 14.20 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Mercury (28 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-15235	*Issued:*	30-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-15235
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	One Water sample.
Date Received	21-Jun-21
Date Started	20-Jul-21
Date Completed	30-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 21-15235
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1878929
.Sample ID	MS\TP06
Depth	3.10
Other ID	8
Sample Type	EW
Sampling Date	22/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	1.6
Inorganics				
Thiocyanate	DETSC 2130	20	ug/l	< 20

Key: n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-15235
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1878929	MS\TP06 3.10 WATER	22/06/21	PB 1L (1L)		

Key: P-Plastic B-Bottle

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-14650	*Issued:*	19-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-14650
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	8 Soil samples.
Date Received	13-Jul-21
Date Started	13-Jul-21
Date Completed	19-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH16	55	13.4	1875196	19/07/2021	Brown sandy CLAY
MS\BH07	70	22.4	1875197	19/07/2021	Brown sandy CLAY
MS\BH17	64	18.70-18.90	1875198	19/07/2021	Brown sandy CLAY
MS\BH09	51	14	1875199	19/07/2021	Brown sandy CLAY
MS\BH17	6	1.00-1.20	1875200	19/07/2021	Brown sandy CLAY
MS\BH17	15	3	1875201	19/07/2021	Brown gravelly, sandy CLAY
MS\BH17	18	3.9	1875202	19/07/2021	Brown gravelly, sandy CLAY
MS\BH17	20	5	1875203	19/07/2021	Brown gravelly, sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1875196	1875197	1875198	1875199
			.Sample ID	MS\BH16	MS\BH07	MS\BH17	MS\BH09
			Depth	13.40	22.40	18.70-18.90	14.00
			Other ID	55	70	64	51
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	06/07/2021	08/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1875196	1875197	1875198	1875199
			.Sample ID	MS\BH16	MS\BH07	MS\BH17	MS\BH09
			Depth	13.40	22.40	18.70-18.90	14.00
			Other ID	55	70	64	51
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	06/07/2021	08/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1875196	1875197	1875198	1875199
			.Sample ID	MS\BH16	MS\BH07	MS\BH17	MS\BH09
			Depth	13.40	22.40	18.70-18.90	14.00
			Other ID	55	70	64	51
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	06/07/2021	08/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
SVOCs							
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	0.2	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1875196	1875197	1875198	1875199
			.Sample ID	MS\BH16	MS\BH07	MS\BH17	MS\BH09
			Depth	13.40	22.40	18.70-18.90	14.00
			Other ID	55	70	64	51
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	06/07/2021	08/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Pyrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(123cd)pyrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(ah)anthracene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1875200	1875201	1875202	1875203
			.Sample ID	MS\BH17	MS\BH17	MS\BH17	MS\BH17
			Depth	1.00-1.20	3.00	3.90	5.00
			Other ID	6	15	18	20
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	07/07/2021	07/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1875200	1875201	1875202	1875203
			.Sample ID	MS\BH17	MS\BH17	MS\BH17	MS\BH17
			Depth	1.00-1.20	3.00	3.90	5.00
			Other ID	6	15	18	20
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	07/07/2021	07/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	0.19	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1875200	1875201	1875202	1875203
			.Sample ID	MS\BH17	MS\BH17	MS\BH17	MS\BH17
			Depth	1.00-1.20	3.00	3.90	5.00
			Other ID	6	15	18	20
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	07/07/2021	07/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
SVOCs							
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3433	0.1	mg/kg	< 0.1	0.1	1.6	0.3
Anthracene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.4	0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3433	0.1	mg/kg	0.1	0.1	1.8	0.5

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14650
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1875200	1875201	1875202	1875203
			.Sample ID	MS\BH17	MS\BH17	MS\BH17	MS\BH17
			Depth	1.00-1.20	3.00	3.90	5.00
			Other ID	6	15	18	20
			Sample Type	ES	ES	ES	ES
			Sampling Date	07/07/2021	07/07/2021	07/07/2021	07/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Pyrene	DETSC 3433	0.1	mg/kg	0.1	< 0.1	1.8	0.4
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3433	0.1	mg/kg	0.1	< 0.1	0.9	0.3
Chrysene	DETSC 3433	0.1	mg/kg	0.1	< 0.1	0.9	0.3
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.7	0.2
Benzo(k)fluoranthene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.5	0.2
Benzo(a)pyrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.7	0.3
Indeno(123cd)pyrene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.3	0.1
Dibenzo(ah)anthracene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.3	0.2
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-14650
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1875196	MS\BH16 13.40 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875197	MS\BH07 22.40 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875198	MS\BH17 18.70-18.90 SOIL	08/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875199	MS\BH09 14.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875200	MS\BH17 1.00-1.20 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875201	MS\BH17 3.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875202	MS\BH17 3.90 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1875203	MS\BH17 5.00 SOIL	07/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-14353	*Issued:*	27-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 21-14353

Client Reference 4339

Order No (not supplied)

Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Description 4 Soil samples, 1 Leachate sample.

Date Received 08-Jul-21

Date Started 08-Jul-21

Date Completed 27-Jul-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1872963	1872964	1872965	1872966
			.Sample ID	MS\BH09	MS\BH09	MS\BH09	MS\BH15
			Depth	0.50	2.00-2.30	4.65-4.85	12.45-13.00
			Other ID	3	8	17	45
			Sample Type	ES	ES	ES	ES
			Sampling Date	06/07/2021	06/07/2021	06/07/2021	06/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%	< 0.001	< 0.001		
Preparation							
Moisture Content	DETSC 1004	0.1	%	13	10	20	16
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	34	25	8.9	12
Beryllium	DETSC 2301#	0.2	mg/kg	2.3	3.4	< 0.2	0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.4	1.6	0.4	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	2.2	0.2	0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	130	30	5.7	6.8
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	120	46	7.4	5.5
Lead	DETSC 2301#	0.3	mg/kg	130	25	34	6.2
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	41	13	4.1	6.1
Selenium	DETSC 2301#	0.5	mg/kg	1.5	6.3	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	520	170	24	19
Zinc	DETSC 2301#	1	mg/kg	520	63	44	22
Inorganics							
pH	DETSC 2008#		pH	10.0	8.1	8.8	8.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.4	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.0	1.3	0.2	0.8
Nitrate as NO3	DETSC 2055	1	mg/kg	3.6	3.8	1.3	1.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	110	320	37	280
Sulphide	DETSC 2024*	10	mg/kg	340	800	40	120
Sulphur (free)	DETSC 3049#	0.75	mg/kg	1.8	5.4	< 0.75	1.7
Sulphur as S, Total	DETSC 2320	0.01	%	0.13	0.46	0.03	0.12
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.26	0.80	0.05	0.08
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9			

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1872963	1872964	1872965	1872966
			.Sample ID	MS\BH09	MS\BH09	MS\BH09	MS\BH15
			Depth	0.50	2.00-2.30	4.65-4.85	12.45-13.00
			Other ID	3	8	17	45
			Sample Type	ES	ES	ES	ES
			Sampling Date	06/07/2021	06/07/2021	06/07/2021	06/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4			
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10			
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10			
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01			
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01			
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01			
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01			
MTBE	DETSC 3321	0.01	mg/kg	< 0.01			
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.26	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.04	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.11	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.18	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.3	< 0.10	< 0.10	< 0.10
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1872967
.Sample ID	MS\BH09
Depth	0.50
Other ID	3
Sample Type	ES
Sampling Date	06/07/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.9
Boron, Dissolved	DETSC 2306*	12	ug/l	18
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.8
Iron, Dissolved	DETSC 2306	5.5	ug/l	81
Lead, Dissolved	DETSC 2306	0.09	ug/l	2.3
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.31
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.6
Inorganics				
pH	DETSC 2008		pH	7.4
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	32.1
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.095
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.078
Nitrate as NO3	DETSC 2055	0.1	mg/l	< 0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.11
Sulphate as SO4	DETSC 2055	0.1	mg/l	7.5
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	0.03
anthracene	$*	0.02	ug/l	0.04
benzo(a)anthracene	$*	0.02	ug/l	0.28
benzo(a)pyrene	$*	0.02	ug/l	0.49
benzo(b)fluoranthene	$*	0.02	ug/l	0.66
benzo(g,h,i)perylene	$*	0.02	ug/l	0.51
benzo(k)fluoranthene	$*	0.02	ug/l	0.25
chrysene	$*	0.02	ug/l	0.21
dibenzo(a,h)anthracene	$*	0.02	ug/l	0.16
fluoranthene	$*	0.02	ug/l	0.32
fluorene	$*	0.02	ug/l	0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	0.39
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	0.03

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1872967
.Sample ID	MS\BH09
Depth	0.50
Other ID	3
Sample Type	ES
Sampling Date	06/07/2021
Sampling Time	n/s

Test	Method	LOD	Units	
pyrene	$*	0.02	ug/l	0.41

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1872963	MS\BH09 3 0.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
1872964	MS\BH09 8 2.00-2.30	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 21-14353
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

		Lab No	1872963	1872964
		.Sample ID	MS\BH09	MS\BH09
		Depth	0.50	2.00-2.30
		Other ID	3	8
		Sample Type	ES	ES
		Sampling Date	06/07/2021	06/07/2021
		Sampling Time		
Test	**Method**	**Units**		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	1154.89	1019.31
ACMs present*		type		
Mass of ACM in sample		g		
% ACM by mass		%		
% asbestos in ACM		%		
% asbestos in sample		%		
Breakdown of Detailed Gravimetric Analysis (b)				
% Amphibole bundles in sample		Mass %	na	na
% Chrysotile bundles in sample		Mass %	<0.001	<0.001
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-14353
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1872963	MS\BH09 0.50 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1872964	MS\BH09 2.00-2.30 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1872965	MS\BH09 4.65-4.85 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1872966	MS\BH15 12.45-13.00 SOIL	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1872967	MS\BH09 0.50 LEACHATE	06/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-14030	*Issued:*	02-Aug-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-14030
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	11 Soil samples, 2 Leachate samples.
Date Received	21-Jun-21
Date Started	05-Jul-21
Date Completed	02-Aug-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH15	4	1	1870852	02/08/2021	Brown gravelly, very sandy CLAY
MS\BH15	13	2.70-2.90	1870853	02/08/2021	Brown gravelly, sandy CLAY
MS\BH15	18	4.40-4.60	1870854	02/08/2021	Brown gravelly, sandy CLAY
MS\BH07	48	15.70-15.90	1870855	02/08/2021	Brown sandy CLAY
MS\BH16	5	0.5	1870856	02/08/2021	Brown gravelly, very sandy CLAY
MS\BH16	17	3.30-3.50	1870857	02/08/2021	Brown gravelly, sandy CLAY
MS\BH16	19	4.20-4.40	1870858	02/08/2021	Brown gravelly, very sandy CLAY
MS\BH16	23	5.00-5.20	1870859	02/08/2021	Brown gravelly, sandy CLAY
MS\BH16	28	5.70-5.90	1870860	02/08/2021	Brown sandy CLAY
MS\BH14	51A	14.2	1870861	02/08/2021	Brown sandy CLAY
MS\BH14	62	17.50-17.70	1870862	02/08/2021	Grey sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870853	1870854	1870855
			.Sample ID	MS\BH15	MS\BH15	MS\BH15	MS\BH07
			Depth	1.00	2.70-2.90	4.40-4.60	15.70-15.90
			Other ID	4	13	18	48
			Sample Type	ES	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021	01/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004	0.1	%	3.9	18	9.0	19
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	15	9.3	7.3	9.5
Beryllium	DETSC 2301#	0.2	mg/kg	7.1	0.4	5.5	1.1
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	9.0	1.0	5.8	5.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	38	800	12	42
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	7.3	57	8.2	21
Lead	DETSC 2301#	0.3	mg/kg	7.8	37	9.1	15
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	18	25	5.6	50
Selenium	DETSC 2301#	0.5	mg/kg	2.1	6.9	1.6	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	130	2200	41	46
Zinc	DETSC 2301#	1	mg/kg	150	120	26	48
Inorganics							
pH	DETSC 2008#		pH	10.6	11.6	10.9	8.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.4	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.9	1.1	1.0	1.8
Nitrate as NO3	DETSC 2055	1	mg/kg	1.9	16	5.6	13
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	2900	310	580	490
Sulphide	DETSC 2024*	10	mg/kg	560	150	560	36
Sulphur (free)	DETSC 3049#	0.75	mg/kg	690	< 0.75	32	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.90	0.47	0.38	0.09
Sulphate as SO4, Total	DETSC 2321#	0.01	%	2.6	1.2	0.21	0.13

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870853	1870854	1870855
			.Sample ID	MS\BH15	MS\BH15	MS\BH15	MS\BH07
			Depth	1.00	2.70-2.90	4.40-4.60	15.70-15.90
			Other ID	4	13	18	48
			Sample Type	ES	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021	01/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5		< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2		< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5		< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4		< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9		< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5		< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6		< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4		< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01		< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870853	1870854	1870855
			.Sample ID	MS\BH15	MS\BH15	MS\BH15	MS\BH07
			Depth	1.00	2.70-2.90	4.40-4.60	15.70-15.90
			Other ID	4	13	18	48
			Sample Type	ES	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021	01/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.36	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	1.5	0.04	0.10	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.12	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.3	0.04	0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.92	0.06	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.59	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.65	0.05	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.55	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.20	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.32	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.19	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.18	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	7.0	0.22	0.16	< 0.10

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870853	1870854	1870855
			.Sample ID	MS\BH15	MS\BH15	MS\BH15	MS\BH07
			Depth	1.00	2.70-2.90	4.40-4.60	15.70-15.90
			Other ID	4	13	18	48
			Sample Type	ES	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021	01/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01			
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01			
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01			
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01			
VOC TIC							
TAME	DETSC 3431*			None Detected	None Detected		None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870856	1870857	1870858
			.Sample ID	MS\BH16	MS\BH16	MS\BH16
			Depth	0.50	3.30-3.50	4.20-4.40
			Other ID	5	17	19
			Sample Type	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	8.0	18	22
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	6.1	11	6.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	1.3	1.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.9	2.6	4.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	0.3	0.2
Chromium III	DETSC 2301*	0.15	mg/kg	410	49	49
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	52	32	22
Lead	DETSC 2301#	0.3	mg/kg	43	49	30
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	24	26	28
Selenium	DETSC 2301#	0.5	mg/kg	6.8	0.6	0.8
Vanadium	DETSC 2301#	0.8	mg/kg	860	89	71
Zinc	DETSC 2301#	1	mg/kg	140	140	76
Inorganics						
pH	DETSC 2008#		pH	11.3	9.7	10.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.6	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.6	2.8	1.6
Nitrate as NO3	DETSC 2055	1	mg/kg	13	2.5	6.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	300	1300	850
Sulphide	DETSC 2024*	10	mg/kg	350	370	32
Sulphur (free)	DETSC 3049#	0.75	mg/kg	3.1	< 0.75	11
Sulphur as S, Total	DETSC 2320	0.01	%	0.17	0.41	0.41
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.51	0.38	0.70

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870856	1870857	1870858
			.Sample ID	MS\BH16	MS\BH16	MS\BH16
			Depth	0.50	3.30-3.50	4.20-4.40
			Other ID	5	17	19
			Sample Type	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	1.8	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	42	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	45	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	2.4	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	0.8	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	2.1	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	33	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	39	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	83	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	110	470	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870856	1870857	1870858
			.Sample ID	MS\BH16	MS\BH16	MS\BH16
			Depth	0.50	3.30-3.50	4.20-4.40
			Other ID	5	17	19
			Sample Type	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	0.07	0.11	1.8
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.14
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.34
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.58
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	0.09	3.8
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.35
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.28	0.12	1.1
Pyrene	DETSC 3303#	0.03	mg/kg	0.24	0.09	0.68
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.14	0.04	0.13
Chrysene	DETSC 3303	0.03	mg/kg	0.16	0.06	0.15
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.33	0.05	0.12
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	0.06
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.17	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.1	0.56	9.3

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870856	1870857	1870858
			.Sample ID	MS\BH16	MS\BH16	MS\BH16
			Depth	0.50	3.30-3.50	4.20-4.40
			Other ID	5	17	19
			Sample Type	ES	ES	ES
			Sampling Date	01/07/2021	02/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	0.10	< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg	0.07	< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg	0.01	< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg	0.18	< 0.01	
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

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Summary of Chemical Analysis
Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870859	1870860	1870861	1870862
			.Sample ID	MS\BH16	MS\BH16	MS\BH14	MS\BH14
			Depth	5.00-5.20	5.70-5.90	14.20	17.50-17.70
			Other ID	23	28	51A	62
			Sample Type	ES	ES	ES	ES
			Sampling Date	02/07/2021	02/07/2021	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004	0.1	%	23	18	16	10
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	10	6.3	7.0	9.2
Beryllium	DETSC 2301#	0.2	mg/kg	1.5	< 0.2	0.9	0.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.5	0.7	2.6	2.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	< 0.1	0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	41	5.3	29	29
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	30	3.5	20	32
Lead	DETSC 2301#	0.3	mg/kg	160	30	16	8.4
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	41	4.8	39	46
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	50	13	31	35
Zinc	DETSC 2301#	1	mg/kg	89	23	53	47
Inorganics							
pH	DETSC 2008#		pH	9.3	8.9	8.4	8.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.4	0.2	1.9	1.0
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	3.2	9.4	2.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	590	170	360	310
Sulphide	DETSC 2024*	10	mg/kg	220	64	24	40
Sulphur (free)	DETSC 3049#	0.75	mg/kg	3.9	5.0	< 0.75	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.50	0.06	0.04	0.77
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.25	0.08	0.09	0.11

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870859	1870860	1870861	1870862
			.Sample ID	MS\BH16	MS\BH16	MS\BH14	MS\BH14
			Depth	5.00-5.20	5.70-5.90	14.20	17.50-17.70
			Other ID	23	28	51A	62
			Sample Type	ES	ES	ES	ES
			Sampling Date	02/07/2021	02/07/2021	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		< 0.01	< 0.01

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870859	1870860	1870861	1870862
			.Sample ID	MS\BH16	MS\BH16	MS\BH14	MS\BH14
			Depth	5.00-5.20	5.70-5.90	14.20	17.50-17.70
			Other ID	23	28	51A	62
			Sample Type	ES	ES	ES	ES
			Sampling Date	02/07/2021	02/07/2021	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.33	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	0.03	0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.33	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1870859	1870860	1870861	1870862
			.Sample ID	MS\BH16	MS\BH16	MS\BH14	MS\BH14
			Depth	5.00-5.20	5.70-5.90	14.20	17.50-17.70
			Other ID	23	28	51A	62
			Sample Type	ES	ES	ES	ES
			Sampling Date	02/07/2021	02/07/2021	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01			< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01			< 0.01
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg				< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg				< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg				< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg				< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg				< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg				< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg				< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg				< 0.01
VOC TIC							
TAME	DETSC 3431*			None Detected		None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870857
			.Sample ID	MS\BH15	MS\BH16
			Depth	1.00	3.30-3.50
			Other ID	4	17
			Sample Type	ES	ES
			Sampling Date	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870857
			.Sample ID	MS\BH15	MS\BH16
			Depth	1.00	3.30-3.50
			Other ID	4	17
			Sample Type	ES	ES
			Sampling Date	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	0.2	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	0.3	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870852	1870857
			.Sample ID	MS\BH15	MS\BH16
			Depth	1.00	3.30-3.50
			Other ID	4	17
			Sample Type	ES	ES
			Sampling Date	01/07/2021	02/07/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	0.2	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870863	1870864
			.Sample ID	MS\BH15	MS\BH16
			Depth	1.00	0.50
			Other ID	4	5
			Sample Type	ES	ES
			Sampling Date	01/07/2021	01/07/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
BS EN 12457 10:1	DETSC 1009*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.1	1.5
Boron, Dissolved	DETSC 2306*	12	ug/l	13	38
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.3	3.2
Iron, Dissolved	DETSC 2306	5.5	ug/l	6.0	39
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.20
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02	0.05
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.58	3.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.2	2.3
Inorganics					
pH	DETSC 2008		pH	8.3	8.9
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0002	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	387	69.9
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	260	19
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0	< 1.0
Subcontracted Analysis					
acenaphthene	$*	0.02	ug/l	0.04	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02	< 0.02
anthracene	$*	0.02	ug/l	0.03	0.04
benzo(a)anthracene	$*	0.02	ug/l	0.10	0.17
benzo(a)pyrene	$*	0.02	ug/l	0.09	0.13
benzo(b)fluoranthene	$*	0.02	ug/l	0.12	0.19
benzo(g,h,i)perylene	$*	0.02	ug/l	0.05	0.09
benzo(k)fluoranthene	$*	0.02	ug/l	0.04	0.07
chrysene	$*	0.02	ug/l	0.07	0.12
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02	0.03
fluoranthene	$*	0.02	ug/l	0.23	0.32
fluorene	$*	0.02	ug/l	0.03	0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	0.05	0.07

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870863	1870864
			.Sample ID	MS\BH15	MS\BH16
			Depth	1.00	0.50
			Other ID	4	5
			Sample Type	ES	ES
			Sampling Date	01/07/2021	01/07/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
naphthalene	$*	0.02	ug/l	0.05	< 0.02
phenanthrene	$*	0.02	ug/l	0.14	0.10
pyrene	$*	0.02	ug/l	0.17	0.25

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-14030
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1870852	MS\BH15 4 1.00	SOIL	NAD	none	Lee Kerridge
1870856	MS\BH16 5 0.50	SOIL	NAD	none	Lee Kerridge
1870857	MS\BH16 17 3.30-3.50	SOIL	NAD	none	Lee Kerridge
1870859	MS\BH16 23 5.00-5.20	SOIL	NAD	none	Lee Kerridge

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-14030
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1870852	MS\BH15 1.00 SOIL	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870853	MS\BH15 2.70-2.90 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870854	MS\BH15 4.40-4.60 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870855	MS\BH07 15.70-15.90 SOIL	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870856	MS\BH16 0.50 SOIL	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870857	MS\BH16 3.30-3.50 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870858	MS\BH16 4.20-4.40 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870859	MS\BH16 5.00-5.20 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870860	MS\BH16 5.70-5.90 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870861	MS\BH14 14.20 SOIL	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870862	MS\BH14 17.50-17.70 SOIL	02/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870863	MS\BH15 1.00 LEACHATE	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870864	MS\BH16 0.50 LEACHATE	01/07/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-14025	*Issued:*	26-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-14025
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	5 Soil samples, 1 Leachate sample.
Date Received	21-Jun-21
Date Started	05-Jul-21
Date Completed	26-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH07	1	0.35	1870836	26/07/2021	Brown gravelly, sandy CLAY
MS\BH07	3	1.00-2.00	1870837	26/07/2021	Grey very gravelly SAND
MS\BH07	5	2.70-4.20	1870838	26/07/2021	Grey very gravelly SAND
MS\BH07	7	4.20-4.65	1870839	26/07/2021	Grey very gravelly SAND
MS\BH07	8	4.65-5.00	1870840	26/07/2021	Brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870836	1870837	1870838
			.Sample ID	MS\BH07	MS\BH07	MS\BH07
			Depth	0.35	1.00-2.00	2.70-4.20
			Other ID	1	3	5
			Sample Type	ES	ES	ES
			Sampling Date	30/06/2021	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	8.0	2.2	2.4
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	3.1	3.9	3.7
Beryllium	DETSC 2301#	0.2	mg/kg	3.7	6.6	6.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.8	6.5	5.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	18	6.8	4.6
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	15	4.0	4.8
Lead	DETSC 2301#	0.3	mg/kg	8.0	2.2	0.9
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	2.0	< 1.0	< 1.0
Selenium	DETSC 2301#	0.5	mg/kg	1.4	1.6	1.6
Vanadium	DETSC 2301#	0.8	mg/kg	48	34	36
Zinc	DETSC 2301#	1	mg/kg	32	7.5	4.6
Inorganics						
pH	DETSC 2008#		pH	9.2	11.1	10.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	0.7	0.8	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.8	0.5	0.6
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	510	780	1300
Sulphide	DETSC 2024*	10	mg/kg	2800	1500	2000
Sulphur (free)	DETSC 3049#	0.75	mg/kg	31	140	95
Sulphur as S, Total	DETSC 2320	0.01	%	0.22	0.46	0.55
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.33	1.1	0.68

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870836	1870837	1870838
			.Sample ID	MS\BH07	MS\BH07	MS\BH07
			Depth	0.35	1.00-2.00	2.70-4.20
			Other ID	1	3	5
			Sample Type	ES	ES	ES
			Sampling Date	30/06/2021	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg			
Aromatic C5-C35	DETSC 3072*	10	mg/kg			
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg			
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	40
Benzene	DETSC 3321#	0.01	mg/kg			
Ethylbenzene	DETSC 3321#	0.01	mg/kg			
Toluene	DETSC 3321#	0.01	mg/kg			
Xylene	DETSC 3321#	0.01	mg/kg			
MTBE	DETSC 3321	0.01	mg/kg			

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870836	1870837	1870838
			.Sample ID	MS\BH07	MS\BH07	MS\BH07
			Depth	0.35	1.00-2.00	2.70-4.20
			Other ID	1	3	5
			Sample Type	ES	ES	ES
			Sampling Date	30/06/2021	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.03	0.37	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.04	0.12	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.36	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.27	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.03	0.11	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.04	0.17	0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.12	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.30	1.8	< 0.10
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			
PCB 52	DETSC 3401#	0.01	mg/kg			
PCB 101	DETSC 3401#	0.01	mg/kg			
PCB 118	DETSC 3401#	0.01	mg/kg			
PCB 153	DETSC 3401#	0.01	mg/kg			
PCB 138	DETSC 3401#	0.01	mg/kg			
PCB 180	DETSC 3401#	0.01	mg/kg			
PCB 77	DETSC 3401*	0.01	mg/kg			
PCB 81	DETSC 3401*	0.01	mg/kg			
PCB 105	DETSC 3401*	0.01	mg/kg			
PCB 114	DETSC 3401*	0.01	mg/kg			
PCB 118	DETSC 3401*	0.01	mg/kg			
PCB 123	DETSC 3401*	0.01	mg/kg			
PCB 126	DETSC 3401*	0.01	mg/kg			
PCB 156	DETSC 3401*	0.01	mg/kg			
PCB 157	DETSC 3401*	0.01	mg/kg			
PCB 167	DETSC 3401*	0.01	mg/kg			
PCB 169	DETSC 3401*	0.01	mg/kg			
PCB 189	DETSC 3401*	0.01	mg/kg			
PCB 7 Total	DETSC 3401#	0.01	mg/kg			

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870836	1870837	1870838
			.Sample ID	MS\BH07	MS\BH07	MS\BH07
			Depth	0.35	1.00-2.00	2.70-4.20
			Other ID	1	3	5
			Sample Type	ES	ES	ES
			Sampling Date	30/06/2021	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
p-cresol	DETSC 3451*	0.01	mg/kg			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg			
VOC TIC						
TAME	DETSC 3431*					

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1870839	1870840
.Sample ID	MS\BH07	MS\BH07
Depth	4.20-4.65	4.65-5.00
Other ID	7	8
Sample Type	ES	ES
Sampling Date	30/06/2021	30/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Preparation					
Moisture Content	DETSC 1004	0.1	%	6.4	18
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	3.3	4.1
Beryllium	DETSC 2301#	0.2	mg/kg	6.4	1.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	6.4	3.4
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	8.2	3.4
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	5.2	5.1
Lead	DETSC 2301#	0.3	mg/kg	1.9	17
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	< 1.0	2.2
Selenium	DETSC 2301#	0.5	mg/kg	1.6	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	39	16
Zinc	DETSC 2301#	1	mg/kg	8.8	20
Inorganics					
pH	DETSC 2008#		pH	11.1	10.8
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.0	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.4	0.4
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	970	810
Sulphide	DETSC 2024*	10	mg/kg	1900	640
Sulphur (free)	DETSC 3049#	0.75	mg/kg	95	89
Sulphur as S, Total	DETSC 2320	0.01	%	0.47	0.20
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.84	0.28

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1870839	1870840
.Sample ID	MS\BH07	MS\BH07
Depth	4.20-4.65	4.65-5.00
Other ID	7	8
Sample Type	ES	ES
Sampling Date	30/06/2021	30/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	12	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	170	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	540	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	1300	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	2000	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	4.1	2.7
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	150	2.3
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	850	12
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	2500	59
Aromatic C5-C35	DETSC 3072*	10	mg/kg	3500	76
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	5500	76
EPH (C10-C40)	DETSC 3311#	10	mg/kg	7400	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1870839	1870840
			.Sample ID	MS\BH07	MS\BH07
			Depth	4.20-4.65	4.65-5.00
			Other ID	7	8
			Sample Type	ES	ES
			Sampling Date	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.06	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.58	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.22	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.15	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.5	< 0.10
PCBs					
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1870839	1870840
			.Sample ID	MS\BH07	MS\BH07
			Depth	4.20-4.65	4.65-5.00
			Other ID	7	8
			Sample Type	ES	ES
			Sampling Date	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
VOC TIC					
TAME	DETSC 3431*			None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870839	1870840
			.Sample ID	MS\BH07	MS\BH07
			Depth	4.20-4.65	4.65-5.00
			Other ID	7	8
			Sample Type	ES	ES
			Sampling Date	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870839	1870840
			.Sample ID	MS\BH07	MS\BH07
			Depth	4.20-4.65	4.65-5.00
			Other ID	7	8
			Sample Type	ES	ES
			Sampling Date	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870839	1870840
			.Sample ID	MS\BH07	MS\BH07
			Depth	4.20-4.65	4.65-5.00
			Other ID	7	8
			Sample Type	ES	ES
			Sampling Date	30/06/2021	30/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1870841
.Sample ID	MS\BH07
Depth	4.20-4.65
Other ID	7
Sample Type	ES
Sampling Date	30/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.53
Boron, Dissolved	DETSC 2306*	12	ug/l	25
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	6.5
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0
Iron, Dissolved	DETSC 2306	5.5	ug/l	140
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.64
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.6
Zinc, Dissolved	DETSC 2306	1.3	ug/l	1.4
Inorganics				
pH	DETSC 2008		pH	7.9
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0003
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	32.7
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	< 0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.61
Sulphate as SO4	DETSC 2055	0.1	mg/l	16
Total Organic Carbon	DETSC 2085	1	mg/l	7.9
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	0.03
fluorene	$*	0.02	ug/l	0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1870841
.Sample ID	MS\BH07
Depth	4.20-4.65
Other ID	7
Sample Type	ES
Sampling Date	30/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	< 0.02
pyrene	$*	0.02	ug/l	0.05

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-14025
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1870839	MS\BH07 7 4.20-4.65	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-14025
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1870836	MS\BH07 0.35 SOIL	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870837	MS\BH07 1.00-2.00 SOIL	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870838	MS\BH07 2.70-4.20 SOIL	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870839	MS\BH07 4.20-4.65 SOIL	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870840	MS\BH07 4.65-5.00 SOIL	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870841	MS\BH07 4.20-4.65 LEACHATE	30/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13926	*Issued:*	08-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13926
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	3 Soil samples.
Date Received	21-Jun-21
Date Started	02-Jul-21
Date Completed	08-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
LF\BH01	81	28.65-28.95	1870194	08/07/2021	Brown very gravelly, sandy CLAY
MS\BH14	16	4.20-4.40	1870195	08/07/2021	Brown gravelly, sandy CLAY
MS\BH14	18	4.50-4.80	1870196	08/07/2021	Brown gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870194	1870195	1870196
			.Sample ID	LF\BH01	MS\BH14	MS\BH14
			Depth	28.65-28.95	4.20-4.40	4.50-4.80
			Other ID	81	16	18
			Sample Type	ES	ES	ES
			Sampling Date	29/06/2021	29/06/2021	29/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%		0.001	
Preparation						
Moisture Content	DETSC 1004	0.1	%	14	24	18
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	54	36	9.7
Beryllium	DETSC 2301#	0.2	mg/kg	1.8	0.8	< 0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.9	2.4	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	4.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	72	290	7.1
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	12	210	6.9
Lead	DETSC 2301#	0.3	mg/kg	15	570	46
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	8.4	0.09
Nickel	DETSC 2301#	1	mg/kg	32	78	5.9
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	320	410	22
Zinc	DETSC 2301#	1	mg/kg	83	580	42
Inorganics						
pH	DETSC 2008#		pH	8.1	10.6	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	1.5	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.9	2.4	0.6
Nitrate as NO3	DETSC 2055	1	mg/kg	17	8.6	6.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	200	420	46
Sulphide	DETSC 2024*	10	mg/kg	120	240	52
Sulphur (free)	DETSC 3049#	0.75	mg/kg	18	13	2.1
Sulphur as S, Total	DETSC 2320	0.01	%	0.41	0.26	0.07
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.27	0.46	0.07
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		0.04	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		0.28	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870194	1870195	1870196
			.Sample ID	LF\BH01	MS\BH14	MS\BH14
			Depth	28.65-28.95	4.20-4.40	4.50-4.80
			Other ID	81	16	18
			Sample Type	ES	ES	ES
			Sampling Date	29/06/2021	29/06/2021	29/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.05	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.44	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.08	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.73	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.55	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.21	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.29	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.22	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.09	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	3.1	< 0.10
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1870194	1870195	1870196
			.Sample ID	LF\BH01	MS\BH14	MS\BH14
			Depth	28.65-28.95	4.20-4.40	4.50-4.80
			Other ID	81	16	18
			Sample Type	ES	ES	ES
			Sampling Date	29/06/2021	29/06/2021	29/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PCB 123	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg		< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg		< 0.01	< 0.01
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
VOC TIC's						
TAME	DETSC 3431*				None Detected	

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Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1870195
.Sample ID	MS\BH14
Depth	4.20-4.40
Other ID	16
Sample Type	ES
Sampling Date	29/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1870195
.Sample ID	MS\BH14
Depth	4.20-4.40
Other ID	16
Sample Type	ES
Sampling Date	29/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1870195
.Sample ID	MS\BH14
Depth	4.20-4.40
Other ID	16
Sample Type	ES
Sampling Date	29/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1
VOC TICs				
Decane (TIC)	DETSC 3431*		mg/kg	0.6845

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1870195	MS\BH14 16 4.20-4.40	SOIL	Chrysotile	Chrysotile present in Microscopic Cement debris	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 21-13926
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1870195
.Sample ID	MS\BH14
Depth	4.20-4.40
Other ID	16
Sample Type	ES
Sampling Date	29/06/2021
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	0.001
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	510.54
ACMs present*		type	Cement
Mass of ACM in sample		g	0.04
% ACM by mass		%	0.01
% asbestos in ACM		%	15.00
% asbestos in sample		%	0.001
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-13926
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1870194	LF\BH01 28.65-28.95 SOIL	29/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870195	MS\BH14 4.20-4.40 SOIL	29/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1870196	MS\BH14 4.50-4.80 SOIL	29/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13733	*Issued:*	23-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13733
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	8 Soil samples, 3 Leachate samples, 1 Water sample.
Date Received	21-Jun-21
Date Started	30-Jun-21
Date Completed	23-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH14	1	0.3	1869125	20/07/2021	Grey gravelly SAND
MS\BH14	3	1	1869126	20/07/2021	Grey gravelly SAND
MS\BH13	34	10.20-10.40	1869127	20/07/2021	Brown SAND
MS\BH02	13	2.25-2.70	1869128	20/07/2021	Brown SAND
MS\BH02	39	10.20-10.40	1869129	20/07/2021	Brown SAND
MS\BH02	43	11.20-11.40	1869130	20/07/2021	Brown sandy CLAY
MS\BH03	82	23.4	1869131	20/07/2021	Brown sandy CLAY
MS\BH13	35	11.00-11.20	1869132	20/07/2021	Brown sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869125	1869126	1869127
			.Sample ID	MS\BH14	MS\BH14	MS\BH13
			Depth	0.30	1.00	10.20-10.40
			Other ID	1	3	34
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	6.0	11	18
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	5.7	10	5.5
Beryllium	DETSC 2301#	0.2	mg/kg	2.8	6.8	0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.2	2.9	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.3	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	410	17	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	16	10	5.8
Lead	DETSC 2301#	0.3	mg/kg	6.6	22	4.3
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	5.0	6.0	4.9
Selenium	DETSC 2301#	0.5	mg/kg	4.7	1.9	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	1000	57	30
Zinc	DETSC 2301#	1	mg/kg	15	200	17
Inorganics						
pH	DETSC 2008#		pH	11.7	11.0	10.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	0.7	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.8	1.0	0.8
Nitrate as NO3	DETSC 2055	1	mg/kg	14	6.5	3.1
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	280	430	140
Sulphide	DETSC 2024*	10	mg/kg	3800	960	72
Sulphur (free)	DETSC 3049#	0.75	mg/kg	25	38	11
Sulphur as S, Total	DETSC 2320	0.01	%	0.42	0.68	0.06
Sulphate as SO4, Total	DETSC 2321#	0.01	%	1.2	1.9	0.11

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869125	1869126	1869127
			.Sample ID	MS\BH14	MS\BH14	MS\BH13
			Depth	0.30	1.00	10.20-10.40
			Other ID	1	3	34
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg			
Aromatic C5-C35	DETSC 3072*	10	mg/kg			
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg			
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg			
Ethylbenzene	DETSC 3321#	0.01	mg/kg			
Toluene	DETSC 3321#	0.01	mg/kg			
Xylene	DETSC 3321#	0.01	mg/kg			
MTBE	DETSC 3321	0.01	mg/kg			

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869125	1869126	1869127
			.Sample ID	MS\BH14	MS\BH14	MS\BH13
			Depth	0.30	1.00	10.20-10.40
			Other ID	1	3	34
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869125	1869126	1869127
			.Sample ID	MS\BH14	MS\BH14	MS\BH13
			Depth	0.30	1.00	10.20-10.40
			Other ID	1	3	34
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			
PCB 52	DETSC 3401#	0.01	mg/kg			
PCB 101	DETSC 3401#	0.01	mg/kg			
PCB 118	DETSC 3401#	0.01	mg/kg			
PCB 153	DETSC 3401#	0.01	mg/kg			
PCB 138	DETSC 3401#	0.01	mg/kg			
PCB 180	DETSC 3401#	0.01	mg/kg			
PCB 77	DETSC 3401*	0.01	mg/kg			
PCB 81	DETSC 3401*	0.01	mg/kg			
PCB 105	DETSC 3401*	0.01	mg/kg			
PCB 114	DETSC 3401*	0.01	mg/kg			
PCB 118	DETSC 3401*	0.01	mg/kg			
PCB 123	DETSC 3401*	0.01	mg/kg			
PCB 126	DETSC 3401*	0.01	mg/kg			
PCB 156	DETSC 3401*	0.01	mg/kg			
PCB 157	DETSC 3401*	0.01	mg/kg			
PCB 167	DETSC 3401*	0.01	mg/kg			
PCB 169	DETSC 3401*	0.01	mg/kg			
PCB 189	DETSC 3401*	0.01	mg/kg			
PCB 7 Total	DETSC 3401#	0.01	mg/kg			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
p-cresol	DETSC 3451*	0.01	mg/kg			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg			
VOC TIC						
TAME	DETSC 3431*					

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1869128	1869129	1869130
			.Sample ID	MS\BH02	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40	11.20-11.40
			Other ID	13	39	43
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	20	21	22
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	9.0	11	12
Beryllium	DETSC 2301#	0.2	mg/kg	< 0.2	< 0.2	0.6
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.8	1.8	6.7
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.1
Chromium III	DETSC 2301*	0.15	mg/kg	3.8	4.9	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	4.6	5.4	15
Lead	DETSC 2301#	0.3	mg/kg	18	4.3	12
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.1	4.5	21
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	12	17	39
Zinc	DETSC 2301#	1	mg/kg	27	17	49
Inorganics						
pH	DETSC 2008#		pH	9.0	9.0	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	1.9	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.8	0.4	3.4
Nitrate as NO3	DETSC 2055	1	mg/kg	2.1	2.1	16
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	250	280	850
Sulphide	DETSC 2024*	10	mg/kg	150	32	92
Sulphur (free)	DETSC 3049#	0.75	mg/kg	60	5.9	2.2
Sulphur as S, Total	DETSC 2320	0.01	%	0.16	0.04	0.80
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.14	0.08	0.30

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1869128	1869129	1869130
			.Sample ID	MS\BH02	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40	11.20-11.40
			Other ID	13	39	43
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	530	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	520	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	340	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	980	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	2400	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	1.7
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	15
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	17
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	2400	< 10	17
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	34
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1869128	1869129	1869130
			.Sample ID	MS\BH02	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40	11.20-11.40
			Other ID	13	39	43
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1869128	1869129	1869130
			.Sample ID	MS\BH02	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40	11.20-11.40
			Other ID	13	39	43
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg		< 0.01	
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	< 0.01
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1869131	1869132
.Sample ID	MS\BH03	MS\BH13
Depth	23.40	11.00-11.20
Other ID	82	35
Sample Type	ES	ES
Sampling Date	28/06/2021	28/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Preparation					
Moisture Content	DETSC 1004	0.1	%	11	20
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	27	7.6
Beryllium	DETSC 2301#	0.2	mg/kg	1.3	1.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.4	9.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	43	41
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	19	27
Lead	DETSC 2301#	0.3	mg/kg	13	16
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	31	49
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	160	49
Zinc	DETSC 2301#	1	mg/kg	62	49
Inorganics					
pH	DETSC 2008#		pH	8.4	8.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.6	2.0
Nitrate as NO3	DETSC 2055	1	mg/kg	13	7.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	230	550
Sulphide	DETSC 2024*	10	mg/kg	40	44
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.34	0.08
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17	0.15

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1869131	1869132
.Sample ID	MS\BH03	MS\BH13
Depth	23.40	11.00-11.20
Other ID	82	35
Sample Type	ES	ES
Sampling Date	28/06/2021	28/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1869131	1869132
.Sample ID	MS\BH03	MS\BH13
Depth	23.40	11.00-11.20
Other ID	82	35
Sample Type	ES	ES
Sampling Date	28/06/2021	28/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1869131	1869132
.Sample ID	MS\BH03	MS\BH13
Depth	23.40	11.00-11.20
Other ID	82	35
Sample Type	ES	ES
Sampling Date	28/06/2021	28/06/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
PCBs					
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	
VOC TIC					
TAME	DETSC 3431*			None Detected	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869128	1869129
			.Sample ID	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40
			Other ID	13	39
			Sample Type	ES	ES
			Sampling Date	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869128	1869129
			.Sample ID	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40
			Other ID	13	39
			Sample Type	ES	ES
			Sampling Date	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869128	1869129
			.Sample ID	MS\BH02	MS\BH02
			Depth	2.25-2.70	10.20-10.40
			Other ID	13	39
			Sample Type	ES	ES
			Sampling Date	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (

Lab No	1869133
.Sample ID	Field Blank 29/06/2021
Depth	
Other ID	
Sample Type	W
Sampling Date	29/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (

Lab No	1869133
.Sample ID	Field Blank 29/06/2021
Depth	
Other ID	
Sample Type	W
Sampling Date	29/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869134	1869135	1869136
			.Sample ID	MS\BH14	MS\BH14	MS\BH02
			Depth	0.30	1.00	2.25-2.70
			Other ID	1	3	13
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
BS EN 12457 10:1	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.8	0.72	0.77
Boron, Dissolved	DETSC 2306*	12	ug/l	20	37	30
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.6	1.1	0.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	< 5.5	< 5.5	< 5.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	2.0	0.19	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.25	0.03	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.1	1.2	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.9	2.1	2.2
Inorganics						
pH	DETSC 2008		pH	10.9	9.9	8.9
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001	< 0.0001	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001	< 0.0001	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	111	50.5	34.3
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015	< 0.015	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	< 0.015	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.90	0.75	0.53
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.34	6.8	2.8
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.7	9.3	20
Total Organic Carbon	DETSC 2085	1	mg/l	2.0	< 1.0	< 1.0

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869134	1869135	1869136
			.Sample ID	MS\BH14	MS\BH14	MS\BH02
			Depth	0.30	1.00	2.25-2.70
			Other ID	1	3	13
			Sample Type	ES	ES	ES
			Sampling Date	28/06/2021	28/06/2021	28/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Subcontracted Analysis						
acenaphthene	$*	0.02	ug/l	< 0.02	< 0.02	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02	< 0.02	< 0.02
anthracene	$*	0.02	ug/l	< 0.02	< 0.02	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	0.16	< 0.02	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02	0.15	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02	0.21	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02	0.10	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02	0.08	< 0.02
chrysene	$*	0.02	ug/l	< 0.02	0.12	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02	0.04	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02	0.25	0.05
fluorene	$*	0.02	ug/l	< 0.02	< 0.02	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02	0.09	< 0.02
naphthalene	$*	0.02	ug/l	0.04	0.04	< 0.02
phenanthrene	$*	0.02	ug/l	< 0.02	0.06	0.03
pyrene	$*	0.02	ug/l	< 0.02	0.22	0.03

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13733
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1869128	MS\BH02 13 2.25-2.70	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13733
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1869125	MS\BH14 0.30 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869126	MS\BH14 1.00 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869127	MS\BH13 10.20-10.40 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869128	MS\BH02 2.25-2.70 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869129	MS\BH02 10.20-10.40 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869130	MS\BH02 11.20-11.40 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869131	MS\BH03 23.40 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869132	MS\BH13 11.00-11.20 SOIL	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869133	Field Blank 29/06/2021 WATER	29/06/21	GV		
1869134	MS\BH14 0.30 LEACHATE	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869135	MS\BH14 1.00 LEACHATE	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869136	MS\BH02 2.25-2.70 LEACHATE	28/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13719	*Issued:*	06-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13719
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	3 Soil samples.
Date Received	21-Jun-21
Date Started	30-Jun-21
Date Completed	06-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-13719
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH02	2	0.3	1869083	06/07/2021	Brown gravelly, sandy CLAY
MS\BH13	2	0.5	1869084	06/07/2021	Brown gravelly, sandy CLAY
MS\BH13	6	3.6	1869085	06/07/2021	Brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13719
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869083	1869084	1869085
			.Sample ID	MS\BH02	MS\BH13	MS\BH13
			Depth	0.30	0.50	3.60
			Other ID	2	2	6
			Sample Type	ES	ES	ES
			Sampling Date	25/06/2021	25/06/2021	25/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	6.1	4.6	18
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	4.1	3.2	5.8
Beryllium	DETSC 2301#	0.2	mg/kg	3.1	0.5	< 0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.2	1.9	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.4	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	240	990	5.1
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	13	49	4.2
Lead	DETSC 2301#	0.3	mg/kg	25	22	30
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	8.3	12	3.1
Selenium	DETSC 2301#	0.5	mg/kg	2.6	10	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	350	1300	14
Zinc	DETSC 2301#	1	mg/kg	50	51	21
Inorganics						
pH	DETSC 2008#		pH	11.4	12.2	10.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.2	1.4	0.8
Nitrate as NO3	DETSC 2055	1	mg/kg	8.7	3.9	2.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	400	19	64
Sulphide	DETSC 2024*	10	mg/kg	560	270	60
Sulphur (free)	DETSC 3049#	0.75	mg/kg	33	6.6	19
Sulphur as S, Total	DETSC 2320	0.01	%	0.29	0.16	0.04
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.56	0.48	0.06
Petroleum Hydrocarbons						
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	84	< 10
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.14	0.18	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.23	0.60	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.20	0.50	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.09	0.21	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13719
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1869083	1869084	1869085
			.Sample ID	MS\BH02	MS\BH13	MS\BH13
			Depth	0.30	0.50	3.60
			Other ID	2	2	6
			Sample Type	ES	ES	ES
			Sampling Date	25/06/2021	25/06/2021	25/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Chrysene	DETSC 3303	0.03	mg/kg	0.15	0.35	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.40	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	0.17	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.20	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.19	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.09	0.20	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.3	3.0	< 0.10
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-13719
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1869083	MS\BH02 0.30 SOIL	25/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869084	MS\BH13 0.50 SOIL	25/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1869085	MS\BH13 3.60 SOIL	25/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13533	*Issued:*	02-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13533
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	4 Soil samples.
Date Received	21-Jun-21
Date Started	28-Jun-21
Date Completed	02-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
LF\TP03	19	4	1868020	02/07/2021	Brown very gravelly SAND
LF\BH02	27	8.70-8.90	1868021	02/07/2021	Brown SAND
MS\BH03	44	11.00-11.20	1868022	02/07/2021	Brown sandy CLAY
MS\BH03	39	9.50-9.80	1868023	02/07/2021	Brown SAND

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1868020	1868021	1868022
			.Sample ID	LF\TP03	LF\BH02	MS\BH03
			Depth	4.00	8.70-8.90	11.00-11.20
			Other ID	19	27	44
			Sample Type	ES	ES	ES
			Sampling Date	24/06/2021	24/06/2021	24/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	9.9	21	23
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	7.0	6.1	7.2
Beryllium	DETSC 2301#	0.2	mg/kg	5.0	< 0.2	0.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	5.5	< 0.2	6.0
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.1
Chromium III	DETSC 2301*	0.15	mg/kg	6.4	2.8	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	5.8	5.8	16
Lead	DETSC 2301#	0.3	mg/kg	1.3	2.7	12
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	1.5	2.2	21
Selenium	DETSC 2301#	0.5	mg/kg	2.2	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	48	8.7	34
Zinc	DETSC 2301#	1	mg/kg	5.2	13	52
Inorganics						
pH	DETSC 2008#		pH	9.3	9.2	8.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.7	0.3	2.9
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	< 1.0	3.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1700	24	950
Sulphide	DETSC 2024*	10	mg/kg	3200	< 10	84
Sulphur (free)	DETSC 3049#	0.75	mg/kg	64	3.2	4.3
Sulphur as S, Total	DETSC 2320	0.01	%	0.72	0.03	0.45
Sulphate as SO4, Total	DETSC 2321#	0.01	%	2.5	0.09	0.08

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1868020	1868021	1868022
			.Sample ID	LF\TP03	LF\BH02	MS\BH03
			Depth	4.00	8.70-8.90	11.00-11.20
			Other ID	19	27	44
			Sample Type	ES	ES	ES
			Sampling Date	24/06/2021	24/06/2021	24/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	2.8	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	4.9	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1868020	1868021	1868022
			.Sample ID	LF\TP03	LF\BH02	MS\BH03
			Depth	4.00	8.70-8.90	11.00-11.20
			Other ID	19	27	44
			Sample Type	ES	ES	ES
			Sampling Date	24/06/2021	24/06/2021	24/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
VOC TIC's						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1868023
.Sample ID	MS\BH03
Depth	9.50-9.80
Other ID	39
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	20
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	4.9
Beryllium	DETSC 2301#	0.2	mg/kg	< 0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	3.3
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	3.5
Lead	DETSC 2301#	0.3	mg/kg	3.5
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.0
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	12
Zinc	DETSC 2301#	1	mg/kg	15
Inorganics				
pH	DETSC 2008#		pH	9.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.4
Nitrate as NO3	DETSC 2055	1	mg/kg	1.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	65
Sulphide	DETSC 2024*	10	mg/kg	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	1.9
Sulphur as S, Total	DETSC 2320	0.01	%	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.05

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Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1868023
.Sample ID	MS\BH03
Depth	9.50-9.80
Other ID	39
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	
Toluene	DETSC 3321#	0.01	mg/kg	
Xylene	DETSC 3321#	0.01	mg/kg	
MTBE	DETSC 3321	0.01	mg/kg	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1868023
.Sample ID	MS\BH03
Depth	9.50-9.80
Other ID	39
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOC TIC's				
TAME	DETSC 3431*			None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (

Lab No	1868020
.Sample ID	LF\TP03
Depth	4.00
Other ID	19
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (

Lab No	1868020
.Sample ID	LF\TP03
Depth	4.00
Other ID	19
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Phenol	DETSC 3433	0.1	mg/kg	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (

Lab No	1868020
.Sample ID	LF\TP03
Depth	4.00
Other ID	19
Sample Type	ES
Sampling Date	24/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-13533
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1868020	LF\TP03 19 4.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13533
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1868020	LF\TP03 4.00 SOIL	24/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868021	LF\BH02 8.70-8.90 SOIL	24/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868022	MS\BH03 11.00-11.20 SOIL	24/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868023	MS\BH03 9.50-9.80 SOIL	24/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13528	*Issued:*	19-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13528
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	3 Soil samples, 1 Leachate sample.
Date Received	21-Jun-21
Date Started	28-Jun-21
Date Completed	19-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
LF\TP02	5	1	1868008	15/07/2021	Brown sandy CLAY
MS\BH03	14	3.00-3.30	1868009	15/07/2021	Brown very gravelly SAND
MS\BH04	8	22.3	1868010	15/07/2021	Brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1868008	1868009	1868010
			.Sample ID	LF\TP02	MS\BH03	MS\BH04
			Depth	1.00	3.00-3.30	22.30
			Other ID	5	14	8
			Sample Type	ES	ES	ES
			Sampling Date	23/06/2021	23/06/2021	23/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	4.6	19	13
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	4.9	9.7	4.4
Beryllium	DETSC 2301#	0.2	mg/kg	3.4	< 0.2	0.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.2	0.4	1.5
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.1
Chromium III	DETSC 2301*	0.15	mg/kg	6.0	4.8	20
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	6.9	5.0	15
Lead	DETSC 2301#	0.3	mg/kg	3.3	4.7	11
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	2.5	3.7	22
Selenium	DETSC 2301#	0.5	mg/kg	1.1	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	32	26	26
Zinc	DETSC 2301#	1	mg/kg	21	19	41
Inorganics						
pH	DETSC 2008#		pH	8.8	8.6	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.0	0.3	0.4
Nitrate as NO3	DETSC 2055	1	mg/kg	1.2	1.2	4.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	370	120	860
Sulphide	DETSC 2024*	10	mg/kg	3000	< 10	72
Sulphur (free)	DETSC 3049#	0.75	mg/kg	7.5	< 0.75	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.26	0.06	0.20
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.63	0.10	0.25
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1868008	1868009	1868010
			.Sample ID	LF\TP02	MS\BH03	MS\BH04
			Depth	1.00	3.00-3.30	22.30
			Other ID	5	14	8
			Sample Type	ES	ES	ES
			Sampling Date	23/06/2021	23/06/2021	23/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.34	< 0.10	< 0.10
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1868008
.Sample ID	LF\TP02
Depth	1.00
Other ID	5
Sample Type	ES
Sampling Date	23/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1868008
.Sample ID	LF\TP02
Depth	1.00
Other ID	5
Sample Type	ES
Sampling Date	23/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Phenol	DETSC 3433	0.1	mg/kg	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1868008
.Sample ID	LF\TP02
Depth	1.00
Other ID	5
Sample Type	ES
Sampling Date	23/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1
VOC TIC				
TAME	DETSC 3431*			None Detected

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1868140
.Sample ID	LF\TP02
Depth	1.00
Other ID	5
Sample Type	ES
Sampling Date	23/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	< 0.16
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.5
Iron, Dissolved	DETSC 2306	5.5	ug/l	14
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	3.1
Inorganics				
pH	DETSC 2008		pH	6.4
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	15.5
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.073
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.060
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.43
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.2
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02
fluorene	$*	0.02	ug/l	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1868140
.Sample ID	LF\TP02
Depth	1.00
Other ID	5
Sample Type	ES
Sampling Date	23/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
naphthalene	$*	0.02	ug/l	0.02
phenanthrene	$*	0.02	ug/l	< 0.02
pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13528
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1868008	LF\TP02 5 1.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13528
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1868008	LF\TP02 1.00 SOIL	23/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868009	MS\BH03 3.00-3.30 SOIL	23/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868010	MS\BH04 22.30 SOIL	23/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1868140	LF\TP02 1.00 LEACHATE	23/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13386	*Issued:*	16-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13386
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	12 Soil samples, 1 Leachate sample, 4 Water samples.
Date Received	21-Jun-21
Date Started	25-Jun-21
Date Completed	16-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
LF\BH01	1	0.3	1867085	16/07/2021	Grey very gravelly SAND
LF\BH01	2	0.5	1867086	16/07/2021	Grey very gravelly SAND
LF\BH01	4	2	1867087	16/07/2021	Grey very gravelly SAND
LF\BH01	6	4	1867088	16/07/2021	Brown SAND
LF\TP01	1	0.3	1867089	16/07/2021	Grey very gravelly SAND
LF\TP01	5	1	1867090	16/07/2021	Grey very gravelly SAND
LF\BH02	1	0.3	1867091	16/07/2021	Grey very gravelly SAND
LF\BH02	3	1	1867092	16/07/2021	Grey very gravelly SAND
MS\BH03	2	0.5	1867093	16/07/2021	Dark brown gravelly, very sandy CLAY
MS\BH03	3	1	1867094	16/07/2021	Dark brown gravelly, very sandy CLAY
MS\BH03	4	2	1867095	16/07/2021	Grey very gravelly SAND
MS\TP06	9	3.8	1867265	16/07/2021	Grey very gravelly SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867085	1867086	1867087	1867088
			.Sample ID	LF\BH01	LF\BH01	LF\BH01	LF\BH01
			Depth	0.30	0.50	2.00	4.00
			Other ID	1	2	4	6
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%				
Preparation							
Moisture Content	DETSC 1004	0.1	%	1.9	4.8	4.4	21
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	5.0	3.5	3.2	4.6
Beryllium	DETSC 2301#	0.2	mg/kg	7.9	5.9	5.8	4.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	4.9	11	6.4	4.3
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	11	3.3	3.0	12
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	8.2	6.1	5.1	6.8
Lead	DETSC 2301#	0.3	mg/kg	3.0	1.0	1.1	1.1
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	1.3	< 1.0	< 1.0	< 1.0
Selenium	DETSC 2301#	0.5	mg/kg	2.0	1.4	1.1	2.0
Vanadium	DETSC 2301#	0.8	mg/kg	37	16	14	110
Zinc	DETSC 2301#	1	mg/kg	10	26	3.5	27
Inorganics							
pH	DETSC 2008#		pH	11.0	11.2	10.9	11.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.1	1.5	0.9	0.6
Organic matter	DETSC 2002#	0.1	%	0.8	0.6	1.3	1.2
Nitrate as NO3	DETSC 2055	1	mg/kg	6.7	4.2	4.5	4.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1700	590	1700	1400
Sulphide	DETSC 2024*	10	mg/kg	1500	1000	1200	1500
Sulphur (free)	DETSC 3049#	0.75	mg/kg	120	240	32	2.4
Sulphur as S, Total	DETSC 2320	0.01	%	0.69	0.30	0.37	0.46
Sulphate as SO4, Total	DETSC 2321#	0.01	%	1.1	1.3	1.0	0.96

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867085	1867086	1867087	1867088
			.Sample ID	LF\BH01	LF\BH01	LF\BH01	LF\BH01
			Depth	0.30	0.50	2.00	4.00
			Other ID	1	2	4	6
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg				
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg				
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg				
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg				
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg				
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg				
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				
Aromatic C5-C35	DETSC 3072*	10	mg/kg				
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg				
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg				
Ethylbenzene	DETSC 3321#	0.01	mg/kg				
Toluene	DETSC 3321#	0.01	mg/kg				
Xylene	DETSC 3321#	0.01	mg/kg				
MTBE	DETSC 3321	0.01	mg/kg				

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867085	1867086	1867087	1867088
			.Sample ID	LF\BH01	LF\BH01	LF\BH01	LF\BH01
			Depth	0.30	0.50	2.00	4.00
			Other ID	1	2	4	6
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.04	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.04	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.05	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	0.05	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	0.04	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.43	< 0.10	0.26	0.11

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867085	1867086	1867087	1867088
			.Sample ID	LF\BH01	LF\BH01	LF\BH01	LF\BH01
			Depth	0.30	0.50	2.00	4.00
			Other ID	1	2	4	6
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg				
PCB 52	DETSC 3401#	0.01	mg/kg				
PCB 101	DETSC 3401#	0.01	mg/kg				
PCB 118	DETSC 3401#	0.01	mg/kg				
PCB 153	DETSC 3401#	0.01	mg/kg				
PCB 138	DETSC 3401#	0.01	mg/kg				
PCB 180	DETSC 3401#	0.01	mg/kg				
PCB 77	DETSC 3401*	0.01	mg/kg				
PCB 81	DETSC 3401*	0.01	mg/kg				
PCB 105	DETSC 3401*	0.01	mg/kg				
PCB 114	DETSC 3401*	0.01	mg/kg				
PCB 118	DETSC 3401*	0.01	mg/kg				
PCB 123	DETSC 3401*	0.01	mg/kg				
PCB 126	DETSC 3401*	0.01	mg/kg				
PCB 156	DETSC 3401*	0.01	mg/kg				
PCB 157	DETSC 3401*	0.01	mg/kg				
PCB 167	DETSC 3401*	0.01	mg/kg				
PCB 169	DETSC 3401*	0.01	mg/kg				
PCB 189	DETSC 3401*	0.01	mg/kg				
PCB 7 Total	DETSC 3401#	0.01	mg/kg				
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg				
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg				
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg				
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg				
p-cresol	DETSC 3451*	0.01	mg/kg				
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg				
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg				
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg				
VOC TIC							
TAME	DETSC 3431*						

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867089	1867090	1867091	1867092
			.Sample ID	LF\TP01	LF\TP01	LF\BH02	LF\BH02
			Depth	0.30	1.00	0.30	1.00
			Other ID	1	5	1	3
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%				
Preparation							
Moisture Content	DETSC 1004	0.1	%	1.3	1.2	2.4	13
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	3.5	4.8	9.4	11
Beryllium	DETSC 2301#	0.2	mg/kg	1.2	5.7	1.1	7.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	5.4	2.7	1.5	2.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.4	0.6
Chromium III	DETSC 2301*	0.15	mg/kg	2.4	22	750	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	5.3	7.4	59	17
Lead	DETSC 2301#	0.3	mg/kg	3.3	1.8	84	49
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.06
Nickel	DETSC 2301#	1	mg/kg	1.4	< 1.0	13	6.1
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	2.8	6.9	2.3
Vanadium	DETSC 2301#	0.8	mg/kg	12	170	1900	95
Zinc	DETSC 2301#	1	mg/kg	20	5.5	62	120
Inorganics							
pH	DETSC 2008#		pH	11.0	10.7	12.0	10.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.6
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	0.8
Organic matter	DETSC 2002#	0.1	%	0.8	1.6	1.0	1.5
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	2.2	54	7.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	400	940	240	550
Sulphide	DETSC 2024*	10	mg/kg	200	1400	680	1300
Sulphur (free)	DETSC 3049#	0.75	mg/kg	53	5.6	2.5	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.07	0.61	0.28	0.57
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.27	0.89	0.54	0.48

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867089	1867090	1867091	1867092
			.Sample ID	LF\TP01	LF\TP01	LF\BH02	LF\BH02
			Depth	0.30	1.00	0.30	1.00
			Other ID	1	5	1	3
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10		
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	13
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01		
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01		

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

				Lab No	1867089	1867090	1867091	1867092
				.Sample ID	LF\TP01	LF\TP01	LF\BH02	LF\BH02
				Depth	0.30	1.00	0.30	1.00
				Other ID	1	5	1	3
				Sample Type	ES	ES	ES	ES
				Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
				Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**		**LOD**	**Units**				
PAHs								
Naphthalene	DETSC 3303#		0.03	mg/kg	0.04	0.04	0.06	0.10
Acenaphthylene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	0.10	0.13
Acenaphthene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303		0.03	mg/kg	< 0.03	< 0.03	0.10	0.12
Phenanthrene	DETSC 3303#		0.03	mg/kg	0.06	0.04	0.16	0.28
Anthracene	DETSC 3303		0.03	mg/kg	0.05	< 0.03	0.07	0.11
Fluoranthene	DETSC 3303#		0.03	mg/kg	0.09	0.05	0.28	0.56
Pyrene	DETSC 3303#		0.03	mg/kg	0.08	0.05	0.23	0.47
Benzo(a)anthracene	DETSC 3303#		0.03	mg/kg	0.08	0.06	0.19	0.40
Chrysene	DETSC 3303		0.03	mg/kg	0.06	< 0.03	0.18	0.36
Benzo(b)fluoranthene	DETSC 3303#		0.03	mg/kg	0.14	0.11	0.34	0.77
Benzo(k)fluoranthene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	0.10	0.28
Benzo(a)pyrene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	0.18	0.53
Indeno(1,2,3-c,d)pyrene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	0.11	0.31
Dibenzo(a,h)anthracene	DETSC 3303#		0.03	mg/kg	< 0.03	< 0.03	0.03	0.09
Benzo(g,h,i)perylene	DETSC 3303#		0.03	mg/kg	0.06	0.05	0.16	0.43
PAH - USEPA 16, Total	DETSC 3303		0.1	mg/kg	0.64	0.40	2.3	4.9

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867089	1867090	1867091	1867092
			.Sample ID	LF\TP01	LF\TP01	LF\BH02	LF\BH02
			Depth	0.30	1.00	0.30	1.00
			Other ID	1	5	1	3
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg				
PCB 52	DETSC 3401#	0.01	mg/kg				
PCB 101	DETSC 3401#	0.01	mg/kg				
PCB 118	DETSC 3401#	0.01	mg/kg				
PCB 153	DETSC 3401#	0.01	mg/kg				
PCB 138	DETSC 3401#	0.01	mg/kg				
PCB 180	DETSC 3401#	0.01	mg/kg				
PCB 77	DETSC 3401*	0.01	mg/kg				
PCB 81	DETSC 3401*	0.01	mg/kg				
PCB 105	DETSC 3401*	0.01	mg/kg				
PCB 114	DETSC 3401*	0.01	mg/kg				
PCB 118	DETSC 3401*	0.01	mg/kg				
PCB 123	DETSC 3401*	0.01	mg/kg				
PCB 126	DETSC 3401*	0.01	mg/kg				
PCB 156	DETSC 3401*	0.01	mg/kg				
PCB 157	DETSC 3401*	0.01	mg/kg				
PCB 167	DETSC 3401*	0.01	mg/kg				
PCB 169	DETSC 3401*	0.01	mg/kg				
PCB 189	DETSC 3401*	0.01	mg/kg				
PCB 7 Total	DETSC 3401#	0.01	mg/kg				
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01		< 0.01
VOC TIC							
TAME	DETSC 3431*			None Detected	None Detected		

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867093	1867094	1867095	1867265
			.Sample ID	MS\BH03	MS\BH03	MS\BH03	MS\TP06
			Depth	0.50	1.00	2.00	3.80
			Other ID	2	3	4	9
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%				< 0.001
Preparation							
Moisture Content	DETSC 1004	0.1	%	6.0	9.4	15	23
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	4.0	14	12	18
Beryllium	DETSC 2301#	0.2	mg/kg	2.1	5.6	6.6	3.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.7	5.1	2.9	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	1.1	< 0.1	22
Chromium III	DETSC 2301*	0.15	mg/kg	200	20	16	54
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	19	22	12	150
Lead	DETSC 2301#	0.3	mg/kg	21	59	12	1000
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.33
Nickel	DETSC 2301#	1	mg/kg	13	7.7	6.4	57
Selenium	DETSC 2301#	0.5	mg/kg	1.7	2.2	3.6	1.0
Vanadium	DETSC 2301#	0.8	mg/kg	220	96	60	160
Zinc	DETSC 2301#	1	mg/kg	71	150	31	3700
Inorganics							
pH	DETSC 2008#		pH	11.6	9.8	10.4	8.8
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	0.2	2.6
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	0.7	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.8	1.1	1.3	1.7
Nitrate as NO3	DETSC 2055	1	mg/kg	10	11	4.7	12
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	210	1900	600	310
Sulphide	DETSC 2024*	10	mg/kg	600	800	1200	400
Sulphur (free)	DETSC 3049#	0.75	mg/kg	120	80	6.4	40
Sulphur as S, Total	DETSC 2320	0.01	%	0.20	0.76	0.46	0.26
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.44	2.6	0.67	0.76

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867093	1867094	1867095	1867265
			.Sample ID	MS\BH03	MS\BH03	MS\BH03	MS\TP06
			Depth	0.50	1.00	2.00	3.80
			Other ID	2	3	4	9
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	< 1.2	250
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5	1000
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	< 3.4	160
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10	1500
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	< 0.9	2.7
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	< 0.5	200
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	< 0.6	1100
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	< 1.4	220
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10	1500
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10	3000
EPH (C10-C40)	DETSC 3311#	10	mg/kg	14	< 10	< 10	6800
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1867093	1867094	1867095	1867265
			.Sample ID	MS\BH03	MS\BH03	MS\BH03	MS\TP06
			Depth	0.50	1.00	2.00	3.80
			Other ID	2	3	4	9
			Sample Type	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	< 0.30
Acenaphthylene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	0.10	< 0.30
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.30
Fluorene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	0.11	< 0.30
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	0.05	1.7
Anthracene	DETSC 3303	0.03	mg/kg	0.06	< 0.03	0.05	0.65
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	< 0.03	0.06	7.4
Pyrene	DETSC 3303#	0.03	mg/kg	0.20	< 0.03	0.06	7.6
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.14	0.06	0.07	0.56
Chrysene	DETSC 3303	0.03	mg/kg	0.12	< 0.03	< 0.03	0.97
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	< 0.03	0.13	0.45
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.30
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.09	< 0.03	< 0.03	< 0.30
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.30
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.30
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	0.06	< 0.30
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.7	< 0.10	0.75	< 14.91

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

				Lab No	1867093	1867094	1867095	1867265
				.Sample ID	MS\BH03	MS\BH03	MS\BH03	MS\TP06
				Depth	0.50	1.00	2.00	3.80
				Other ID	2	3	4	9
				Sample Type	ES	ES	ES	ES
				Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021
				Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**		**LOD**	**Units**				
PCBs								
PCB 28 + PCB 31	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 52	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 101	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 118	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 153	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 138	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 180	DETSC 3401#		0.01	mg/kg				< 0.01
PCB 77	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 81	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 105	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 114	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 118	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 123	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 126	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 156	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 157	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 167	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 169	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 189	DETSC 3401*		0.01	mg/kg				< 0.01
PCB 7 Total	DETSC 3401#		0.01	mg/kg				< 0.01
Phenols								
Phenol - Monohydric	DETSC 2130#		0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
p-cresol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*		0.01	mg/kg		< 0.01	< 0.01	< 0.01
VOC TIC								
TAME	DETSC 3431*					None Detected	None Detected	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867089	1867090	1867094	1867095	1867265
			.Sample ID	LF\TP01	LF\TP01	MS\BH03	MS\BH03	MS\TP06
			Depth	0.30	1.00	1.00	2.00	3.80
			Other ID	1	5	3	4	9
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	0.04	0.03	< 0.01	0.03	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867089	1867090	1867094	1867095	1867265
			.Sample ID	LF\TP01	LF\TP01	MS\BH03	MS\BH03	MS\TP06
			Depth	0.30	1.00	1.00	2.00	3.80
			Other ID	1	5	3	4	9
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs								
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867089	1867090	1867094	1867095	1867265
			.Sample ID	LF\TP01	LF\TP01	MS\BH03	MS\BH03	MS\TP06
			Depth	0.30	1.00	1.00	2.00	3.80
			Other ID	1	5	3	4	9
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

				Lab No	1867096	1867097	1867264	1878929
				.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
				Depth			3.10	3.10
				Other ID			8	8
				Sample Type	WATER	WATER	EW	EW
				Sampling Date	n/s	n/s	22/06/2021	22/06/2021
				Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l				25	
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l				< 0.1	
Boron, Dissolved	DETSC 2306*	12	ug/l				420	
Cadmium, Dissolved	DETSC 2306	0.03	ug/l				0.32	
Chromium III, Dissolved	DETSC 2306*	1	ug/l				< 1.0	
Chromium, Hexavalent	DETSC 2203	7	ug/l				< 7.0	
Copper, Dissolved	DETSC 2306	0.4	ug/l				1.7	
Iron, Dissolved	DETSC 2306	5.5	ug/l				1800	
Lead, Dissolved	DETSC 2306	0.09	ug/l				10	
Mercury, Dissolved	DETSC 2306	0.01	ug/l				0.06	
Nickel, Dissolved	DETSC 2306	0.5	ug/l				7.5	
Selenium, Dissolved	DETSC 2306	0.25	ug/l				5.3	
Vanadium, Dissolved	DETSC 2306	0.6	ug/l					1.6
Zinc, Dissolved	DETSC 2306	1.3	ug/l				130	
Inorganics								
pH	DETSC 2008		pH				7.1	
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l				0.0075	
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l				0.0003	
Thiocyanate	DETSC 2130	20	ug/l					< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l				430	
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l				0.27	
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l				0.22	
Nitrate as NO3	DETSC 2055	0.1	mg/l				0.20	
Nitrite as NO2	DETSC 2055	0.1	mg/l				< 0.10	
Sulphate as SO4	DETSC 2055	0.1	mg/l				150	
Total Organic Carbon	DETSC 2033	0.1	mg/l				63	

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Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867096	1867097	1867264	1878929
			.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
			Depth			3.10	3.10
			Other ID			8	8
			Sample Type	WATER	WATER	EW	EW
			Sampling Date	n/s	n/s	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l			< 0.1	
Aliphatic C6-C8	DETSC 3322	0.1	ug/l			< 0.1	
Aliphatic C8-C10	DETSC 3322	0.1	ug/l			< 0.1	
Aliphatic C10-C12	DETSC 3072*	1	ug/l			1900	
Aliphatic C12-C16	DETSC 3072*	1	ug/l			28000	
Aliphatic C16-C21	DETSC 3072*	1	ug/l			180000	
Aliphatic C21-C35	DETSC 3072*	1	ug/l			44000	
Aliphatic C5-C35	DETSC 3072*	10	ug/l			250000	
Aromatic C5-C7	DETSC 3322	0.1	ug/l			< 0.1	
Aromatic C7-C8	DETSC 3322	0.1	ug/l			< 0.1	
Aromatic C8-C10	DETSC 3322	0.1	ug/l			< 0.1	
Aromatic C10-C12	DETSC 3072*	1	ug/l			7000	
Aromatic C12-C16	DETSC 3072*	1	ug/l			23000	
Aromatic C16-C21	DETSC 3072*	1	ug/l			120000	
Aromatic C21-C35	DETSC 3072*	1	ug/l			28000	
Aromatic C5-C35	DETSC 3072*	10	ug/l			180000	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l			430000	
EPH (C10-C40)	DETSC 3311	10	ug/l			< 100.0	
Benzene	DETSC 3322	1	ug/l			< 1.0	
Toluene	DETSC 3322	1	ug/l			< 1.0	
Ethylbenzene	DETSC 3322	1	ug/l			< 1.0	
Xylene	DETSC 3322	1	ug/l			< 1.0	
MTBE	DETSC 3322	1	ug/l			< 1.0	
Phenols							
Phenol - Monohydric	DETSC 2130	100	ug/l			< 100	

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Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867096	1867097	1867264	1878929
			.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
			Depth			3.10	3.10
			Other ID			8	8
			Sample Type	WATER	WATER	EW	EW
			Sampling Date	n/s	n/s	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
VOCs							
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2	
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867096	1867097	1867264	1878929
			.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
			Depth			3.10	3.10
			Other ID			8	8
			Sample Type	WATER	WATER	EW	EW
			Sampling Date	n/s	n/s	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
Naphthalene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	
SVOCs							
Phenol	DETSC 3434*	1	ug/l			< 100.0	
Aniline	DETSC 3434*	1	ug/l			< 100.0	
2-Chlorophenol	DETSC 3434*	1	ug/l			< 100.0	
Benzyl Alcohol	DETSC 3434*	1	ug/l			< 100.0	
2-Methylphenol	DETSC 3434*	1	ug/l			< 100.0	
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l			< 100.0	
3&4-Methylphenol	DETSC 3434*	1	ug/l			< 100.0	
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l			< 100.0	
2,4-Dimethylphenol	DETSC 3434*	1	ug/l			< 100.0	
2,4-Dichlorophenol	DETSC 3434*	1	ug/l			< 100.0	
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l			< 100.0	
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l			< 100.0	
2-Methylnaphthalene	DETSC 3434*	1	ug/l			< 100.0	
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l			< 100.0	
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l			< 100.0	
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l			< 100.0	

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867096	1867097	1867264	1878929
			.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
			Depth			3.10	3.10
			Other ID			8	8
			Sample Type	WATER	WATER	EW	EW
			Sampling Date	n/s	n/s	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
2-Chloronaphthalene	DETSC 3434*	1	ug/l			< 100.0	
2-Nitroaniline	DETSC 3434*	1	ug/l			< 100.0	
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l			< 100.0	
Acenaphthylene	DETSC 3434*	1	ug/l			< 100.0	
3-Nitroaniline	DETSC 3434*	1	ug/l			< 100.0	
Acenaphthene	DETSC 3434*	1	ug/l			150	
4-Nitrophenol	DETSC 3434*	1	ug/l			< 100.0	
Dibenzofuran	DETSC 3434*	1	ug/l			310	
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l			< 100.0	
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l			< 100.0	
Diethylphthalate	DETSC 3434*	1	ug/l			< 100.0	
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l			< 100.0	
Fluorene	DETSC 3434*	1	ug/l			< 100.0	
4-Nitroaniline	DETSC 3434*	1	ug/l			< 100.0	
Diphenylamine	DETSC 3434*	1	ug/l			< 100.0	
4-Bromophenylphenylether	DETSC 3434*	1	ug/l			< 100.0	
Hexachlorobenzene	DETSC 3434*	1	ug/l			< 100.0	
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l			< 100.0	
Pentachlorophenol	DETSC 3434*	1	ug/l			< 100.0	
Phenanthrene	DETSC 3434*	1	ug/l			< 100.0	
Anthracene	DETSC 3434*	1	ug/l			< 100.0	
Di-n-butylphthalate	DETSC 3434*	1	ug/l			< 100.0	
Fluoranthene	DETSC 3434*	1	ug/l			5400	
Pyrene	DETSC 3434*	1	ug/l			5400	
Butylbenzylphthalate	DETSC 3434*	1	ug/l			< 100.0	
Benzo(a)anthracene	DETSC 3434*	1	ug/l			660	
Chrysene	DETSC 3434*	1	ug/l			460	
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l			< 100.0	
Di-n-octylphthalate	DETSC 3434*	1	ug/l			< 100.0	
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l			140	
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l			< 100.0	

Summary of Chemical Analysis

Water Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1867096	1867097	1867264	1878929
			.Sample ID	Trip Blank 26/06/2021	Field Blank 23/06/2021	MS\TP06	MS\TP06
			Depth			3.10	3.10
			Other ID			8	8
			Sample Type	WATER	WATER	EW	EW
			Sampling Date	n/s	n/s	22/06/2021	22/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Benzo(a)pyrene	DETSC 3434*	1	ug/l			< 100.0	
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l			< 100.0	
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l			< 100.0	
Benzo(ghi)perylene	DETSC 3434*	1	ug/l			< 100.0	
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l			< 100.0	
Dimethylphthalate	DETSC 3434*	1	ug/l			< 100.0	
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l			< 100.0	
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l			< 100.0	
Azobenzene	DETSC 3434*	1	ug/l			< 100.0	
Carbazole	DETSC 3434*	1	ug/l			< 100.0	
1-Methylnaphthalene	DETSC 3434*	1	ug/l			< 100.0	
Subcontracted Analysis							
acenaphthene	$*	0.02	ug/l			318	
acenaphthylene	$*	0.02	ug/l			49.9	
anthracene	$*	0.02	ug/l			> 1000	
benzo(a)anthracene	$*	0.02	ug/l			365	
benzo(a)pyrene	$*	0.02	ug/l			179	
benzo(b)fluoranthene	$*	0.02	ug/l			388	
benzo(g,h,i)perylene	$*	0.02	ug/l			151	
benzo(k)fluoranthene	$*	0.02	ug/l			136	
chrysene	$*	0.02	ug/l			604	
dibenzo(a,h)anthracene	$*	0.02	ug/l			40.6	
fluoranthene	$*	0.02	ug/l			> 1000	
fluorene	$*	0.02	ug/l			275	
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l			126	
naphthalene	$*	0.02	ug/l			9.17	
phenanthrene	$*	0.02	ug/l			203	
pyrene	$*	0.02	ug/l			> 1000	
VOC TIC							
TAME	DETSC 3431*					None Detected	

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1867266
.Sample ID	MS\TP06
Depth	3.80
Other ID	9
Sample Type	ES
Sampling Date	22/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.2
Boron, Dissolved	DETSC 2306*	12	ug/l	65
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.12
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	22
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.9
Iron, Dissolved	DETSC 2306	5.5	ug/l	7.8
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.98
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.03
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.7
Zinc, Dissolved	DETSC 2306	1.3	ug/l	200
Inorganics				
pH	DETSC 2008		pH	5.6
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0015
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	176
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.024
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.020
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.29
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	52
Total Organic Carbon	DETSC 2033	0.1	mg/l	2.8

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1867266
.Sample ID	MS\TP06
Depth	3.80
Other ID	9
Sample Type	ES
Sampling Date	22/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	0.07
acenaphthylene	$*	0.02	ug/l	0.02
anthracene	$*	0.02	ug/l	0.23
benzo(a)anthracene	$*	0.02	ug/l	0.16
benzo(a)pyrene	$*	0.02	ug/l	0.14
benzo(b)fluoranthene	$*	0.02	ug/l	0.21
benzo(g,h,i)perylene	$*	0.02	ug/l	0.11
benzo(k)fluoranthene	$*	0.02	ug/l	0.08
chrysene	$*	0.02	ug/l	0.14
dibenzo(a,h)anthracene	$*	0.02	ug/l	0.04
fluoranthene	$*	0.02	ug/l	0.63
fluorene	$*	0.02	ug/l	0.05
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	0.09
naphthalene	$*	0.02	ug/l	0.02
phenanthrene	$*	0.02	ug/l	0.08
pyrene	$*	0.02	ug/l	0.54
VOC TIC				
TAME	DETSC 3431*			None Detected

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1867085	LF\BH01 1 0.30	SOIL	NAD	none	Rebecca Burgess
1867086	LF\BH01 2 0.50	SOIL	NAD	none	Rebecca Burgess
1867087	LF\BH01 4 2.00	SOIL	NAD	none	Rebecca Burgess
1867089	LF\TP01 1 0.30	SOIL	NAD	none	Rebecca Burgess
1867090	LF\TP01 5 1.00	SOIL	NAD	none	Rebecca Burgess
1867091	LF\BH02 1 0.30	SOIL	NAD	none	Rebecca Burgess
1867092	LF\BH02 3 1.00	SOIL	NAD	none	Rebecca Burgess
1867093	MS\BH03 2 0.50	SOIL	NAD	none	Rebecca Burgess
1867094	MS\BH03 3 1.00	SOIL	NAD	none	Rebecca Burgess
1867095	MS\BH03 4 2.00	SOIL	NAD	none	Rebecca Burgess
1867265	MS\TP06 9 3.80	SOIL	Chrysotile	Bundle of Chrysotile fibres	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 21-13386
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1867265
.Sample ID	MS\TP06
Depth	3.80
Other ID	9
Sample Type	ES
Sampling Date	22/06/2021
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	508.42
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-13386
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1867085	LF\BH01 0.30 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867086	LF\BH01 0.50 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867087	LF\BH01 2.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867088	LF\BH01 4.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867089	LF\TP01 0.30 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867090	LF\TP01 1.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867091	LF\BH02 0.30 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867092	LF\BH02 1.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867093	MS\BH03 0.50 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867094	MS\BH03 1.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867095	MS\BH03 2.00 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867096	Trip Blank 23/06/2021 WATER		GV		
1867097	Field Blank 23/06/2021 WATER		GV		
1867264	MS\TP06 3.10 WATER	22/06/21	GB 1L x2		
1867265	MS\TP06 3.80 SOIL	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1867266	MS\TP06 3.80 LEACHATE	22/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub V-Vial B-Bottle

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13306-1	*Issued:*	21-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13306-1
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Nat Zero Teeside
Description	3 Soil samples, 1 Leachate sample.

Date Received	24-Jun-21
Date Started	24-Jun-21
Date Completed	21-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 21-13306, extra testing.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MB\BH05		17.3	1866590	16/07/2021	Brown sandy CLAY
MS\TP10	6	0.5	1866592	16/07/2021	Brown gravelly, sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866590	1866591	1866592
			.Sample ID	MB\BH05	MS\TP10	MS\TP10
			Depth	17.30	0.30	0.50
			Other ID		2	6
			Sample Type	ES	ES	ES
			Sampling Date	21/06/2021	21/06/2021	21/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	15	17	19
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	7.8	8.7	18
Beryllium	DETSC 2301#	0.2	mg/kg	1.0	1.4	1.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.3	1.0	1.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.2	0.4
Chromium III	DETSC 2301*	0.15	mg/kg	29	35	31
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	23	23	35
Lead	DETSC 2301#	0.3	mg/kg	17	28	110
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.11
Nickel	DETSC 2301#	1	mg/kg	33	32	25
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	36	48	50
Zinc	DETSC 2301#	1	mg/kg	57	80	220
Inorganics						
pH	DETSC 2008#		pH	8.5	8.1	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.2
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	0.8	1.0
Organic matter	DETSC 2002#	0.1	%	2.3	1.9	2.7
Nitrate as NO3	DETSC 2055	1	mg/kg	3.5	1.5	8.1
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	350	59	48
Sulphide	DETSC 2024*	10	mg/kg	40	52	20
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.04	0.04	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.11	0.12	0.07

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866590	1866591	1866592
			.Sample ID	MB\BH05	MS\TP10	MS\TP10
			Depth	17.30	0.30	0.50
			Other ID		2	6
			Sample Type	ES	ES	ES
			Sampling Date	21/06/2021	21/06/2021	21/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866590	1866591	1866592
			.Sample ID	MB\BH05	MS\TP10	MS\TP10
			Depth	17.30	0.30	0.50
			Other ID		2	6
			Sample Type	ES	ES	ES
			Sampling Date	21/06/2021	21/06/2021	21/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg		< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg		< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg		< 0.01	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866590	1866591	1866592
			.Sample ID	MB\BH05	MS\TP10	MS\TP10
			Depth	17.30	0.30	0.50
			Other ID		2	6
			Sample Type	ES	ES	ES
			Sampling Date	21/06/2021	21/06/2021	21/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	1866594
.Sample ID	MS\TP10
Depth	0.30
Other ID	2
Sample Type	ES
Sampling Date	21/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.30
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.6
Iron, Dissolved	DETSC 2306	5.5	ug/l	270
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.34
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	1.8
Inorganics				
pH	DETSC 2008		pH	6.2
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	10.2
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.40
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	1.7
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	1866594
.Sample ID	MS\TP10
Depth	0.30
Other ID	2
Sample Type	ES
Sampling Date	21/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	1.59
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	0.07
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	0.13
fluorene	$*	0.02	ug/l	0.61
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02
naphthalene	$*	0.02	ug/l	0.55
phenanthrene	$*	0.02	ug/l	0.82
pyrene	$*	0.02	ug/l	0.06

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13306-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1866591	MS\TP10 2 0.30	SOIL	NAD	none	Keith Wilson
1866592	MS\TP10 6 0.50	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13306-1
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Nat Zero Teeside

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866590	MB\BH05 17.30 SOIL	21/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1866591	MS\TP10 0.30 SOIL	21/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1866592	MS\TP10 0.50 SOIL	21/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1866594	MS\TP10 0.30 LEACHATE	21/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13303	*Issued:*	30-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13303
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Nat Zero Teeside
Description	One Soil sample.
Date Received	24-Jun-21
Date Started	24-Jun-21
Date Completed	30-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13303
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\TP05	15	3	1866587	30/06/2021	Brown gravelly, very sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13303
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teesid

Lab No	1866587
.Sample ID	MS\TP05
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	17/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	7.0
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	28
Beryllium	DETSC 2301#	0.2	mg/kg	1.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.1
Chromium III	DETSC 2301*	0.15	mg/kg	260
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	53
Lead	DETSC 2301#	0.3	mg/kg	80
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	23
Selenium	DETSC 2301#	0.5	mg/kg	14
Vanadium	DETSC 2301#	0.8	mg/kg	1900
Zinc	DETSC 2301#	1	mg/kg	160
Inorganics				
pH	DETSC 2008#		pH	10.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	0.7
Organic matter	DETSC 2002#	0.1	%	1.1
Nitrate as NO3	DETSC 2055	1	mg/kg	4.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	320
Sulphide	DETSC 2024*	10	mg/kg	920
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.22
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.35
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.05
Pyrene	DETSC 3303#	0.03	mg/kg	0.04
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13303
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teesid

Lab No	1866587
.Sample ID	MS\TP05
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	17/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.32
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-13303
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1866587	MS\TP05 15 3.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13303
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Nat Zero Teeside

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866587	MS\TP05 3.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13302-1	*Issued:*	12-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13302-1
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Nat Zero Teeside
Description	One Soil sample.
Date Received	24-Jun-21
Date Started	24-Jun-21
Date Completed	12-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 21-13302, report amended.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13302-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\TP01	4	0.5	1866586	30/06/2021	Dark brown very gravelly SAND

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13302-1
Client Ref 4339
Preliminary Onshore Ground Investigation for Nat Zero
Contract Title Teeside

Lab No	1866586
.Sample ID	MS\TP01
Depth	0.50
Other ID	4
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	8.1
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	4.4
Beryllium	DETSC 2301#	0.2	mg/kg	4.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.8
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	30
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11
Lead	DETSC 2301#	0.3	mg/kg	4.9
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.0
Selenium	DETSC 2301#	0.5	mg/kg	1.8
Vanadium	DETSC 2301#	0.8	mg/kg	50
Zinc	DETSC 2301#	1	mg/kg	70
Inorganics				
pH	DETSC 2008#		pH	11.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	2.3
Organic matter	DETSC 2002#	0.1	%	1.4
Nitrate as NO3	DETSC 2055	1	mg/kg	6.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	730
Sulphide	DETSC 2024*	10	mg/kg	1100
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.44
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.87
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13302-1
Client Ref 4339
Preliminary Onshore Ground Investigation for Nat Zero
Contract Title Teeside

Lab No	1866586
.Sample ID	MS\TP01
Depth	0.50
Other ID	4
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-13302-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1866586	MS\TP01 4 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13302-1
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Nat Zero Teeside

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866586	MS\TP01 0.50 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Sulphur (free) (7 days), Total Sulphur ICP (7 days), pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13300	*Issued:*	30-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13300
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Nat Zero Teeside
Description	One Soil sample.
Date Received	24-Jun-21
Date Started	24-Jun-21
Date Completed	30-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-13300
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\TP06	4	0.5	1866583	30/06/2021	Dark brown very gravelly, SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13300
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	1866583
.Sample ID	MS\TP06
Depth	0.50
Other ID	4
Sample Type	ES
Sampling Date	15/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	15
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	7.4
Beryllium	DETSC 2301#	0.2	mg/kg	2.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.8
Cadmium	DETSC 2301#	0.1	mg/kg	1.2
Chromium III	DETSC 2301*	0.15	mg/kg	260
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	85
Lead	DETSC 2301#	0.3	mg/kg	21
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	86
Selenium	DETSC 2301#	0.5	mg/kg	1.4
Vanadium	DETSC 2301#	0.8	mg/kg	620
Zinc	DETSC 2301#	1	mg/kg	170
Inorganics				
pH	DETSC 2008#		pH	10.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.6
Nitrate as NO3	DETSC 2055	1	mg/kg	12
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	460
Sulphide	DETSC 2024*	10	mg/kg	100
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.08
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.19

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13300
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	1866583
.Sample ID	MS\TP06
Depth	0.50
Other ID	4
Sample Type	ES
Sampling Date	15/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.12
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.35
Pyrene	DETSC 3303#	0.03	mg/kg	0.29
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.26
Chrysene	DETSC 3303	0.03	mg/kg	0.27
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.46
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.19
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.28
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.14
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.15
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.5
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13300
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1866583	MS\TP06 4 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-13300
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Nat Zero Teeside

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866583	MS\TP06 0.50 SOIL	15/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Sulphur (free) (7 days), Total Sulphur ICP (7 days), pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13296-1	*Issued:*	12-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13296-1
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Nat Zero Teeside
Description	2 Soil samples.
Date Received	24-Jun-21
Date Started	24-Jun-21
Date Completed	12-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 21-13296, report amended.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13296-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH10	7	5	1866576	30/06/2021	Brown SAND
MS\TP04	4	0.5	1866577	30/06/2021	Grey very gravelly SAND

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13296-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866576	1866577
			.Sample ID	MS\BH10	MS\TP04
			Depth	5.00	0.50
			Other ID	7	4
			Sample Type	ES	ES
			Sampling Date	14/06/2021	14/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004	0.1	%	21	4.7
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	8.5	6.1
Beryllium	DETSC 2301#	0.2	mg/kg	< 0.2	5.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.5	3.7
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.1
Chromium III	DETSC 2301*	0.15	mg/kg	4.2	16
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	7.1	8.1
Lead	DETSC 2301#	0.3	mg/kg	33	15
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.9	3.6
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.3
Vanadium	DETSC 2301#	0.8	mg/kg	14	51
Zinc	DETSC 2301#	1	mg/kg	38	76
Inorganics					
pH	DETSC 2008#		pH	10.3	9.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	2.4	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.1	1.2
Nitrate as NO3	DETSC 2055	1	mg/kg	1.5	8.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	270	580
Sulphide	DETSC 2024*	10	mg/kg	44	2600
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	11
Sulphur as S, Total	DETSC 2320	0.01	%	0.08	0.39
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17	0.59
Petroleum Hydrocarbons					
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.04	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-13296-1
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Nat Zero Teeside

			Lab No	1866576	1866577
			.Sample ID	MS\BH10	MS\TP04
			Depth	5.00	0.50
			Other ID	7	4
			Sample Type	ES	ES
			Sampling Date	14/06/2021	14/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.26	< 0.10
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-13296-1
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Nat Zero Teeside

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1866576	MS\BH10 5.00 SOIL	14/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Sulphur (free) (7 days), Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1866577	MS\TP04 0.50 SOIL	14/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Sulphur (free) (7 days), Total Sulphur ICP (7 days), pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-13132	*Issued:*	30-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-13132
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	12 Soil samples, 1 Leachate sample, 1 Water sample.
Date Received	21-Jun-21
Date Started	22-Jun-21
Date Completed	30-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH04	1	0.3	1865488	20/07/2021	Dark brown gravelly, sandy CLAY including some rootlets
MS\BH04	2	0.5	1865489	20/07/2021	Dark brown gravelly, sandy CLAY including some rootlets
MS\BH04	3	1	1865490	20/07/2021	Brown very sandy CLAY
MS\BH10	47	19.1	1865491	20/07/2021	Dark brown gravelly, sandy CLAY
MS\TP01	15	3	1865492	20/07/2021	Dark brown gravelly, sandy CLAY including some rootlets
MS\TP01	19	4	1865493	20/07/2021	Dark brown, gravelly, sandy and CLAY
MS\TP05	4	0.5	1865494	20/07/2021	Dark brown very gravelly, sandy CLAY including some rootlets
MS\TP05	6	1	1865495	20/07/2021	Dark brown very gravelly, sandy CLAY including some rootlets
MS\TP05	11	2	1865496	20/07/2021	Brown very gravelly, sandy CLAY
MS\TP07	4	0.5	1865497	20/07/2021	Dark brown very gravelly, sandy CLAY including some rootlets
MS\TP07	10	2	1865498	20/07/2021	Dark brown very gravelly, sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865489	1865490
			.Sample ID	MS\BH04	MS\BH04	MS\BH04
			Depth	0.30	0.50	1.00
			Other ID	1	2	3
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%		< 0.001	
Preparation						
Moisture Content	DETSC 1004	0.1	%	3.4	4.4	4.0
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	10	8.3	6.9
Beryllium	DETSC 2301#	0.2	mg/kg	7.3	7.2	0.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.4	4.8	0.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.3	0.5
Chromium III	DETSC 2301*	0.15	mg/kg	26	19	3.0
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	17	12	5.4
Lead	DETSC 2301#	0.3	mg/kg	11	39	27
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	5.2	3.5	2.6
Selenium	DETSC 2301#	0.5	mg/kg	2.5	2.4	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	100	100	11
Zinc	DETSC 2301#	1	mg/kg	37	67	150
Inorganics						
pH	DETSC 2008#		pH	10.0	10.9	9.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	0.8	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.8	1.0	0.4
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	4.6	6.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	760	1300	120
Sulphide	DETSC 2024*	10	mg/kg	2100	1100	7600
Sulphur (free)	DETSC 3049#	0.75	mg/kg	19	170	11
Sulphur as S, Total	DETSC 2320	0.01	%	0.58	0.75	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	1.3	3.5	0.14

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865489	1865490
			.Sample ID	MS\BH04	MS\BH04	MS\BH04
			Depth	0.30	0.50	1.00
			Other ID	1	2	3
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	12	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		< 0.01

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865489	1865490
			.Sample ID	MS\BH04	MS\BH04	MS\BH04
			Depth	0.30	0.50	1.00
			Other ID	1	2	3
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.14	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.48	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.28	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.46	0.62	0.40
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.14	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.26	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.12	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.07	0.14	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.69	2.3	0.44
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			
PCB 52	DETSC 3401#	0.01	mg/kg			
PCB 101	DETSC 3401#	0.01	mg/kg			
PCB 118	DETSC 3401#	0.01	mg/kg			
PCB 153	DETSC 3401#	0.01	mg/kg			
PCB 138	DETSC 3401#	0.01	mg/kg			
PCB 180	DETSC 3401#	0.01	mg/kg			
PCB 77	DETSC 3401*	0.01	mg/kg			
PCB 81	DETSC 3401*	0.01	mg/kg			
PCB 105	DETSC 3401*	0.01	mg/kg			
PCB 114	DETSC 3401*	0.01	mg/kg			
PCB 118	DETSC 3401*	0.01	mg/kg			
PCB 123	DETSC 3401*	0.01	mg/kg			
PCB 126	DETSC 3401*	0.01	mg/kg			
PCB 156	DETSC 3401*	0.01	mg/kg			
PCB 157	DETSC 3401*	0.01	mg/kg			
PCB 167	DETSC 3401*	0.01	mg/kg			
PCB 169	DETSC 3401*	0.01	mg/kg			
PCB 189	DETSC 3401*	0.01	mg/kg			
PCB 7 Total	DETSC 3401#	0.01	mg/kg			

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865489	1865490
			.Sample ID	MS\BH04	MS\BH04	MS\BH04
			Depth	0.30	0.50	1.00
			Other ID	1	2	3
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01		
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
VOC TIC						
TAME	DETSC 3431*			None Detected		None Detected

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865491	1865492	1865493	1865494
			.Sample ID	MS\BH10	MS\TP01	MS\TP01	MS\TP05
			Depth	19.10	3.00	4.00	0.50
			Other ID	47	15	19	4
			Sample Type	ES	ES	ES	ES
			Sampling Date	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%				< 0.001
Preparation							
Moisture Content	DETSC 1004	0.1	%	13	9.2	17	10
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.4	9.6	5.5	32
Beryllium	DETSC 2301#	0.2	mg/kg	3.5	3.9	0.8	2.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	3.8	5.4	1.5	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.4	< 0.1	4.4
Chromium III	DETSC 2301*	0.15	mg/kg	20	130	8.0	32
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	17	31	8.1	2700
Lead	DETSC 2301#	0.3	mg/kg	29	46	22	630
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	15	11	3.8	68
Selenium	DETSC 2301#	0.5	mg/kg	1.1	4.0	0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	57	280	23	110
Zinc	DETSC 2301#	1	mg/kg	60	170	37	1300
Inorganics							
pH	DETSC 2008#		pH	10.2	10.1	10.4	9.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.3	16	0.2
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	1.1	0.7	1.1	0.2
Nitrate as NO3	DETSC 2055	1	mg/kg	5.7	14	5.6	11
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1500	1300	440	1500
Sulphide	DETSC 2024*	10	mg/kg	2700	1100	400	200
Sulphur (free)	DETSC 3049#	0.75	mg/kg	5.1	0.86	6.5	1.7
Sulphur as S, Total	DETSC 2320	0.01	%	0.42	0.54	0.10	0.29
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.77	2.2	0.26	0.65

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865491	1865492	1865493	1865494
			.Sample ID	MS\BH10	MS\TP01	MS\TP01	MS\TP05
			Depth	19.10	3.00	4.00	0.50
			Other ID	47	15	19	4
			Sample Type	ES	ES	ES	ES
			Sampling Date	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	38	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		< 0.01	

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

				Lab No	1865491	1865492	1865493	1865494
				.Sample ID	MS\BH10	MS\TP01	MS\TP01	MS\TP05
				Depth	19.10	3.00	4.00	0.50
				Other ID	47	15	19	4
				Sample Type	ES	ES	ES	ES
				Sampling Date	18/06/2021	17/06/2021	17/06/2021	17/06/2021
				Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	1.1	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	1.6	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	1.4	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.24	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.77	0.44	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.20	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.25	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.16	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.17	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	5.9	0.44	< 0.10
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg			< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg			< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg			< 0.01	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865491	1865492	1865493	1865494
			.Sample ID	MS\BH10	MS\TP01	MS\TP01	MS\TP05
			Depth	19.10	3.00	4.00	0.50
			Other ID	47	15	19	4
			Sample Type	ES	ES	ES	ES
			Sampling Date	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg				
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg				
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg				
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg				
p-cresol	DETSC 3451*	0.01	mg/kg				
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg				
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg				
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg				
VOC TIC							
TAME	DETSC 3431*			None Detected		None Detected	

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865495	1865496	1865497
			.Sample ID	MS\TP05	MS\TP05	MS\TP07
			Depth	1.00	2.00	0.50
			Other ID	6	11	4
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%			
Preparation						
Moisture Content	DETSC 1004	0.1	%	8.5	16	9.1
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	42	180	24
Beryllium	DETSC 2301#	0.2	mg/kg	2.4	1.1	1.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.9	2.8	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	3.5	1.2	4.6
Chromium III	DETSC 2301*	0.15	mg/kg	210	29	110
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	92	330	60
Lead	DETSC 2301#	0.3	mg/kg	270	200	190
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	30	27	21
Selenium	DETSC 2301#	0.5	mg/kg	7.2	5.6	1.0
Vanadium	DETSC 2301#	0.8	mg/kg	1200	70	390
Zinc	DETSC 2301#	1	mg/kg	570	430	170
Inorganics						
pH	DETSC 2008#		pH	10.0	6.4	10.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3	< 0.1	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.9	0.2	1.5
Nitrate as NO3	DETSC 2055	1	mg/kg	6.5	7.9	7.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	710	1800	180
Sulphide	DETSC 2024*	10	mg/kg	720	200	440
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.26	0.96	0.17
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.47	3.1	0.22

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865495	1865496	1865497
			.Sample ID	MS\TP05	MS\TP05	MS\TP07
			Depth	1.00	2.00	0.50
			Other ID	6	11	4
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	51	< 10	68
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865495	1865496	1865497
			.Sample ID	MS\TP05	MS\TP05	MS\TP07
			Depth	1.00	2.00	0.50
			Other ID	6	11	4
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.11
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.44
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.37
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.12
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.51	< 0.03	0.78
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.22
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	0.39
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	0.21
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.09	< 0.03	0.23
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.81	< 0.10	2.9
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg			
PCB 52	DETSC 3401#	0.01	mg/kg			
PCB 101	DETSC 3401#	0.01	mg/kg			
PCB 118	DETSC 3401#	0.01	mg/kg			
PCB 153	DETSC 3401#	0.01	mg/kg			
PCB 138	DETSC 3401#	0.01	mg/kg			
PCB 180	DETSC 3401#	0.01	mg/kg			
PCB 77	DETSC 3401*	0.01	mg/kg			
PCB 81	DETSC 3401*	0.01	mg/kg			
PCB 105	DETSC 3401*	0.01	mg/kg			
PCB 114	DETSC 3401*	0.01	mg/kg			
PCB 118	DETSC 3401*	0.01	mg/kg			
PCB 123	DETSC 3401*	0.01	mg/kg			
PCB 126	DETSC 3401*	0.01	mg/kg			
PCB 156	DETSC 3401*	0.01	mg/kg			
PCB 157	DETSC 3401*	0.01	mg/kg			
PCB 167	DETSC 3401*	0.01	mg/kg			
PCB 169	DETSC 3401*	0.01	mg/kg			
PCB 189	DETSC 3401*	0.01	mg/kg			
PCB 7 Total	DETSC 3401#	0.01	mg/kg			

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865495	1865496	1865497
			.Sample ID	MS\TP05	MS\TP05	MS\TP07
			Depth	1.00	2.00	0.50
			Other ID	6	11	4
			Sample Type	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
p-cresol	DETSC 3451*	0.01	mg/kg			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg			
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865498	1865499	1880713
			.Sample ID	MS\TP07	MS\TP07	MS\BH10
			Depth	2.00	4.00	19.10
			Other ID	10	19	47
			Sample Type	ES	ES	ES
			Sampling Date	18/06/2021	18/06/2021	18/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%			
Preparation						
Moisture Content	DETSC 1004	0.1	%	5.5	7.6	
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	7.6	13	
Beryllium	DETSC 2301#	0.2	mg/kg	1.0	1.8	
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.5	1.4	
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	1.1	
Chromium III	DETSC 2301*	0.15	mg/kg	380	350	
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	
Copper	DETSC 2301#	0.2	mg/kg	23	49	
Lead	DETSC 2301#	0.3	mg/kg	12	51	
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	
Nickel	DETSC 2301#	1	mg/kg	5.2	15	
Selenium	DETSC 2301#	0.5	mg/kg	1.8	1.4	
Vanadium	DETSC 2301#	0.8	mg/kg	2500	2100	
Zinc	DETSC 2301#	1	mg/kg	70	450	
Inorganics						
pH	DETSC 2008#		pH	11.4	11.9	
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.3	
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.1	
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	
Organic matter	DETSC 2002#	0.1	%	0.2	0.9	
Nitrate as NO3	DETSC 2055	1	mg/kg	21	10	
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	250	360	
Sulphide	DETSC 2024*	10	mg/kg	< 10	280	
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	
Sulphur as S, Total	DETSC 2320	0.01	%	0.37	0.26	
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.75	0.41	

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865498	1865499	1880713
			.Sample ID	MS\TP07	MS\TP07	MS\BH10
			Depth	2.00	4.00	19.10
			Other ID	10	19	47
			Sample Type	ES	ES	ES
			Sampling Date	18/06/2021	18/06/2021	18/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865498	1865499	1880713
			.Sample ID	MS\TP07	MS\TP07	MS\BH10
			Depth	2.00	4.00	19.10
			Other ID	10	19	47
			Sample Type	ES	ES	ES
			Sampling Date	18/06/2021	18/06/2021	18/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.40	0.40	
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.04	0.03	
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.44	0.44	
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01		< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01		< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1865498	1865499	1880713
			.Sample ID	MS\TP07	MS\TP07	MS\BH10
			Depth	2.00	4.00	19.10
			Other ID	10	19	47
			Sample Type	ES	ES	ES
			Sampling Date	18/06/2021	18/06/2021	18/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	
Phenol	DETSC 3451*	0.01	mg/kg			
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg			
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
p-cresol	DETSC 3451*	0.01	mg/kg			
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg			
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg			
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg			
VOC TIC						
TAME	DETSC 3431*			None Detected		

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865490	1865491	1865493	1865495	1865496
			.Sample ID	MS\BH04	MS\BH04	MS\BH10	MS\TP01	MS\TP05	MS\TP05
			Depth	0.30	1.00	19.10	4.00	1.00	2.00
			Other ID	1	3	47	19	6	11
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
VOCs									
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865490	1865491	1865493	1865495	1865496
			.Sample ID	MS\BH04	MS\BH04	MS\BH10	MS\TP01	MS\TP05	MS\TP05
			Depth	0.30	1.00	19.10	4.00	1.00	2.00
			Other ID	1	3	47	19	6	11
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Phenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865488	1865490	1865491	1865493	1865495	1865496
			.Sample ID	MS\BH04	MS\BH04	MS\BH10	MS\TP01	MS\TP05	MS\TP05
			Depth	0.30	1.00	19.10	4.00	1.00	2.00
			Other ID	1	3	47	19	6	11
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	17/06/2021	17/06/2021	18/06/2021	17/06/2021	17/06/2021	17/06/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

Lab No	1865498
.Sample ID	MS\TP07
Depth	2.00
Other ID	10
Sample Type	ES
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

Lab No	1865498
.Sample ID	MS\TP07
Depth	2.00
Other ID	10
Sample Type	ES
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Phenol	DETSC 3433	0.1	mg/kg	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

Lab No	1865498
.Sample ID	MS\TP07
Depth	2.00
Other ID	10
Sample Type	ES
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

			Lab No	1865500
			.Sample ID	TRIP BLANK 18/06/2021
			Depth	4.00
			Other ID	
			Sample Type	W
			Sampling Date	18/06/2021
			Sampling Time	n/s
Test	**Method**	**LOD**	**Units**	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1865500
.Sample ID	TRIP BLANK 18/06/2021
Depth	4.00
Other ID	
Sample Type	W
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1865501
.Sample ID	MS\BH10
Depth	19.10
Other ID	
Sample Type	ES
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	6.1
Boron, Dissolved	DETSC 2306*	12	ug/l	88
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	3.1
Chromium III, Dissolved	DETSC 2306*	1	ug/l	32
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	33
Iron, Dissolved	DETSC 2306	5.5	ug/l	180
Lead, Dissolved	DETSC 2306	0.09	ug/l	26
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.16
Nickel, Dissolved	DETSC 2306	0.5	ug/l	35
Selenium, Dissolved	DETSC 2306	0.25	ug/l	6.8
Zinc, Dissolved	DETSC 2306	1.3	ug/l	73
Inorganics				
pH	DETSC 2008		pH	6.6
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	36.4
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	< 0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.30
Sulphate as SO4	DETSC 2055	0.1	mg/l	16
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teesid

Lab No	1865501
.Sample ID	MS\BH10
Depth	19.10
Other ID	
Sample Type	ES
Sampling Date	18/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02
fluorene	$*	0.02	ug/l	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	0.02
pyrene	$*	0.02	ug/l	< 0.02

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1865488	MS\BH04 1 0.30	SOIL	NAD	none	Rebecca Burgess
1865489	MS\BH04 2 0.50	SOIL	Chrysotile	Bundle of Chrysotile fibres	Rebecca Burgess
1865492	MS\TP01 15 3.00	SOIL	NAD	none	Rebecca Burgess
1865493	MS\TP01 19 4.00	SOIL	NAD	none	Rebecca Burgess
1865494	MS\TP05 4 0.50	SOIL	Chrysotile	Bundle of Chrysotile fibres	Rebecca Burgess
1865495	MS\TP05 6 1.00	SOIL	NAD	none	Rebecca Burgess
1865496	MS\TP05 11 2.00	SOIL	NAD	none	Rebecca Burgess
1865497	MS\TP07 4 0.50	SOIL	NAD	none	Rebecca Burgess
1865498	MS\TP07 10 2.00	SOIL	NAD	none	Rebecca Burgess
1865499	MS\TP07 19 4.00	SOIL	NAD	none	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 21-13132
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1865489	1865494
			.Sample ID	MS\BH04	MS\TP05
			Depth	0.50	0.50
			Other ID	2	4
			Sample Type	ES	ES
			Sampling Date	17/06/2021	17/06/2021
			Sampling Time		
Test	**Method**	**Units**			
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %		**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %		na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %		<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %		na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g		na	na
Breakdown of Gravimetric Analysis (a)					
Mass of Sample		g		1145.39	985.06
ACMs present*		type			
Mass of ACM in sample		g			
% ACM by mass		%			
% asbestos in ACM		%			
% asbestos in sample		%			
Breakdown of Detailed Gravimetric Analysis (b)					
% Amphibole bundles in sample		Mass %		na	na
% Chrysotile bundles in sample		Mass %		<0.001	<0.001
Breakdown of PCOM Analysis (c)					
% Amphibole fibres in sample		Mass %		na	na
% Chrysotile fibres in sample		Mass %		na	na
Breakdown of Potentially Respirable Fibre Analysis (d)					
Amphibole fibres		Fibres/g		na	na
Chrysotile fibres		Fibres/g		na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-13132
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1865488	MS\BH04 0.30 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865489	MS\BH04 0.50 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865490	MS\BH04 1.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865491	MS\BH10 19.10 SOIL	18/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865492	MS\TP01 3.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865493	MS\TP01 4.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865494	MS\TP05 0.50 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865495	MS\TP05 1.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865496	MS\TP05 2.00 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865497	MS\TP07 0.50 SOIL	17/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865498	MS\TP07 2.00 SOIL	18/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865499	MS\TP07 4.00 SOIL	18/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1865500	TRIP BLANK 18/06/2021 4.00 WATER	18/06/21	GV		
1865501	MS\BH10 19.10 LEACHATE	18/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12957	*Issued:*	13-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 21-12957

Client Reference 4339

Order No (not supplied)

Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Description 3 Soil samples, 1 Leachate sample.

Date Received 21-Jun-21

Date Started 21-Jun-21

Date Completed 13-Jul-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH05	3	4.4	1864612	13/07/2021	Brown very sandy CLAY
MS\TP09	6	1	1864614	13/07/2021	Brown sandy, gravelly CLAY
MS\TP09	15	3	1864615	13/07/2021	Brown sandy, gravelly CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864612	1864614	1864615
			.Sample ID	MS\BH05	MS\TP09	MS\TP09
			Depth	4.40	1.00	3.00
			Other ID	3	6	15
			Sample Type	ES	ES	ES
			Sampling Date	16/06/2021	16/06/2021	16/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	18	6.4	12
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	7.1	5.3	6.2
Beryllium	DETSC 2301#	0.2	mg/kg	< 0.2	6.7	6.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3	1.8	3.3
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	3.8	51	30
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	5.5	9.3	9.4
Lead	DETSC 2301#	0.3	mg/kg	20	9.7	7.2
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	2.9	3.3	2.2
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	2.0	2.4
Vanadium	DETSC 2301#	0.8	mg/kg	13	170	110
Zinc	DETSC 2301#	1	mg/kg	22	13	19
Inorganics						
pH	DETSC 2008#		pH	8.9	10.8	10.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	< 0.1	0.4	0.3
Nitrate as NO3	DETSC 2055	1	mg/kg	4.9	7.2	7.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	28	520	670
Sulphide	DETSC 2024*	10	mg/kg	32	1200	2200
Sulphur (free)	DETSC 3049#	0.75	mg/kg	3.5	1.8	3.8
Sulphur as S, Total	DETSC 2320	0.01	%	0.02	0.58	0.57
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06	1.5	1.2
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	< 0.5

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864612	1864614	1864615
			.Sample ID	MS\BH05	MS\TP09	MS\TP09
			Depth	4.40	1.00	3.00
			Other ID	3	6	15
			Sample Type	ES	ES	ES
			Sampling Date	16/06/2021	16/06/2021	16/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	< 0.01
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.10
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.49
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.14
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.62
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.45
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.14
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.13
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.04	0.15
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.07
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	2.5
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg			< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg			< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg			< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg			< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg			< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg			< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg			< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg			< 0.01
VOC TIC						
TAME	DETSC 3431*				None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864615
.Sample ID	MS\TP09
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864615
.Sample ID	MS\TP09
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864615
.Sample ID	MS\TP09
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864616
.Sample ID	MS\TP09
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.58
Boron, Dissolved	DETSC 2306*	12	ug/l	14
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3
Iron, Dissolved	DETSC 2306	5.5	ug/l	< 5.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.84
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3
Inorganics				
pH	DETSC 2008		pH	7.7
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	27.5
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	< 0.015
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.28
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	17
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02
fluorene	$*	0.02	ug/l	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864616
.Sample ID	MS\TP09
Depth	3.00
Other ID	15
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-12957
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1864614	MS\TP09 6 1.00	SOIL	NAD	none	Keith Wilson
1864615	MS\TP09 15 3.00	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12957
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1864612	MS\BH05 4.40 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864613	MS\BH05 16.60 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864614	MS\TP09 1.00 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864615	MS\TP09 3.00 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864616	MS\TP09 3.00 LEACHATE	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12955	*Issued:*	13-Jul-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-12955
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	2 Soil samples, 1 Leachate sample.
Date Received	21-Jun-21
Date Started	21-Jun-21
Date Completed	13-Jul-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH10	29	11.3	1864602	13/07/2021	Brown sandy CLAY
MS\TP06	6	1.2	1864603	13/07/2021	Brown sandy, gravelly CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864602	1864603
			.Sample ID	MS\BH10	MS\TP06
			Depth	11.30	1.20
			Other ID	29	6
			Sample Type	ES	ES
			Sampling Date	16/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004	0.1	%	26	14
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	9.4	28
Beryllium	DETSC 2301#	0.2	mg/kg	0.8	2.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.7	17
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.8
Chromium III	DETSC 2301*	0.15	mg/kg	32	49
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	19	100
Lead	DETSC 2301#	0.3	mg/kg	19	120
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.11
Nickel	DETSC 2301#	1	mg/kg	30	66
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	2.0
Vanadium	DETSC 2301#	0.8	mg/kg	51	100
Zinc	DETSC 2301#	1	mg/kg	73	180
Inorganics					
pH	DETSC 2008#		pH	8.4	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.3	2.6
Nitrate as NO3	DETSC 2055	1	mg/kg	8.6	7.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	540	330
Sulphide	DETSC 2024*	10	mg/kg	180	260
Sulphur (free)	DETSC 3049#	0.75	mg/kg	69	28
Sulphur as S, Total	DETSC 2320	0.01	%	0.37	0.37
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.44	0.61
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	15
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	56
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	72
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864602	1864603
			.Sample ID	MS\BH10	MS\TP06
			Depth	11.30	1.20
			Other ID	29	6
			Sample Type	ES	ES
			Sampling Date	16/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	3.2
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	5.3
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	34
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	98
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	140
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	210
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	21
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.25
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.95
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.41
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.25
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.65
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.91
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.52
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.29
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.44
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.67
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	5.5

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864602	1864603
			.Sample ID	MS\BH10	MS\TP06
			Depth	11.30	1.20
			Other ID	29	6
			Sample Type	ES	ES
			Sampling Date	16/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PCBs					
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01	
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOC TIC					
TAME	DETSC 3431*			None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864604
.Sample ID	MS\BH10
Depth	11.30
Other ID	29
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.87
Boron, Dissolved	DETSC 2306*	12	ug/l	12
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	22
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.22
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.76
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3
Inorganics				
pH	DETSC 2008		pH	7.1
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	28.3
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.80
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.66
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.25
Sulphate as SO4	DETSC 2055	0.1	mg/l	21
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02
fluorene	$*	0.02	ug/l	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1864604
.Sample ID	MS\BH10
Depth	11.30
Other ID	29
Sample Type	ES
Sampling Date	16/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	< 0.02
pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12955
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1864603	MS\TP06 6 1.20	SOIL	NAD	none	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12955
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1864602	MS\BH10 11.30 SOIL	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864603	MS\TP06 1.20 SOIL	15/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864604	MS\BH10 11.30 LEACHATE	16/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12897	*Issued:*	23-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-12897
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	2 Soil samples.
Date Received	11-Jun-21
Date Started	18-Jun-21
Date Completed	23-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-12897
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\TP03	9	2	1864247	23/06/2021	Brown very gravelly SAND
MS\TP04	5	4	1864248	23/06/2021	Brown very gravelly SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12897
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864247	1864248
			.Sample ID	MS\TP03	MS\TP04
			Depth	2.00	4.00
			Other ID	9	5
			Sample Type	ES	ES
			Sampling Date	14/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004	0.1	%	6.6	15
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	6.4	5.5
Beryllium	DETSC 2301#	0.2	mg/kg	5.3	6.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.1	3.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.1
Chromium III	DETSC 2301*	0.15	mg/kg	8.1	3.8
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	9.7	6.2
Lead	DETSC 2301#	0.3	mg/kg	12	1.4
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	2.5	2.1
Selenium	DETSC 2301#	0.5	mg/kg	1.6	0.6
Vanadium	DETSC 2301#	0.8	mg/kg	45	17
Zinc	DETSC 2301#	1	mg/kg	27	5.5
Inorganics					
pH	DETSC 2008#		pH	10.1	10.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	0.9
Organic matter	DETSC 2002#	0.1	%	0.7	0.5
Nitrate as NO3	DETSC 2055	1	mg/kg	4.9	9.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	970	1900
Sulphide	DETSC 2024*	10	mg/kg	14000	7000
Sulphur (free)	DETSC 3049#	0.75	mg/kg	7.3	3.7
Sulphur as S, Total	DETSC 2320	0.01	%	0.60	1.2
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.65	4.9

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12897
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864247	1864248
			.Sample ID	MS\TP03	MS\TP04
			Depth	2.00	4.00
			Other ID	9	5
			Sample Type	ES	ES
			Sampling Date	14/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12897
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1864247	1864248
			.Sample ID	MS\TP03	MS\TP04
			Depth	2.00	4.00
			Other ID	9	5
			Sample Type	ES	ES
			Sampling Date	14/06/2021	15/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.14	< 0.10
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01
VOC TIC					
TAME	DETSC 3431*				None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12897
Client Ref 4339
Preliminary Onshore Ground Investigation for Net Zero Teeside
Contract Title (NZT)

Lab No	1864248
.Sample ID	MS\TP04
Depth	4.00
Other ID	5
Sample Type	ES
Sampling Date	15/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12897
Client Ref 4339
Preliminary Onshore Ground Investigation for Net Zero Teeside
Contract Title (NZT)

Lab No	1864248
.Sample ID	MS\TP04
Depth	4.00
Other ID	5
Sample Type	ES
Sampling Date	15/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12897
Client Ref 4339
Preliminary Onshore Ground Investigation for Net Zero Teeside
Contract Title (NZT)

Lab No	1864248
.Sample ID	MS\TP04
Depth	4.00
Other ID	5
Sample Type	ES
Sampling Date	15/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12897
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1864247	MS\TP03 9 2.00	SOIL	NAD	none	Keith Wilson
1864248	MS\TP04 5 4.00	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12897
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1864247	MS\TP03 2.00 SOIL	14/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1864248	MS\TP04 4.00 SOIL	15/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12521	*Issued:*	22-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-12521
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	One Soil sample.
Date Received	11-Jun-21
Date Started	15-Jun-21
Date Completed	22-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH10	6	4	1862197	22/06/2021	Grey gravelly SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	3.5
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	12
Beryllium	DETSC 2301#	0.2	mg/kg	0.8
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2
Chromium III	DETSC 2301*	0.15	mg/kg	430
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11
Lead	DETSC 2301#	0.3	mg/kg	3.1
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.7
Selenium	DETSC 2301#	0.5	mg/kg	5.4
Vanadium	DETSC 2301#	0.8	mg/kg	1600
Zinc	DETSC 2301#	1	mg/kg	11
Inorganics				
pH	DETSC 2008#		pH	11.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.6
Nitrate as NO3	DETSC 2055	1	mg/kg	7.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120
Sulphide	DETSC 2024*	10	mg/kg	260
Sulphur (free)	DETSC 3049#	0.75	mg/kg	1.7
Sulphur as S, Total	DETSC 2320	0.01	%	0.25
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10
PCBs				
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1862197
.Sample ID	MS\BH10
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	09/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1
VOC TIC				
TAME	DETSC 3431*			None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12521
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1862197	MS\BH10 6 4.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12521
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1862197	MS\BH10 4.00 SOIL	09/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12241	*Issued:*	21-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-12241
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	1 Soil sample, 1 Water sample.
Date Received	10-Jun-21
Date Started	10-Jun-21
Date Completed	21-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH10	3	1	1860515	21/06/2021	Brown gravelly SAND

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Moisture Content	DETSC 1004	0.1	%	2.4
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	14
Beryllium	DETSC 2301#	0.2	mg/kg	1.1
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.2
Chromium III	DETSC 2301*	0.15	mg/kg	570
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14
Lead	DETSC 2301#	0.3	mg/kg	5.5
Mercury	DETSC 2325#	0.05	mg/kg	0.78
Nickel	DETSC 2301#	1	mg/kg	11
Selenium	DETSC 2301#	0.5	mg/kg	8.8
Vanadium	DETSC 2301#	0.8	mg/kg	2100
Zinc	DETSC 2301#	1	mg/kg	11
Inorganics				
pH	DETSC 2008#		pH	11.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.7
Nitrate as NO3	DETSC 2055	1	mg/kg	10
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	43
Sulphide	DETSC 2024*	10	mg/kg	340
Sulphur (free)	DETSC 3049#	0.75	mg/kg	1.5
Sulphur as S, Total	DETSC 2320	0.01	%	0.23
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.24
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
PCBs				
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 77	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 81	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 105	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 114	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 118	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 123	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 126	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 156	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 157	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 167	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 169	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 189	DETSC 3401*	0.01	mg/kg	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Phenol	DETSC 3433	0.1	mg/kg	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1860515
.Sample ID	MS\BH10
Depth	1.00
Other ID	3
Sample Type	ES
Sampling Date	07/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1
VOC TIC				
TAME	DETSC 3431*			None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

			Lab No	1860516
			.Sample ID	Trip Blank 07/06/2021
			Depth	
			Other ID	
			Sample Type	WATER
			Sampling Date	07/06/2021
			Sampling Time	n/s
Test	**Method**	**LOD**	**Units**	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

			Lab No	1860516
			.Sample ID	Trip Blank 07/06/2021
			Depth	
			Other ID	
			Sample Type	WATER
			Sampling Date	07/06/2021
			Sampling Time	n/s
Test	**Method**	**LOD**	**Units**	
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12241
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1860515	MS\BH10 3 1.00	SOIL	NAD	none	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12241
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1860515	MS\BH10 1.00 SOIL	07/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1860516	Trip Blank 07/06/2021 WATER	07/06/21	GV		

Key: G-Glass P-Plastic J-Jar T-Tub V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-12239	*Issued:*	21-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-12239
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	3 Soil samples.
Date Received	10-Jun-21
Date Started	10-Jun-21
Date Completed	21-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH11	48	13.2	1860480	21/06/2021	Dark brown sandy CLAY
MS\BH12	3	1	1860481	21/06/2021	Dark brown gravelly SAND
MS\BH12	4	2.70-3.00	1860482	21/06/2021	Brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860480	1860481	1860482
			.Sample ID	MS\BH11	MS\BH12	MS\BH12
			Depth	13.20	1.00	2.70-3.00
			Other ID	48	3	4
			Sample Type	ES	ES	ES
			Sampling Date	03/06/2021	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	24	5.9	17
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	8.7	9.5	6.6
Beryllium	DETSC 2301#	0.2	mg/kg	0.8	2.1	0.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	4.4	1.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.4	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	29	350	14
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	18	54	5.6
Lead	DETSC 2301#	0.3	mg/kg	17	34	11
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	27	11	2.6
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	3.9	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	47	1300	43
Zinc	DETSC 2301#	1	mg/kg	64	78	21
Inorganics						
pH	DETSC 2008#		pH	8.1	10.9	10.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	2.7	1.2	0.2
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	4.2	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	380	110	71
Sulphide	DETSC 2024*	10	mg/kg	52	460	130
Sulphur (free)	DETSC 3049#	0.75	mg/kg	3.5	3.4	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.36	0.22	0.05
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17	0.48	0.06
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860480	1860481	1860482
			.Sample ID	MS\BH11	MS\BH12	MS\BH12
			Depth	13.20	1.00	2.70-3.00
			Other ID	48	3	4
			Sample Type	ES	ES	ES
			Sampling Date	03/06/2021	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.20	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.62	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.55	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.26	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.27	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.75	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.26	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.43	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.27	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.33	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	4.0	< 0.10

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860480	1860481	1860482
			.Sample ID	MS\BH11	MS\BH12	MS\BH12
			Depth	13.20	1.00	2.70-3.00
			Other ID	48	3	4
			Sample Type	ES	ES	ES
			Sampling Date	03/06/2021	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
VOC TIC						
TAME	DETSC 3431*				None Detected	

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860481	1860482
			.Sample ID	MS\BH12	MS\BH12
			Depth	1.00	2.70-3.00
			Other ID	3	4
			Sample Type	ES	ES
			Sampling Date	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860481	1860482
			.Sample ID	MS\BH12	MS\BH12
			Depth	1.00	2.70-3.00
			Other ID	3	4
			Sample Type	ES	ES
			Sampling Date	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Phenol	DETSC 3433	0.1	mg/kg		< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg		< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg		< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg		< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1860481	1860482
			.Sample ID	MS\BH12	MS\BH12
			Depth	1.00	2.70-3.00
			Other ID	3	4
			Sample Type	ES	ES
			Sampling Date	03/06/2021	03/06/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12239
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1860481	MS\BH12 3 1.00	SOIL	NAD	none	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12239
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1860480	MS\BH11 13.20 SOIL	03/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1860481	MS\BH12 1.00 SOIL	03/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1860482	MS\BH12 2.70-3.00 SOIL	03/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-11994	*Issued:*	28-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-11994
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	3 Soil samples, 1 Leachate sample.

Date Received	07-Jun-21
Date Started	07-Jun-21
Date Completed	28-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

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THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH11	2	0.5	1859044	28/06/2021	Dark brown gravelly, sandy CLAY (Made ground - brick)
MS\BH11	6	4	1859045	28/06/2021	Grey very gravelly SAND
MS\BH11	7	5	1859046	28/06/2021	Brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1859044	1859045	1859046
			.Sample ID	MS\BH11	MS\BH11	MS\BH11
			Depth	0.50	4.00	5.00
			Other ID	2	6	7
			Sample Type	ES	ES	ES
			Sampling Date	02/06/2021	02/06/2021	02/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Asbestos Quantification	DETSC 1102	0.001	%	< 0.001		
Preparation						
Moisture Content	DETSC 1004	0.1	%	6.1	13	18
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	6.2	5.7	12
Beryllium	DETSC 2301#	0.2	mg/kg	3.8	< 0.2	2.1
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.2	0.2	0.6
Cadmium	DETSC 2301#	0.1	mg/kg	20	8.1	4.2
Chromium III	DETSC 2301*	0.15	mg/kg	14	6.6	760
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	21	5.9	47
Lead	DETSC 2301#	0.3	mg/kg	110	38	520
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	11	4.7	11
Selenium	DETSC 2301#	0.5	mg/kg	1.2	< 0.5	5.1
Vanadium	DETSC 2301#	0.8	mg/kg	37	17	1400
Zinc	DETSC 2301#	1	mg/kg	4100	350	980
Inorganics						
pH	DETSC 2008#		pH	11.4	8.6	11.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	0.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	2.8	< 0.6	0.7
Organic matter	DETSC 2002#	0.1	%	0.5	0.2	1.2
Nitrate as NO3	DETSC 2055	1	mg/kg	5.4	18	7.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1400	120	600
Sulphide	DETSC 2024*	10	mg/kg	1800	< 10	1700
Sulphur (free)	DETSC 3049#	0.75	mg/kg	22	21	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.58	0.03	0.32
Sulphate as SO4, Total	DETSC 2321#	0.01	%	1.3	0.07	0.40
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1859044	1859045	1859046
			.Sample ID	MS\BH11	MS\BH11	MS\BH11
			Depth	0.50	4.00	5.00
			Other ID	2	6	7
			Sample Type	ES	ES	ES
			Sampling Date	02/06/2021	02/06/2021	02/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	110	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	< 0.01
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.60	0.07	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.08	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.3	0.06	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.98	0.04	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.70	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.50	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.60	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.57	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.25	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.28	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	6.3	0.17	< 0.10

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Summary of Chemical Analysis

Soil Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1859044	1859045	1859046
			.Sample ID	MS\BH11	MS\BH11	MS\BH11
			Depth	0.50	4.00	5.00
			Other ID	2	6	7
			Sample Type	ES	ES	ES
			Sampling Date	02/06/2021	02/06/2021	02/06/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg		< 0.01	
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
p-cresol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg		< 0.01	
VOC TIC						
TAME	DETSC 3431*				None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859045
.Sample ID	MS\BH11
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859045
.Sample ID	MS\BH11
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859045
.Sample ID	MS\BH11
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859047
.Sample ID	MS\BH11
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.88
Boron, Dissolved	DETSC 2306*	12	ug/l	24
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05
Chromium III, Dissolved	DETSC 2306*	1	ug/l	1.3
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.9
Iron, Dissolved	DETSC 2306	5.5	ug/l	15
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.60
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l	5.4
Inorganics				
pH	DETSC 2008		pH	9.4
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	14.9
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.073
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.060
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.48
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	2.9
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	< 0.02
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	< 0.02
benzo(a)anthracene	$*	0.02	ug/l	< 0.02
benzo(a)pyrene	$*	0.02	ug/l	< 0.02
benzo(b)fluoranthene	$*	0.02	ug/l	< 0.02
benzo(g,h,i)perylene	$*	0.02	ug/l	< 0.02
benzo(k)fluoranthene	$*	0.02	ug/l	< 0.02
chrysene	$*	0.02	ug/l	< 0.02
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	< 0.02
fluorene	$*	0.02	ug/l	< 0.02
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859047
.Sample ID	MS\BH11
Depth	4.00
Other ID	6
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	n/s

Test	Method	LOD	Units	
naphthalene	$*	0.02	ug/l	< 0.02
phenanthrene	$*	0.02	ug/l	< 0.02
pyrene	$*	0.02	ug/l	< 0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1859044	MS\BH11 2 0.50	SOIL	Amosite	Amosite present as fibre bundles	D Wilkinson
1859045	MS\BH11 6 4.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 21-11994
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1859044
.Sample ID	MS\BH11
Depth	0.50
Other ID	2
Sample Type	ES
Sampling Date	02/06/2021
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1356.60
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	<0.001
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-11994
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1859044	MS\BH11 0.50 SOIL	02/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1859045	MS\BH11 4.00 SOIL	02/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1859046	MS\BH11 5.00 SOIL	02/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1859047	MS\BH11 4.00 LEACHATE	02/06/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-11630	*Issued:*	28-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-11630
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)
Description	3 Soil samples, 1 Leachate sample.
Date Received	02-Jun-21
Date Started	02-Jun-21
Date Completed	28-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH08	1	0.36	1856406	28/06/2021	Light brown gravelly, clayey SAND
MS\BH08	5	3	1856407	28/06/2021	Grey gravelly SAND
MS\BH08	6	6	1856408	28/06/2021	Dark brown SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1856406	1856407	1856408
			.Sample ID	MS\BH08	MS\BH08	MS\BH08
			Depth	0.36	3.00	6.00
			Other ID	1	5	6
			Sample Type	ES	ES	ES
			Sampling Date	28/05/2021	28/05/2021	28/05/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
Moisture Content	DETSC 1004	0.1	%	11	9.0	20
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	8.7	6.1	7.1
Beryllium	DETSC 2301#	0.2	mg/kg	8.1	7.9	0.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	7.4	3.6	0.9
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chromium III	DETSC 2301*	0.15	mg/kg	8.2	9.4	4.2
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	6.6	7.3	4.5
Lead	DETSC 2301#	0.3	mg/kg	2.1	2.7	17
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.5	2.1	2.6
Selenium	DETSC 2301#	0.5	mg/kg	2.1	1.6	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	26	34	13
Zinc	DETSC 2301#	1	mg/kg	8.6	23	20
Inorganics						
pH	DETSC 2008#		pH	10.0	10.3	9.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.9	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.8	1.3	0.5
Nitrate as NO3	DETSC 2055	1	mg/kg	13	1.7	4.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	910	2500	1500
Sulphide	DETSC 2024*	10	mg/kg	800	1800	210
Sulphur (free)	DETSC 3049#	0.75	mg/kg	14	23	13
Sulphur as S, Total	DETSC 2320	0.01	%	0.82	1.7	0.10
Sulphate as SO4, Total	DETSC 2321#	0.01	%	1.6	4.0	0.16
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1856406	1856407	1856408
			.Sample ID	MS\BH08	MS\BH08	MS\BH08
			Depth	0.36	3.00	6.00
			Other ID	1	5	6
			Sample Type	ES	ES	ES
			Sampling Date	28/05/2021	28/05/2021	28/05/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10		
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	18	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01		
MTBE	DETSC 3321	0.01	mg/kg	< 0.01		
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.88
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.09
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.2
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	1.7
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	11
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	3.1
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	14
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	12
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	5.7
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	4.5
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	6.2
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.2
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	4.5
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.3
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.75
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	2.7
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	74

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1856406	1856407	1856408
			.Sample ID	MS\BH08	MS\BH08	MS\BH08
			Depth	0.36	3.00	6.00
			Other ID	1	5	6
			Sample Type	ES	ES	ES
			Sampling Date	28/05/2021	28/05/2021	28/05/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01		
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01		
VOC TIC						
TAME	DETSC 3431*			None Detected		

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1856406
.Sample ID	MS\BH08
Depth	0.36
Other ID	1
Sample Type	ES
Sampling Date	28/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1856406
.Sample ID	MS\BH08
Depth	0.36
Other ID	1
Sample Type	ES
Sampling Date	28/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1856406
.Sample ID	MS\BH08
Depth	0.36
Other ID	1
Sample Type	ES
Sampling Date	28/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1856409
.Sample ID	MS\BH08
Depth	0.36
Other ID	1
Sample Type	ES
Sampling Date	28/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
BS EN 12457 10:1	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.32
Boron, Dissolved	DETSC 2306*	12	ug/l	22
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	< 5.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.2
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.8
Inorganics				
pH	DETSC 2008		pH	9.0
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	75.1
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.073
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.060
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.15
Nitrite as NO2	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	37
Total Organic Carbon	DETSC 2085	1	mg/l	1.1
Subcontracted Analysis				
acenaphthene	$*	0.02	ug/l	0.72
acenaphthylene	$*	0.02	ug/l	< 0.02
anthracene	$*	0.02	ug/l	0.05
benzo(a)anthracene	$*	0.02	ug/l	0.04
benzo(a)pyrene	$*	0.02	ug/l	0.05
benzo(b)fluoranthene	$*	0.02	ug/l	0.06
benzo(g,h,i)perylene	$*	0.02	ug/l	0.03
benzo(k)fluoranthene	$*	0.02	ug/l	0.02
chrysene	$*	0.02	ug/l	0.03
dibenzo(a,h)anthracene	$*	0.02	ug/l	< 0.02
fluoranthene	$*	0.02	ug/l	0.19
fluorene	$*	0.02	ug/l	0.29
indeno(1,2,3-c,d)pyrene	$*	0.02	ug/l	0.02

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1856409
.Sample ID	MS\BH08
Depth	0.36
Other ID	1
Sample Type	ES
Sampling Date	28/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
naphthalene	$*	0.02	ug/l	0.21
phenanthrene	$*	0.02	ug/l	047
pyrene	$*	0.02	ug/l	0.13

Key: * -not accredited. $ -subcontracted. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-11630
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1856406	MS\BH08 1 0.36	SOIL	NAD	none	D Wilkinson
1856407	MS\BH08 5 3.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-11630
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1856406	MS\BH08 0.36 SOIL	28/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1856407	MS\BH08 3.00 SOIL	28/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1856408	MS\BH08 6.00 SOIL	28/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1856409	MS\BH08 0.36 LEACHATE	28/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	21-11379	*Issued:*	18-Jun-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-11379
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	2 Soil samples.
Date Received	28-May-21
Date Started	28-May-21
Date Completed	18-Jun-21
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MS\BH06	1	0.5	1854685	09/06/2021	Dark brown gravelly, very sandy CLAY
MS\BH06	8	5.3	1854686	09/06/2021	Red gravelly SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1854685	1854686
			.Sample ID	MS\BH06	MS\BH06
			Depth	0.50	5.30
			Other ID	1	8
			Sample Type	ES	ES
			Sampling Date	24/05/2021	24/05/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification	DETSC 1102	0.001	%	< 0.001	
Preparation					
Moisture Content	DETSC 1004	0.1	%	6.6	15
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	5.6	9.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.3	3.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	2.2
Chromium III	DETSC 2301*	0.15	mg/kg	50	24
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	160	69
Lead	DETSC 2301#	0.3	mg/kg	30	51
Mercury	DETSC 2325#	0.05	mg/kg	1.9	< 0.05
Nickel	DETSC 2301#	1	mg/kg	61	28
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	160	110
Zinc	DETSC 2301#	1	mg/kg	70	1000
Inorganics					
pH	DETSC 2008#		pH	8.9	10.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.8	< 0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	0.5	0.7
Nitrate as NO3	DETSC 2055	1	mg/kg	< 1.0	1.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	32	970
Sulphide	DETSC 2024*	10	mg/kg	110	2400
Sulphur (free)	DETSC 3049#	0.75	mg/kg	5.6	< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%	0.05	0.41
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10	1.0

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1854685	1854686
			.Sample ID	MS\BH06	MS\BH06
			Depth	0.50	5.30
			Other ID	1	8
			Sample Type	ES	ES
			Sampling Date	24/05/2021	24/05/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	12	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	140	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	1300	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	1500	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	4.0	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	60	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	880	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	940	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	2400	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	3300	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1854685	1854686
			.Sample ID	MS\BH06	MS\BH06
			Depth	0.50	5.30
			Other ID	1	8
			Sample Type	ES	ES
			Sampling Date	24/05/2021	24/05/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.33	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.13	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.61	< 0.10
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOC TIC					
TAME	DETSC 3431*			None Detected	None Detected

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1854685
.Sample ID	MS\BH06
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	24/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1854685
.Sample ID	MS\BH06
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	24/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Phenol	DETSC 3433	0.1	mg/kg	< 1.0
Aniline	DETSC 3433*	0.1	mg/kg	< 1.0
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 1.0
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 1.0
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 1.0
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 1.0
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 1.0
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 1.0
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 1.0
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 1.0
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 1.0
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 1.0
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 1.0
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 1.0
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 1.0
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 1.0
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 1.0
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 1.0
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1854685
.Sample ID	MS\BH06
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	24/05/2021
Sampling Time	n/s

Test	Method	LOD	Units	
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 1.0
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 1.0
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 1.0
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 1.0
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 1.0
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 1.0
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 1.0
Diphenylamine	DETSC 3433	0.1	mg/kg	< 1.0
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 1.0
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 1.0
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 1.0
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 1.0
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 1.0
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 1.0
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 1.0
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 1.0
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 1.0
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 1.0
Azobenzene	DETSC 3433	0.1	mg/kg	< 1.0
Carbazole	DETSC 3433*	0.1	mg/kg	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1854685	MS\BH06 1 0.50	SOIL	Chrysotile	Bundle of Chrysotile fibres	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 21-11379
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1854685
.Sample ID	MS\BH06
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	24/05/2021
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1202.49
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 21-11379
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1854685	MS\BH06 0.50 SOIL	24/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1854686	MS\BH06 5.30 SOIL	24/05/21	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Allied Exploration & Geotechnics Limited
Unit 25 Stella Gill Ind Est
Pelton Fell
Chester-le-Street
DH2 2RG

Attention :	Kerry Wade
Date :	20th July, 2021
Your reference :	4339
Our reference :	Test Report 21/9472 Batch 6
Location :	4339
Date samples received :	14th July, 2021
Status :	Final report
Issue :	2

Twenty four samples were received for analysis on 14th July, 2021 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Simon Gomery BSc
Project Manager

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	102-104	117-119	135-137	156-158							LOD/LOR	Units	Method No.
Sample ID	MS\BH09	LF\BH02	MS\BH17	MS\BH15									
Depth	14.00	24.90	14.20	17.15									
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	08/07/2021	07/07/2021	06/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	6	6	6	6									
Date of Receipt	14/07/2021	14/07/2021	14/07/2021	14/07/2021									
VOC MS (Methanol Preserve)													
Dichlorodifluoromethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Methyl Tertiary Butyl Ether	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Chloromethane	<50	<50 SV	269	<50							<50	ug/kg	TM152/PM104
Vinyl Chloride	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Bromomethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Chloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Trichlorofluoromethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethene (1,1 DCE)	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Dichloromethane (DCM)	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
trans-1-2-Dichloroethene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
cis-1-2-Dichloroethene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
2,2-Dichloropropane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Bromochloromethane	<50 +	<50 +	<50 +	<50 +							<50	ug/kg	TM152/PM104
Chloroform	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1,1-Trichloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloropropene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Carbon tetrachloride	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Benzene #	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Trichloroethene (TCE)	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloropropane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Dibromomethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Bromodichloromethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
cis-1-3-Dichloropropene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Toluene #	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
trans-1-3-Dichloropropene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1,2-Trichloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Tetrachloroethene (PCE)	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichloropropane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Dibromochloromethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromoethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Chlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1,1,2-Tetrachloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Ethylbenzene #	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
m/p-Xylene #	<100	<100 SV	<100	<100							<100	ug/kg	TM152/PM104
o-Xylene #	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Styrene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Bromoform	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Isopropylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,1,2,2-Tetrachloroethane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Bromobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichloropropane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	102-104	117-119	135-137	156-158									
Sample ID	MS\BH09	LF\BH02	MS\BH17	MS\BH15									
Depth	14.00	24.90	14.20	17.15									
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	08/07/2021	07/07/2021	06/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	6	6	6	6									
Date of Receipt	14/07/2021	14/07/2021	14/07/2021	14/07/2021									
VOC MS (Methanol Preserve) Continued													
Propylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
2-Chlorotoluene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,3,5-Trimethylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
4-Chlorotoluene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
tert-Butylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trimethylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
sec-Butylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
4-Isopropyltoluene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,4-Dichlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
n-Butylbenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromo-3-chloropropane	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trichlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Hexachlorobutadiene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Naphthalene	<50	100 SV	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichlorobenzene	<50	<50 SV	<50	<50							<50	ug/kg	TM152/PM104
Surrogate Recovery Toluene D8	90	52 SV	85	74							<0	%	TM152/PM104
Surrogate Recovery 4-Bromofluorobenzene	79	42 SV	73	66							<0	%	TM152/PM104
Natural Moisture Content	21.9	23.4	31.3	19.1							<0.1	%	PM4/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	102-104	117-119	135-137	156-158							LOD/LOR	Units	Method No.
Sample ID	MS\BH09	LF\BH02	MS\BH17	MS\BH15									
Depth	14.00	24.90	14.20	17.15									
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	08/07/2021	07/07/2021	06/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	6	6	6	6									
Date of Receipt	14/07/2021	14/07/2021	14/07/2021	14/07/2021									
SVOC MS													
Phenols													
2-Chlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Pentachlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	<10	31	<10	<10							<10	ug/kg	TM16/PM8
Naphthalene	<10	22	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthylene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluorene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenanthrene #	<10	27	<10	<10							<10	ug/kg	TM16/PM8
Anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluoranthene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Pyrene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(a)anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Chrysene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(a)pyrene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Diethyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100	<100	<100	<100							<100	ug/kg	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	102-104	117-119	135-137	156-158							LOD/LOR	Units	Method No.
Sample ID	MS\BH09	LF\BH02	MS\BH17	MS\BH15									
Depth	14.00	24.90	14.20	17.15									
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	08/07/2021	07/07/2021	06/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	6	6	6	6									
Date of Receipt	14/07/2021	14/07/2021	14/07/2021	14/07/2021									
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
3-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Azobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Carbazole	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzofuran #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachloroethane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Isophorone #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Nitrobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	110	113	118	115							<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	100	99	100	98							<0	%	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9472						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9472

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/9472

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis			AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis	Yes		AR	Yes

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Allied Exploration & Geotechnics Limited
Unit 25 Stella Gill Ind Est
Pelton Fell
Chester-le-Street
DH2 2RG

Attention :	Kerry Wade
Date :	20th July, 2021
Your reference :	4339
Our reference :	Test Report 21/9472 Batch 5
Location :	4339
Date samples received :	10th July, 2021
Status :	Final report
Issue :	2

Five samples were received for analysis on 10th July, 2021 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Simon Gomery BSc
Project Manager

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	84-86	90-92	93-95	96-98							LOD/LOR	Units	Method No.
Sample ID	MS\BH108	MS\BH110	MS\BH112	MS\BH114									
Depth													
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	07/07/2021	06/07/2021	08/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	5	5	5	5									
Date of Receipt	10/07/2021	10/07/2021	10/07/2021	10/07/2021									
VOC MS (Methanol Preserve)													
Dichlorodifluoromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Methyl Tertiary Butyl Ether	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Vinyl Chloride	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromomethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Trichlorofluoromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethene (1,1 DCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dichloromethane (DCM)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
trans-1-2-Dichloroethene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
cis-1-2-Dichloroethene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
2,2-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromochloromethane	<50 [+]	<50 [+]	<50 [+]	<50 [+]							<50	ug/kg	TM152/PM104
Chloroform	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,1-Trichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Carbon tetrachloride	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Benzene [#]	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Trichloroethene (TCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dibromomethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromodichloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
cis-1-3-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Toluene [#]	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
trans-1-3-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,2-Trichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Tetrachloroethene (PCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dibromochloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromoethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,1,2-Tetrachloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Ethylbenzene [#]	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
m/p-Xylene [#]	<100	<100	<100	<100							<100	ug/kg	TM152/PM104
o-Xylene [#]	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Styrene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromoform	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Isopropylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,2,2-Tetrachloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	84-86	90-92	93-95	96-98							LOD/LOR	Units	Method No.
Sample ID	MS\BH108	MS\BH110	MS\BH112	MS\BH114									
Depth													
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	07/07/2021	06/07/2021	08/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	5	5	5	5									
Date of Receipt	10/07/2021	10/07/2021	10/07/2021	10/07/2021									
VOC MS (Methanol Preserve) Continued													
Propylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
2-Chlorotoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3,5-Trimethylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
4-Chlorotoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
tert-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trimethylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
sec-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
4-Isopropyltoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,4-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
n-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromo-3-chloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Hexachlorobutadiene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Naphthalene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Surrogate Recovery Toluene D8	73	76	66	69							<0	%	TM152/PM104
Surrogate Recovery 4-Bromofluorobenzene	66	64	54	55							<0	%	TM152/PM104
Natural Moisture Content	22.1	21.7	21.4	20.4							<0.1	%	PM4/PM0

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	84-86	90-92	93-95	96-98							LOD/LOR	Units	Method No.
Sample ID	MS\BH108	MS\BH110	MS\BH112	MS\BH114									
Depth													
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	07/07/2021	06/07/2021	08/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	5	5	5	5									
Date of Receipt	10/07/2021	10/07/2021	10/07/2021	10/07/2021									
SVOC MS													
Phenols													
2-Chlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Pentachlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	15	<10	<10	<10							<10	ug/kg	TM16/PM8
Naphthalene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthylene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluorene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenanthrene #	16	<10	<10	<10							<10	ug/kg	TM16/PM8
Anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluoranthene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Pyrene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(a)anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Chrysene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(a)pyrene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Diethyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100	<100	<100	<100							<100	ug/kg	TM16/PM8

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	84-86	90-92	93-95	96-98							LOD/LOR	Units	Method No.
Sample ID	MS\BH108	MS\BH110	MS\BH112	MS\BH114									
Depth													
COC No / misc													
Containers	V	V	V	V									
Sample Date	07/07/2021	07/07/2021	06/07/2021	08/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	5	5	5	5									
Date of Receipt	10/07/2021	10/07/2021	10/07/2021	10/07/2021									
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
3-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Azobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Carbazole	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzofuran #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachloroethane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Isophorone #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Nitrobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	95	120	119	123							<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	98	111	105	110							<0	%	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9472						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9472

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/9472

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis			AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis	Yes		AR	Yes

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Allied Exploration & Geotechnics Limited
Unit 25 Stella Gill Ind Est
Pelton Fell
Chester-le-Street
DH2 2RG

Attention :	Kerry Wade
Date :	14th July, 2021
Your reference :	4339
Our reference :	Test Report 21/9472 Batch 4
Location :	4339
Date samples received :	6th July, 2021
Status :	Final report
Issue :	2

Fourteen samples were received for analysis on 6th July, 2021 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Simon Gomery BSc
Project Manager

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	55-57	73-75	76-78	79-81							LOD/LOR	Units	Method No.
Sample ID	MS\BH07	MS\BH14	MS\BH15	MS\BH16									
Depth	15.70	17.50-17.70	2.00	5.00									
COC No / misc													
Containers	V	V	V	V									
Sample Date	05/07/2021	02/07/2021	05/07/2021	05/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	4	4	4	4									
Date of Receipt	06/07/2021	06/07/2021	06/07/2021	06/07/2021									
VOC MS (Methanol Preserve)													
Dichlorodifluoromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Methyl Tertiary Butyl Ether	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chloromethane	<50	120	119	856							<50	ug/kg	TM152/PM104
Vinyl Chloride	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromomethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Trichlorofluoromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethene (1,1 DCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dichloromethane (DCM)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
trans-1-2-Dichloroethene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
cis-1-2-Dichloroethene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
2,2-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromochloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chloroform	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,1-Trichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Carbon tetrachloride	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Benzene #	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Trichloroethene (TCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dibromomethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromodichloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
cis-1-3-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Toluene #	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
trans-1-3-Dichloropropene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,2-Trichloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Tetrachloroethene (PCE)	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Dibromochloromethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromoethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Chlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,1,2-Tetrachloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Ethylbenzene #	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
m/p-Xylene #	<100	<100	<100	<100							<100	ug/kg	TM152/PM104
o-Xylene #	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Styrene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromoform	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Isopropylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,1,2,2-Tetrachloroethane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Bromobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	55-57	73-75	76-78	79-81							LOD/LOR	Units	Method No.
Sample ID	MS\BH07	MS\BH14	MS\BH15	MS\BH16									
Depth	15.70	17.50-17.70	2.00	5.00									
COC No / misc													
Containers	V	V	V	V									
Sample Date	05/07/2021	02/07/2021	05/07/2021	05/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	4	4	4	4									
Date of Receipt	06/07/2021	06/07/2021	06/07/2021	06/07/2021									
VOC MS (Methanol Preserve) Continued													
Propylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
2-Chlorotoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3,5-Trimethylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
4-Chlorotoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
tert-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trimethylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
sec-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
4-Isopropyltoluene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,3-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,4-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
n-Butylbenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2-Dibromo-3-chloropropane	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,4-Trichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Hexachlorobutadiene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Naphthalene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
1,2,3-Trichlorobenzene	<50	<50	<50	<50							<50	ug/kg	TM152/PM104
Surrogate Recovery Toluene D8	81	96	91	92							<0	%	TM152/PM104
Surrogate Recovery 4-Bromofluorobenzene	80	95	89	88							<0	%	TM152/PM104
Natural Moisture Content	25.4	13.1	27.8	25.1							<0.1	%	PM4/PM0

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	55-57	73-75	76-78	79-81							LOD/LOR	Units	Method No.
Sample ID	MS\BH07	MS\BH14	MS\BH15	MS\BH16									
Depth	15.70	17.50-17.70	2.00	5.00									
COC No / misc													
Containers	V	V	V	V									
Sample Date	05/07/2021	02/07/2021	05/07/2021	05/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	4	4	4	4									
Date of Receipt	06/07/2021	06/07/2021	06/07/2021	06/07/2021									
SVOC MS													
Phenols													
2-Chlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Methylphenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitrophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Pentachlorophenol	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenol #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Naphthalene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthylene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Acenaphthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluorene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phenanthrene #	<10	<10	<10	30							<10	ug/kg	TM16/PM8
Anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Fluoranthene #	<10	<10	<10	34							<10	ug/kg	TM16/PM8
Pyrene #	<10	<10	<10	29							<10	ug/kg	TM16/PM8
Benzo(a)anthracene	<10	<10	<10	44							<10	ug/kg	TM16/PM8
Chrysene	<10	<10	<10	18							<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	<10	<10	<10	33							<10	ug/kg	TM16/PM8
Benzo(a)pyrene	<10	<10	<10	16							<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	<10	<10	<10	15							<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	<10	<10	<10	24							<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Diethyl phthalate	<100	<100	<100	<100							<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100	<100	<100	<100							<100	ug/kg	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	55-57	73-75	76-78	79-81							LOD/LOR	Units	Method No.
Sample ID	MS\BH07	MS\BH14	MS\BH15	MS\BH16									
Depth	15.70	17.50-17.70	2.00	5.00									
COC No / misc													
Containers	V	V	V	V									
Sample Date	05/07/2021	02/07/2021	05/07/2021	05/07/2021									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	4	4	4	4									
Date of Receipt	06/07/2021	06/07/2021	06/07/2021	06/07/2021									
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
3-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chloroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
4-Nitroaniline	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Azobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Carbazole	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Dibenzofuran #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Hexachloroethane	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Isophorone #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Nitrobenzene #	<10	<10	<10	<10							<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	108	108	110	114							<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	107	104	110	113							<0	%	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade
EMT Job No: 21/9472

VOC Report : **Liquid**

EMT Sample No.	82												
Sample ID	FIELD BLANK												
Depth													
COC No / misc													
Containers	V												
Sample Date	05/07/2021												
Sample Type	Field Blank												
Batch Number	4												
Date of Receipt	06/07/2021												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1										<0.1	ug/l	TM15/PM10
Chloromethane #	<3										<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1										<0.1	ug/l	TM15/PM10
Bromomethane	<1										<1	ug/l	TM15/PM10
Chloroethane #	<3										<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3										<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3										<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<5										<5	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3										<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3										<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3										<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1										<1	ug/l	TM15/PM10
Bromochloromethane #	<2										<2	ug/l	TM15/PM10
Chloroform #	<2										<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2										<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3										<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2										<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2										<2	ug/l	TM15/PM10
Benzene #	<0.5										<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3										<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2										<2	ug/l	TM15/PM10
Dibromomethane #	<3										<3	ug/l	TM15/PM10
Bromodichloromethane #	<2										<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2										<2	ug/l	TM15/PM10
Toluene #	<5										<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2										<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2										<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3										<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2										<2	ug/l	TM15/PM10
Dibromochloromethane #	<2										<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2										<2	ug/l	TM15/PM10
Chlorobenzene #	<2										<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2										<2	ug/l	TM15/PM10
Ethylbenzene #	<1										<1	ug/l	TM15/PM10
m/p-Xylene #	<2										<2	ug/l	TM15/PM10
o-Xylene #	<1										<1	ug/l	TM15/PM10
Styrene	<2										<2	ug/l	TM15/PM10
Bromoform #	<2										<2	ug/l	TM15/PM10
Isopropylbenzene #	<3										<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4										<4	ug/l	TM15/PM10
Bromobenzene #	<2										<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3										<3	ug/l	TM15/PM10
Propylbenzene #	<3										<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3										<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3										<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3										<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3										<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3										<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3										<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3										<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
n-Butylbenzene #	<3										<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2										<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3										<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3										<3	ug/l	TM15/PM10
Naphthalene	<2										<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3										<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	115										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	101										<0	%	TM15/PM10

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Kerry Wade

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9472						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9472

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/9472

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis			AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis	Yes		AR	Yes

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Allied Exploration & Geotechnics Limited
Unit 25 Stella Gill Ind Est
Pelton Fell
Chester-le-Street
DH2 2RG

Attention :	Danielle Wilkes
Date :	6th July, 2021
Your reference :	4339
Our reference :	Test Report 21/9472 Batch 2
Location :	
Date samples received :	26th June, 2021
Status :	Final report
Issue :	1

Six samples were received for analysis on 26th June, 2021 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Simon Gomery BSc
Project Manager

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location:
Contact: Danielle Wilkes
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	17-19												
Sample ID	MS\BH03												
Depth	11.20												
COC No / misc													
Containers	V												
Sample Date	23/06/2021												
Sample Type	Soil												
Batch Number	2												
Date of Receipt	26/06/2021												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS (Methanol Preserve)													
Dichlorodifluoromethane	<50										<50	ug/kg	TM152/PM104
Methyl Tertiary Butyl Ether	<50										<50	ug/kg	TM152/PM104
Chloromethane	166										<50	ug/kg	TM152/PM104
Vinyl Chloride	<50										<50	ug/kg	TM152/PM104
Bromomethane	<50										<50	ug/kg	TM152/PM104
Chloroethane	<50										<50	ug/kg	TM152/PM104
Trichlorofluoromethane	<50										<50	ug/kg	TM152/PM104
1,1-Dichloroethene (1,1 DCE)	<50										<50	ug/kg	TM152/PM104
Dichloromethane (DCM)	<50										<50	ug/kg	TM152/PM104
trans-1-2-Dichloroethene	<50										<50	ug/kg	TM152/PM104
1,1-Dichloroethane	<50										<50	ug/kg	TM152/PM104
cis-1-2-Dichloroethene	<50										<50	ug/kg	TM152/PM104
2,2-Dichloropropane	<50										<50	ug/kg	TM152/PM104
Bromochloromethane	<50										<50	ug/kg	TM152/PM104
Chloroform	<50										<50	ug/kg	TM152/PM104
1,1,1-Trichloroethane	<50										<50	ug/kg	TM152/PM104
1,1-Dichloropropene	<50										<50	ug/kg	TM152/PM104
Carbon tetrachloride	<50										<50	ug/kg	TM152/PM104
1,2-Dichloroethane	<50										<50	ug/kg	TM152/PM104
Benzene #	<50										<50	ug/kg	TM152/PM104
Trichloroethene (TCE)	<50										<50	ug/kg	TM152/PM104
1,2-Dichloropropane	<50										<50	ug/kg	TM152/PM104
Dibromomethane	<50										<50	ug/kg	TM152/PM104
Bromodichloromethane	<50										<50	ug/kg	TM152/PM104
cis-1-3-Dichloropropene	<50										<50	ug/kg	TM152/PM104
Toluene #	<50										<50	ug/kg	TM152/PM104
trans-1-3-Dichloropropene	<50										<50	ug/kg	TM152/PM104
1,1,2-Trichloroethane	<50										<50	ug/kg	TM152/PM104
Tetrachloroethene (PCE)	<50										<50	ug/kg	TM152/PM104
1,3-Dichloropropane	<50										<50	ug/kg	TM152/PM104
Dibromochloromethane	<50										<50	ug/kg	TM152/PM104
1,2-Dibromoethane	<50										<50	ug/kg	TM152/PM104
Chlorobenzene	<50										<50	ug/kg	TM152/PM104
1,1,1,2-Tetrachloroethane	<50										<50	ug/kg	TM152/PM104
Ethylbenzene #	<50										<50	ug/kg	TM152/PM104
m/p-Xylene #	<100										<100	ug/kg	TM152/PM104
o-Xylene #	<50										<50	ug/kg	TM152/PM104
Styrene	<50										<50	ug/kg	TM152/PM104
Bromoform	<50										<50	ug/kg	TM152/PM104
Isopropylbenzene	<50										<50	ug/kg	TM152/PM104
1,1,2,2-Tetrachloroethane	<50										<50	ug/kg	TM152/PM104
Bromobenzene	<50										<50	ug/kg	TM152/PM104
1,2,3-Trichloropropane	<50										<50	ug/kg	TM152/PM104

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location:
Contact: Danielle Wilkes
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	17-19												
Sample ID	MS\BH03												
Depth	11.20												
COC No / misc													
Containers	V												
Sample Date	23/06/2021												
Sample Type	Soil												
Batch Number	2												
Date of Receipt	26/06/2021												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS (Methanol Preserve) Continued													
Propylbenzene	<50										<50	ug/kg	TM152/PM104
2-Chlorotoluene	<50										<50	ug/kg	TM152/PM104
1,3,5-Trimethylbenzene	<50										<50	ug/kg	TM152/PM104
4-Chlorotoluene	<50										<50	ug/kg	TM152/PM104
tert-Butylbenzene	<50										<50	ug/kg	TM152/PM104
1,2,4-Trimethylbenzene	<50										<50	ug/kg	TM152/PM104
sec-Butylbenzene	<50										<50	ug/kg	TM152/PM104
4-Isopropyltoluene	<50										<50	ug/kg	TM152/PM104
1,3-Dichlorobenzene	<50										<50	ug/kg	TM152/PM104
1,4-Dichlorobenzene	<50										<50	ug/kg	TM152/PM104
n-Butylbenzene	<50										<50	ug/kg	TM152/PM104
1,2-Dichlorobenzene	<50										<50	ug/kg	TM152/PM104
1,2-Dibromo-3-chloropropane	<50										<50	ug/kg	TM152/PM104
1,2,4-Trichlorobenzene	<50										<50	ug/kg	TM152/PM104
Hexachlorobutadiene	<50										<50	ug/kg	TM152/PM104
Naphthalene	<50										<50	ug/kg	TM152/PM104
1,2,3-Trichlorobenzene	<50										<50	ug/kg	TM152/PM104
Surrogate Recovery Toluene D8	121										<0	%	TM152/PM104
Surrogate Recovery 4-Bromofluorobenzene	116										<0	%	TM152/PM104
Natural Moisture Content	14.7										<0.1	%	PM4/PM0

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location:
Contact: Danielle Wilkes
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	17-19												
Sample ID	MS\BH03												
Depth	11.20										Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V												
Sample Date	23/06/2021												
Sample Type	Soil												
Batch Number	2												
Date of Receipt	26/06/2021										LOD/LOR	Units	Method No.
SVOC MS													
Phenols													
2-Chlorophenol #	<10										<10	ug/kg	TM16/PM8
2-Methylphenol	<10										<10	ug/kg	TM16/PM8
2-Nitrophenol	<10										<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10										<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	<10										<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10										<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10										<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10										<10	ug/kg	TM16/PM8
4-Methylphenol	<10										<10	ug/kg	TM16/PM8
4-Nitrophenol	<10										<10	ug/kg	TM16/PM8
Pentachlorophenol	<10										<10	ug/kg	TM16/PM8
Phenol #	<10										<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10										<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	<10										<10	ug/kg	TM16/PM8
Naphthalene	<10										<10	ug/kg	TM16/PM8
Acenaphthylene	<10										<10	ug/kg	TM16/PM8
Acenaphthene	<10										<10	ug/kg	TM16/PM8
Fluorene	<10										<10	ug/kg	TM16/PM8
Phenanthrene #	<10										<10	ug/kg	TM16/PM8
Anthracene	<10										<10	ug/kg	TM16/PM8
Fluoranthene #	<10										<10	ug/kg	TM16/PM8
Pyrene #	<10										<10	ug/kg	TM16/PM8
Benzo(a)anthracene	<10										<10	ug/kg	TM16/PM8
Chrysene	<10										<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	<10										<10	ug/kg	TM16/PM8
Benzo(a)pyrene	<10										<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	<10										<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	<10										<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	<10										<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	<10										<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	<10										<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100										<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100										<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100										<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100										<100	ug/kg	TM16/PM8
Diethyl phthalate	<100										<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100										<100	ug/kg	TM16/PM8

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location:
Contact: Danielle Wilkes
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SVOC Report : **Solid**

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Batch Number	2												
Date of Receipt	26/06/2021										LOD/LOR	Units	Method No.
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10										<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
2-Nitroaniline	<10										<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10										<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10										<10	ug/kg	TM16/PM8
3-Nitroaniline	<10										<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10										<10	ug/kg	TM16/PM8
4-Chloroaniline	<10										<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10										<10	ug/kg	TM16/PM8
4-Nitroaniline	<10										<10	ug/kg	TM16/PM8
Azobenzene	<10										<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10										<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10										<10	ug/kg	TM16/PM8
Carbazole	<10										<10	ug/kg	TM16/PM8
Dibenzofuran #	<10										<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10										<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10										<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10										<10	ug/kg	TM16/PM8
Hexachloroethane	<10										<10	ug/kg	TM16/PM8
Isophorone #	<10										<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10										<10	ug/kg	TM16/PM8
Nitrobenzene #	<10										<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	125										<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	118										<0	%	TM16/PM8

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location:
Contact: Danielle Wilkes

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9472						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9472

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

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Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
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REPORTS FROM THE SOUTH AFRICA LABORATORY

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NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
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*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/9472

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis			AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis	Yes		AR	Yes

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Allied Exploration & Geotechnics Limited
Unit 25 Stella Gill Ind Est
Pelton Fell
Chester-le-Street
DH2 2RG

Attention :	Danielle Wilkes
Date :	12th July, 2021
Your reference :	4339
Our reference :	Test Report 21/9472 Batch 3
Location :	4339
Date samples received :	2nd July, 2021
Status :	Final report
Issue :	2

Seven samples were received for analysis on 2nd July, 2021 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

[redacted]

Paul Boden BSc
Senior Project Manager

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Danielle Wilkes
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	27-29	30-32	33-35	36-38	42-44						LOD/LOR	Units	Method No.
Sample ID	LF\BH01	MS\BH13	MS\BH13	MS\BH03	MS\BH100								
Depth	28.10	3.00	11.00	11.20	1.00								
COC No / misc													
Containers	V	V	V	V	V								
Sample Date	23/06/2021	28/06/2021	28/06/2021	23/06/2021	23/06/2021								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	3	3	3	3	3								
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021								
VOC MS (Methanol Preserve)													
Dichlorodifluoromethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Methyl Tertiary Butyl Ether	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Chloromethane	<50	126	<50	206	<50						<50	ug/kg	TM152/PM104
Vinyl Chloride	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Bromomethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Chloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Trichlorofluoromethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1-Dichloroethene (1,1 DCE)	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Dichloromethane (DCM)	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
trans-1-2-Dichloroethene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1-Dichloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
cis-1-2-Dichloroethene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
2,2-Dichloropropane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Bromochloromethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Chloroform	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1,1-Trichloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1-Dichloropropene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Carbon tetrachloride	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2-Dichloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Benzene #	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Trichloroethene (TCE)	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2-Dichloropropane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Dibromomethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Bromodichloromethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
cis-1-3-Dichloropropene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Toluene #	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
trans-1-3-Dichloropropene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1,2-Trichloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Tetrachloroethene (PCE)	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,3-Dichloropropane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Dibromochloromethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2-Dibromoethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Chlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1,1,2-Tetrachloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Ethylbenzene #	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
m/p-Xylene #	<100	<100	<100	<100	<100						<100	ug/kg	TM152/PM104
o-Xylene #	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Styrene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Bromoform	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Isopropylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,1,2,2-Tetrachloroethane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Bromobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2,3-Trichloropropane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Danielle Wilkes
EMT Job No: 21/9472

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	27-29	30-32	33-35	36-38	42-44						LOD/LOR	Units	Method No.
Sample ID	LF\BH01	MS\BH13	MS\BH13	MS\BH03	MS\BH100								
Depth	28.10	3.00	11.00	11.20	1.00								
COC No / misc													
Containers	V	V	V	V	V								
Sample Date	23/06/2021	28/06/2021	28/06/2021	23/06/2021	23/06/2021								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	3	3	3	3	3								
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021								
VOC MS (Methanol Preserve) Continued													
Propylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
2-Chlorotoluene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,3,5-Trimethylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
4-Chlorotoluene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
tert-Butylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2,4-Trimethylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
sec-Butylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
4-Isopropyltoluene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,3-Dichlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,4-Dichlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
n-Butylbenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2-Dichlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2-Dibromo-3-chloropropane	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2,4-Trichlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Hexachlorobutadiene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Naphthalene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
1,2,3-Trichlorobenzene	<50	<50	<50	<50	<50						<50	ug/kg	TM152/PM104
Surrogate Recovery Toluene D8	107	111	74	95	79						<0	%	TM152/PM104
Surrogate Recovery 4-Bromofluorobenzene	105	104	70	102	78						<0	%	TM152/PM104
Natural Moisture Content	14.0	25.9	25.9	28.1	25.3						<0.1	%	PM4/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Danielle Wilkes
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	27-29	30-32	33-35	36-38	42-44						LOD/LOR	Units	Method No.
Sample ID	LF\BH01	MS\BH13	MS\BH13	MS\BH03	MS\BH100								
Depth	28.10	3.00	11.00	11.20	1.00								
COC No / misc													
Containers	V	V	V	V	V								
Sample Date	23/06/2021	28/06/2021	28/06/2021	23/06/2021	23/06/2021								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	3	3	3	3	3								
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021								
SVOC MS													
Phenols													
2-Chlorophenol #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2-Methylphenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2-Nitrophenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Methylphenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Nitrophenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Pentachlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Phenol #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Naphthalene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Acenaphthylene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Acenaphthene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Fluorene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Phenanthrene #	<10	25	<10	<10	<10						<10	ug/kg	TM16/PM8
Anthracene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Fluoranthene #	<10	23	<10	<10	<10						<10	ug/kg	TM16/PM8
Pyrene #	<10	21	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(a)anthracene	<10	39	<10	<10	<10						<10	ug/kg	TM16/PM8
Chrysene	<10	20	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	<10	23	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(a)pyrene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	<10	17	<10	<10	<10						<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8
Diethyl phthalate	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100	<100	<100	<100	<100						<100	ug/kg	TM16/PM8

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Danielle Wilkes
EMT Job No: 21/9472

SVOC Report : **Solid**

EMT Sample No.	27-29	30-32	33-35	36-38	42-44							
Sample ID	LF\BH01	MS\BH13	MS\BH13	MS\BH03	MS\BH100							
Depth	28.10	3.00	11.00	11.20	1.00							
COC No / misc												
Containers	V	V	V	V	V							
Sample Date	23/06/2021	28/06/2021	28/06/2021	23/06/2021	23/06/2021							
Sample Type	Soil	Soil	Soil	Soil	Soil							
Batch Number	3	3	3	3	3							
Date of Receipt	02/07/2021	02/07/2021	02/07/2021	02/07/2021	02/07/2021							

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2-Nitroaniline	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
3-Nitroaniline	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Chloroaniline	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
4-Nitroaniline	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Azobenzene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Carbazole	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Dibenzofuran #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Hexachloroethane	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Isophorone #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Nitrobenzene #	<10	<10	<10	<10	<10						<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	110	119	113	117	121						<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	96	100	94	98	98						<0	%	TM16/PM8

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Allied Exploration & Geotechnics Limited
Reference: 4339
Location: 4339
Contact: Danielle Wilkes

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9472						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9472

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/9472

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis			AR	Yes
TM152	Modified USEPA 8260B v2:1996. Quantitative determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS on methanol preserved samples	PM104	Modified USEPA method 5021A v2:2014. Preparation of solid samples preserved in methanol for GC-MS Headspace analysis	Yes		AR	Yes

Certificate of Analysis

Certificate Number 21-22387 *Issued:* 24-Nov-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 21-22387

Client Reference 4339

Order No (not supplied)

Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Description 3 Water samples.

Date Received 20-Oct-21

Date Started 20-Oct-21

Date Completed 24-Nov-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1922118	1922119	1922120
			.Sample ID	MS\BH12	LF\BH01	LF\BH01
			Depth	4.11-34.50	4.61-38.00	4.64-8.10
			Other ID	200D	200D	200S
			Sample Type	EW	EW	EW
			Sampling Date	18/10/2021	18/10/2021	18/10/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.73	5.1	9.7
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	700	270	320
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.08	0.04	0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	2.2	7.9	16
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.5	3.3	0.5
Iron, Dissolved	DETSC 2306	5.5	ug/l	4500	56	30
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.1	1.4	0.40
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.03	0.17	0.15
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.4	6.2	1.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.63	3.0	1.4
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	2.2	8.1	3.8
Zinc, Dissolved	DETSC 2306	1.3	ug/l	8.5	10	4.9
Inorganics						
pH	DETSC 2008		pH	7.2	11.3	10.2
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0003	0.0048	0.0063
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001	0.0008	0.0002
Thiocyanate	DETSC 2130	20	ug/l	32	46	< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	1780	723	1050
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	7.9	0.47	0.098
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	6.5	0.39	0.080
Nitrate as NO3	DETSC 2055	0.1	mg/l	140	17	
Nitrate as N	*	0.1	mg/l			0.35
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035	< 0.035	< 0.035
Sulphate as SO4	DETSC 2055	0.1	mg/l	210	820	900
Total Organic Carbon	DETSC 2085	1	mg/l	41	< 1.0	23

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1922118	1922119	1922120
			.Sample ID	MS\BH12	LF\BH01	LF\BH01
			Depth	4.11-34.50	4.61-38.00	4.64-8.10
			Other ID	200D	200D	200S
			Sample Type	EW	EW	EW
			Sampling Date	18/10/2021	18/10/2021	18/10/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	180	87	190
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Phenols						
Phenol - Monohydric	DETSC 2130	100	ug/l	610	< 100	< 100
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Lab No	1922118	1922120
.Sample ID	MS\BH12	LF\BH01
Depth	4.11-34.50	4.64-8.10
Other ID	200D	200S
Sample Type	EW	EW
Sampling Date	18/10/2021	18/10/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
VOCs					
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1922118	1922120
			.Sample ID	MS\BH12	LF\BH01
			Depth	4.11-34.50	4.64-8.10
			Other ID	200D	200S
			Sample Type	EW	EW
			Sampling Date	18/10/2021	18/10/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1
SVOCs					
Phenol	DETSC 3434*	1	ug/l	3.5	1.9
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	2.2
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1922118	1922120
			.Sample ID	MS\BH12	LF\BH01
			Depth	4.11-34.50	4.64-8.10
			Other ID	200D	200S
			Sample Type	EW	EW
			Sampling Date	18/10/2021	18/10/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Acenaphthylene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Acenaphthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Fluorene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Phenanthrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-22387
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1922118	1922120
			.Sample ID	MS\BH12	LF\BH01
			Depth	4.11-34.50	4.64-8.10
			Other ID	200D	200S
			Sample Type	EW	EW
			Sampling Date	18/10/2021	18/10/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzo(a)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Chrysene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	5.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzo(a)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Benzo(ghi)perylene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-22387
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1922118	MS\BH12 4.11-34.50 WATER	18/10/21	GB 1L x5, GV x2, PB 1L, PU		
1922119	LF\BH01 4.61-38.00 WATER	18/10/21	GB 1L x5, GV x3, PB 1L, PU		
1922120	LF\BH01 4.64-8.10 WATER	18/10/21	GB 1L x5, GV x3, PB 1L, PU		

Key: G-Glass P-Plastic B-Bottle V-Vial U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

[redacted]

Derwentside Environmental Testing Services Ltd
Unit 2, Park Road Indsutrial Estate
Consett
Co Durham
DH8 5PY

Attention :	Sample Reg
Date :	24th November, 2021
Your reference :	21-22387
Our reference :	Test Report 21/17937 Batch 1
Location :	
Date samples received :	
Status :	Final Report
Issue :	1

Three samples were received for analysis, of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Hayley Prowse
Project Manager

Client Name: Derwentside Environmental Testing Services Ltd
Reference: 21-22387
Location:
Contact: Sample Reg
EMT Job No: 21/17937

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1	2	3										
Sample ID	MS/BH12-200D	LF/BH01-200D	LF/BH01-200S										
Depth													
COC No / misc													
Containers	G	G	G										
Sample Date	18/10/2021	18/10/2021	18/10/2021										
Sample Type	Liquid	Liquid	Liquid										
Batch Number	1	1	1										
Date of Receipt													

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
PAH MS													
Naphthalene	<0.1	0.1 SV	0.2								<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.013	<0.013 SV	<0.013								<0.013	ug/l	TM4/PM30
Acenaphthene	0.061	0.039 SV	0.040								<0.013	ug/l	TM4/PM30
Fluorene	0.017	<0.014 SV	<0.014								<0.014	ug/l	TM4/PM30
Phenanthrene	<0.011	0.011 SV	<0.011								<0.011	ug/l	TM4/PM30
Anthracene	<0.013	<0.013 SV	<0.013								<0.013	ug/l	TM4/PM30
Fluoranthene	<0.012	<0.012 SV	<0.012								<0.012	ug/l	TM4/PM30
Pyrene	<0.013	<0.013 SV	<0.013								<0.013	ug/l	TM4/PM30
Benzo(a)anthracene	<0.015	<0.015 SV	<0.015								<0.015	ug/l	TM4/PM30
Chrysene	<0.011	<0.011 SV	<0.011								<0.011	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.018	<0.018 SV	<0.018								<0.018	ug/l	TM4/PM30
Benzo(a)pyrene	<0.016	<0.016 SV	<0.016								<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.011	<0.011 SV	<0.011								<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.01 SV	<0.01								<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.011	<0.011 SV	<0.011								<0.011	ug/l	TM4/PM30
PAH 16 Total	<0.195	<0.195 SV	0.240								<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	<0.01 SV	<0.01								<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	<0.01 SV	<0.01								<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	76	61 SV	70								<0	%	TM4/PM30
Naphthalene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Acenaphthylene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Acenaphthene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Fluorene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Phenanthrene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Anthracene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Fluoranthene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Pyrene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Benzo(a)anthracene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Chrysene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Benzo(bk)fluoranthene	NDP	NDP	NDP								<0.002	ug/l	TM198/PM30
Benzo(a)pyrene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Indeno(123cd)pyrene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Dibenzo(ah)anthracene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Benzo(ghi)perylene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
PAH 16 Total	NDP	NDP	NDP								<0.016	ug/l	TM198/PM30
Benzo(b)fluoranthene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
Benzo(k)fluoranthene	NDP	NDP	NDP								<0.001	ug/l	TM198/PM30
PAH Surrogate % Recovery	NDP	NDP	NDP								<0	%	TM198/PM30

Client Name: Derwentside Environmental Testing Services Ltd

Matrix : Liquid

Reference: 21-22387

Location:

Contact: Sample Reg

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
21/17937	1	MS/BH12-200D		1	TM198/PM30	Sample unsuitable for this test
21/17937	1	LF/BH01-200D		2	TM198/PM30	Sample unsuitable for this test
21/17937	1	LF/BH01-200S		3	TM198/PM30	Sample unsuitable for this test

Client Name: Derwentside Environmental Testing Services Ltd

Reference: 21-22387

Location:

Contact: Sample Reg

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/17937						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17937

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17937

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM198	Modified USEPA Method 8270 v5:2014 for the solvent extraction and determination of low level PAHs by GC-MS HES.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				

Certificate of Analysis

Certificate Number	21-17183	*Issued:*	01-Sep-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-17183
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	6 Water samples.
Date Received	16-Aug-21
Date Started	16-Aug-21
Date Completed	01-Sep-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
			.Sample ID	LF\BH01	LF\BH01	MS\BH15
			Depth	4.68-8.10	4.73-38.00	3.28-5.00
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	7.0	8.3	8.9
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	220	260	80
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05	0.05	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	50	83	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.5	< 0.4	0.8
Iron, Dissolved	DETSC 2306	5.5	ug/l	12	29	14
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.14	< 0.09	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.23	0.19	0.14
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.4	6.5	0.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	15	4.9	6.5
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	15	15	93
Zinc, Dissolved	DETSC 2306	1.3	ug/l	1.6	2.8	9.2
Inorganics						
pH	DETSC 2008		pH	11.0	11.4	10.7
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	100	25	230
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	772	518	931
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.075	0.28	0.69
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.062	0.23	0.57
Nitrate as NO3	DETSC 2055	0.1	mg/l			
Nitrate as N	*	0.1	mg/l	0.37	0.19	0.35
Nitrite as NO2	DETSC 2055	0.1	mg/l			
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035	0.052	0.27
Sulphate as SO4	DETSC 2055	0.1	mg/l	690	390	1100
Sulphur as S, Total	DETSC 2320*	10	mg/l		150	380
Total Organic Carbon	DETSC 2085	1	mg/l	68	< 1.0	6.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
			.Sample ID	LF\BH01	LF\BH01	MS\BH15
			Depth	4.68-8.10	4.73-38.00	3.28-5.00
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	6.4	5.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	4.6	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	20	12
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	5.9	1.8
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	37	20
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	37	20
EPH (C10-C40)	DETSC 3311	10	ug/l	210	280	120
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
			.Sample ID	LF\BH01	LF\BH01	MS\BH15
			Depth	4.68-8.10	4.73-38.00	3.28-5.00
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	0.16	0.12	0.60
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.10
Acenaphthene	DETSC 3304	0.01	ug/l	0.06	0.05	0.42
Fluorene	DETSC 3304	0.01	ug/l	0.02	0.02	0.20
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.10
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.03
Pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.03
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.26	< 0.20	1.5
Phenols						
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
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			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
VOCs						
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
			.Sample ID	LF\BH01	LF\BH01	MS\BH15
			Depth	4.68-8.10	4.73-38.00	3.28-5.00
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1
SVOCs						
Phenol	DETSC 3434*	1	ug/l	7.9	4.4	3.8
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	2.2	1.7	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890324	1890325	1890326
			.Sample ID	LF\BH01	LF\BH01	MS\BH15
			Depth	4.68-8.10	4.73-38.00	3.28-5.00
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	1.4	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	11	8.4	0.58
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	76	210	180
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	11
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	1.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	8.6	16	11
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.09	0.49
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.10	0.05	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.7	1.6	4.4
Selenium, Dissolved	DETSC 2306	0.25	ug/l	9.2	7.1	2.5
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	1.1	8.1	0.9
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.4	4.4	3.0
Inorganics						
pH	DETSC 2008		pH	9.7	9.7	11.9
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	170	150	< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	1040	30.3	437
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	1.6	2.3	0.16
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.3	1.9	0.13
Nitrate as NO3	DETSC 2055	0.1	mg/l		< 0.10	
Nitrate as N	*	0.1	mg/l	0.39		0.83
Nitrite as NO2	DETSC 2055	0.1	mg/l		< 0.10	
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035		< 0.035
Sulphate as SO4	DETSC 2055	0.1	mg/l	130	160	130
Sulphur as S, Total	DETSC 2320*	10	mg/l		50	37
Total Organic Carbon	DETSC 2085	1	mg/l	4.6	36	< 1.0

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	0.7
Aliphatic C10-C12	DETSC 3072*	1	ug/l	2.4	2.8	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	1.6	1.5	1.3
Aliphatic C16-C21	DETSC 3072*	1	ug/l	27	30	5.1
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	32	35	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	22
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	14
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	36
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	32	36	44
EPH (C10-C40)	DETSC 3311	10	ug/l	130	150	200
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	22
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	14
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	4.9	0.20	0.08
Acenaphthylene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.51	0.02	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.07	0.01	0.06
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.03
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01
Pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	5.6	0.23	0.21
Phenols						
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
VOCs						
Dichlorodifluoromethane	DETSC 3432	1	ug/l		< 1	< 1
Chloromethane	DETSC 3432	1	ug/l		< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l		< 1	< 1
Bromomethane	DETSC 3432	1	ug/l		< 1	< 1
Chloroethane	DETSC 3432	1	ug/l		< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l		< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l		< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l		< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l		< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l		< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l		< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l		< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l		< 4	< 4
Chloroform	DETSC 3432	1	ug/l		< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l		< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l		< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l		< 1	< 1
Benzene	DETSC 3432	1	ug/l		5	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l		< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l		< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l		< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l		< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l		< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l		< 1	< 1
Toluene	DETSC 3432	1	ug/l		< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l		< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l		< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l		< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l		< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l		< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l		< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l		< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l		< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l		< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l		< 2	< 2
o-Xylene	DETSC 3432	1	ug/l		< 1	< 1
Styrene	DETSC 3432	1	ug/l		< 1	< 1
Bromoform	DETSC 3432	1	ug/l		< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l		< 1	< 1

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l		< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l		< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l		< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l		< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l		< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l		< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l		< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l		< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l		< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l		< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l		< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l		< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l		< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l		< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l		< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l		< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l		< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l		< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l		< 1	< 1
MTBE	DETSC 3432*	1	ug/l		< 1	< 1
SVOCs						
Phenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l		< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l		< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17183
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890327	1890328	1890329
			.Sample ID	MS\BH15	MS\BH09	MS\BH12
			Depth	3.28-12.00	4.64-8.70	3.81-34.50
			Other ID	100	100	100
			Sample Type	EW	EW	EW
			Sampling Date	13/08/2021	13/08/2021	13/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
3-Nitroaniline	DETSC 3434*	1	ug/l		< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l		< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l		< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l		< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l		< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l		< 1.0	< 1.0
VOC TIC						
TAME	DETSC 3431*			None Detected	None Detected	None Detected

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-17183
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1890324	LF\BH01 4.68-8.10 WATER	13/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890325	LF\BH01 4.73-38.00 WATER	13/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890326	MS\BH15 3.28-5.00 WATER	13/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890327	MS\BH15 3.28-12.00 WATER	13/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890328	MS\BH09 4.64-8.70 WATER	13/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890329	MS\BH12 3.81-34.50 WATER	13/08/21	GB 1L x4, GV x2, PB 1L, PU		

Key: G-Glass P-Plastic B-Bottle V-Vial U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-17182	*Issued:*	07-Sep-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-17182
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	13 Water samples.
Date Received	16-Aug-21
Date Started	16-Aug-21
Date Completed	07-Sep-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890312	1890313	1890314	1890315
			.Sample ID	MS\BH04	MS\BH13	MS\BH13	MS\BH11	MS\BH05
			Depth	2.30-2.70	1.97-20.00	2.11-9.50	3.95-4.40	5.25-29.90
			Other ID	100S	100D	100S	100S	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.6	1.9	10	1.1	2.6
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	590	660	360	360	280
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	0.13	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0	4.3	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	19
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	870	1200	91	12	13
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09	1.8	0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.03	0.05	0.72
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	11	0.9	1.4	1.0
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.29	2.0	0.60	0.96	24
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	< 0.6				14
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.8	8.7	6.3	220	6.2
Inorganics								
pH	DETSC 2008		pH	7.7	7.2	8.5	7.9	10.3
Cyanide, Total	DETSC 2130	40	ug/l	< 40				< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20				< 20
Thiocyanate	DETSC 2130	20	ug/l	< 20				410
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	1380	3390	370	725	75.8
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.019	3.2	2.4	0.19	0.32
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.015	2.6	2.0	0.16	0.27
Nitrate as NO3	DETSC 2055	0.1	mg/l					1.5
Nitrate as N	*	0.1	mg/l	0.27	0.21	0.15	0.28	
Nitrite as NO2	DETSC 2055	0.1	mg/l					< 0.10
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035	< 0.035	< 0.035	< 0.035	
Sulphate as SO4	DETSC 2055	0.1	mg/l	1000	1300	280	770	210
Sulphur as S, Total	DETSC 2320*	10	mg/l	380	570		290	51
Total Organic Carbon	DETSC 2085	1	mg/l	15	3.9	8.2	31	2.2

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890312	1890313	1890314	1890315
			.Sample ID	MS\BH04	MS\BH13	MS\BH13	MS\BH11	MS\BH05
			Depth	2.30-2.70	1.97-20.00	2.11-9.50	3.95-4.40	5.25-29.90
			Other ID	100S	100D	100S	100S	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	14	< 1.0	< 1.0	110	6.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	5.4	< 1.0	< 1.0	10	13
Aliphatic C16-C21	DETSC 3072*	1	ug/l	8.2	< 1.0	< 1.0	4.9	13
Aliphatic C21-C35	DETSC 3072*	1	ug/l	1.5	< 1.0	< 1.0	1.1	14
Aliphatic C5-C35	DETSC 3072*	10	ug/l	30	< 10	< 10	120	46
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	30	< 10	< 10	120	47
EPH (C10-C40)	DETSC 3311	10	ug/l	< 10	< 10	440	780	1000
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890312	1890313	1890314	1890315
			.Sample ID	MS\BH04	MS\BH13	MS\BH13	MS\BH11	MS\BH05
			Depth	2.30-2.70	1.97-20.00	2.11-9.50	3.95-4.40	5.25-29.90
			Other ID	100S	100D	100S	100S	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	0.22	0.24	0.10	0.11	0.28
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.04	0.08	0.06	0.04	0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	0.02	0.02	0.01	0.03
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01	0.08	0.03
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	0.09	0.02
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.01	0.11	0.02
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.28	0.39	0.20	0.50	0.39

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890312	1890313	1890314	1890315
			.Sample ID	MS\BH04	MS\BH13	MS\BH13	MS\BH11	MS\BH05
			Depth	2.30-2.70	1.97-20.00	2.11-9.50	3.95-4.40	5.25-29.90
			Other ID	100S	100D	100S	100S	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l					
PCB 52	DETSC 3402	0.2	ug/l					
PCB 77	DETSC 3402	0.3	ug/l					
PCB 81	DETSC 3402	0.2	ug/l					
PCB 101	DETSC 3402	0.3	ug/l					
PCB 105	DETSC 3402	0.2	ug/l					
PCB 114	DETSC 3402	0.3	ug/l					
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l					
PCB 126	DETSC 3402	0.5	ug/l					
PCB 138	DETSC 3402	0.2	ug/l					
PCB 153	DETSC 3402	0.2	ug/l					
PCB 156	DETSC 3402	0.3	ug/l					
PCB 157	DETSC 3402	0.2	ug/l					
PCB 167	DETSC 3402	0.3	ug/l					
PCB 169	DETSC 3402	0.2	ug/l					
PCB 180	DETSC 3402	0.2	ug/l					
PCB 189	DETSC 3402	0.3	ug/l					
PCB 12	DETSC 3402	1	ug/l					
PCB 7 Total	DETSC 3402	1	ug/l					
Phenols								
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1890316	1890317	1890318	1890319	1890320
			.Sample ID	MS\BH05	MS\BH03	Duplicate B	MS\BH04	MS\BH07
			Depth	4.47-12.50	1.77-28.50	4.30-7.30	2.30-28.50	4.30-7.30
			Other ID	100S	100D	100D	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.4	2.8	6.4	1.9	6.4
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	280	73	390	570	380
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.08	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	120	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	2.0	0.5	< 0.4	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	44	70	15	510	26
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.11	0.13	< 0.09	< 0.09	0.10
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02	0.03	0.03	< 0.01	0.03
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.9	22	0.9	0.9	0.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.69	27	7.6	0.71	8.2
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	1.3	1.7	2.2	< 0.6	2.3
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.8	6.0	9.7	1.9	5.1
Inorganics								
pH	DETSC 2008		pH	9.2	12.2	8.8	8.2	8.3
Cyanide, Total	DETSC 2130	40	ug/l	42	< 40	< 40	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	2300	26	< 20	< 20	< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	45.7	2170	685	1160	697
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	13	0.14	1.4	0.15	1.5
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	10	0.12	1.2	0.12	1.2
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.40				
Nitrate as N	*	0.1	mg/l		0.24	1.3	0.31	0.28
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.45				
Nitrite as N	DETSC 2201	0.035	mg/l		0.25	< 0.035	< 0.035	< 0.035
Sulphate as SO4	DETSC 2055	0.1	mg/l	96	1100	810	2700	840
Sulphur as S, Total	DETSC 2320*	10	mg/l		490			
Total Organic Carbon	DETSC 2085	1	mg/l	12	< 1.0	18	30	13

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1890316	1890317	1890318	1890319	1890320
			.Sample ID	MS\BH05	MS\BH03	Duplicate B	MS\BH04	MS\BH07
			Depth	4.47-12.50	1.77-28.50	4.30-7.30	2.30-28.50	4.30-7.30
			Other ID	100S	100D	100D	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	120	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	210	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	15	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	340	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	5.2	58	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	20	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	250	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	330	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	670	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	370	3500	150	< 10	120
Benzene	DETSC 3322	1	ug/l	5.2	58	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	20	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	210	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1890316	1890317	1890318	1890319	1890320
			.Sample ID	MS\BH05	MS\BH03	Duplicate B	MS\BH04	MS\BH07
			Depth	4.47-12.50	1.77-28.50	4.30-7.30	2.30-28.50	4.30-7.30
			Other ID	100S	100D	100D	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	0.12	0.31	0.14	0.46	0.15
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.20	0.09	0.17
Fluorene	DETSC 3304	0.01	ug/l	0.02	0.08	0.08	0.04	0.06
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.20	< 0.01	0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	0.02	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	0.61	0.42	0.63	0.38

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

	Lab No	1890316	1890317	1890318	1890319	1890320
	.Sample ID	MS\BH05	MS\BH03	Duplicate B	MS\BH04	MS\BH07
	Depth	4.47-12.50	1.77-28.50	4.30-7.30	2.30-28.50	4.30-7.30
	Other ID	100S	100D	100D	100D	100D
	Sample Type	EW	EW	EW	EW	EW
	Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
	Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCBs								
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 52	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 77	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 81	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 101	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 105	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 114	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l			< 0.6		< 0.6
PCB 126	DETSC 3402	0.5	ug/l			< 0.5		< 0.5
PCB 138	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 153	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 156	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 157	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 167	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 169	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 180	DETSC 3402	0.2	ug/l			< 0.2		< 0.2
PCB 189	DETSC 3402	0.3	ug/l			< 0.3		< 0.3
PCB 12	DETSC 3402	1	ug/l			< 1.0		< 1.0
PCB 7 Total	DETSC 3402	1	ug/l			< 1.0		< 1.0
Phenols								
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100	< 100	< 100

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

	Lab No	1890321	1890322	1890323
	.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
	Depth	4.29-4.60	1.89-2.70	
	Other ID	100S	100S	100
	Sample Type	EW	EW	EW
	Sampling Date	12/08/2021	12/08/2021	12/08/2021
	Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	13	4.1	
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	
Boron, Dissolved	DETSC 2306*	12	ug/l	380	390	
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	
Iron, Dissolved	DETSC 2306	5.5	ug/l	41	14	
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.16	< 0.09	
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.33	0.07	
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.7	1.0	
Selenium, Dissolved	DETSC 2306	0.25	ug/l	27	4.7	
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	7.6	14	0.6
Zinc, Dissolved	DETSC 2306	1.3	ug/l	3.7	1.7	
Inorganics				
pH	DETSC 2008		pH	8.0	8.6	
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	52	< 20	< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	945	806	
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.58	0.23	
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.47	0.19	
Nitrate as NO3	DETSC 2055	0.1	mg/l			
Nitrate as N	*	0.1	mg/l	0.22	0.20	
Nitrite as NO2	DETSC 2055	0.1	mg/l			
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035	< 0.035	
Sulphate as SO4	DETSC 2055	0.1	mg/l	1100	920	
Sulphur as S, Total	DETSC 2320*	10	mg/l	400	310	
Total Organic Carbon	DETSC 2085	1	mg/l	38	43	

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1890321	1890322	1890323
			.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
			Depth	4.29-4.60	1.89-2.70	
			Other ID	100S	100S	100
			Sample Type	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	
EPH (C10-C40)	DETSC 3311	10	ug/l	280	170	
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	

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Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

			Lab No	1890321	1890322	1890323
			.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
			Depth	4.29-4.60	1.89-2.70	
			Other ID	100S	100S	100
			Sample Type	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	0.12	0.09	
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Acenaphthene	DETSC 3304	0.01	ug/l	0.12	0.01	
Fluorene	DETSC 3304	0.01	ug/l	0.07	0.01	
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	
Anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	
Fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	
Pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	
PAH Total	DETSC 3304	0.2	ug/l	0.36	< 0.20	

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation fc

	Lab No	1890321	1890322	1890323
	.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
	Depth	4.29-4.60	1.89-2.70	
	Other ID	100S	100S	100
	Sample Type	EW	EW	EW
	Sampling Date	12/08/2021	12/08/2021	12/08/2021
	Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**	
PCBs				
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2
PCB 77	DETSC 3402	0.3	ug/l	< 0.3
PCB 81	DETSC 3402	0.2	ug/l	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3
PCB 105	DETSC 3402	0.2	ug/l	< 0.2
PCB 114	DETSC 3402	0.3	ug/l	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6
PCB 126	DETSC 3402	0.5	ug/l	< 0.5
PCB 138	DETSC 3402	0.2	ug/l	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2
PCB 156	DETSC 3402	0.3	ug/l	< 0.3
PCB 157	DETSC 3402	0.2	ug/l	< 0.2
PCB 167	DETSC 3402	0.3	ug/l	< 0.3
PCB 169	DETSC 3402	0.2	ug/l	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2
PCB 189	DETSC 3402	0.3	ug/l	< 0.3
PCB 12	DETSC 3402	1	ug/l	< 1.0
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0
Phenols				
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	

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Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890314	1890316	1890318	1890320
			.Sample ID	MS\BH04	MS\BH11	MS\BH05	Duplicate B	MS\BH07
			Depth	2.30-2.70	3.95-4.40	4.47-12.50	4.30-7.30	4.30-7.30
			Other ID	100S	100S	100S	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
VOCs								
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	2	2	2	2	2
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	5	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890314	1890316	1890318	1890320
			.Sample ID	MS\BH04	MS\BH11	MS\BH05	Duplicate B	MS\BH07
			Depth	2.30-2.70	3.95-4.40	4.47-12.50	4.30-7.30	4.30-7.30
			Other ID	100S	100S	100S	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Naphthalene	DETSC 3432	1	ug/l					
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
SVOCs								
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	3.7	1.3	2.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	1.6	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890311	1890314	1890316	1890318	1890320
			.Sample ID	MS\BH04	MS\BH11	MS\BH05	Duplicate B	MS\BH07
			Depth	2.30-2.70	3.95-4.40	4.47-12.50	4.30-7.30	4.30-7.30
			Other ID	100S	100S	100S	100D	100D
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890321	1890322	1890323
			.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
			Depth	4.29-4.60	1.89-2.70	
			Other ID	100S	100S	100
			Sample Type	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
VOCs						
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	2	2	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	18
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890321	1890322	1890323
			.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
			Depth	4.29-4.60	1.89-2.70	
			Other ID	100S	100S	100
			Sample Type	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1
Naphthalene	DETSC 3432	1	ug/l			< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1
SVOCs						
Phenol	DETSC 3434*	1	ug/l	5.0	3.0	
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17182
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890321	1890322	1890323
			.Sample ID	MS\BH07	MS\BH03	Trip Blank 12/08/2021
			Depth	4.29-4.60	1.89-2.70	
			Other ID	100S	100S	100
			Sample Type	EW	EW	EW
			Sampling Date	12/08/2021	12/08/2021	12/08/2021
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-17182
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1890311	MS\BH04 2.30-2.70 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890312	MS\BH13 1.97-20.00 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890313	MS\BH13 2.11-9.50 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890314	MS\BH11 3.95-4.40 WATER	12/08/21	GB 1L x2, GV x2, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890315	MS\BH05 5.25-29.90 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as NO2 (2 days)	
1890316	MS\BH05 4.47-12.50 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as NO2 (2 days)	
1890317	MS\BH03 1.77-28.50 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890318	Duplicate B 4.30-7.30 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890319	MS\BH04 2.30-28.50 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890320	MS\BH07 4.30-7.30 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890321	MS\BH07 4.29-4.60 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890322	MS\BH03 1.89-2.70 WATER	12/08/21	GB 1L x4, GV x3, PB 1L, PU	pH/Cond/TDS (1 days), Nitrite as N (2 days)	
1890323	Trip Blank WATER	12/08/21	PB 1L x3		VOC

Key: G-Glass P-Plastic B-Bottle V-Vial U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-17181	*Issued:*	01-Sep-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-17181
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	4 Water samples.
Date Received	16-Aug-21
Date Started	16-Aug-21
Date Completed	01-Sep-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890307	1890308
			.Sample ID	MS\BH12	MS\BH11
			Depth	3.81-20.50	4.07-11.40
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	7.7	2.6
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	300	700
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.4	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	16	20
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.10
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.08	0.07
Nickel, Dissolved	DETSC 2306	0.5	ug/l	3.1	2.3
Selenium, Dissolved	DETSC 2306	0.25	ug/l	28	1.6
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	54	16
Zinc, Dissolved	DETSC 2306	1.3	ug/l	3.2	1.8
Inorganics					
pH	DETSC 2008		pH	11.2	8.4
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	< 20	170
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	142	95.4
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.80	2.2
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.66	1.8
Nitrate as NO3	DETSC 2055	0.1	mg/l	< 0.10	
Nitrate as N	*	0.1	mg/l		0.15
Nitrite as NO2	DETSC 2055	0.1	mg/l	0.69	
Nitrite as N	DETSC 2201	0.035	mg/l		< 0.035
Sulphate as SO4	DETSC 2055	0.1	mg/l	160	67
Total Organic Carbon	DETSC 2085	1	mg/l	100	39

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890307	1890308
			.Sample ID	MS\BH12	MS\BH11
			Depth	3.81-20.50	4.07-11.40
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	34	45
Aliphatic C12-C16	DETSC 3072*	1	ug/l	12	18
Aliphatic C16-C21	DETSC 3072*	1	ug/l	19	24
Aliphatic C21-C35	DETSC 3072*	1	ug/l	5.8	12
Aliphatic C5-C35	DETSC 3072*	10	ug/l	71	99
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	71	99
EPH (C10-C40)	DETSC 3311	10	ug/l	33	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1890307	1890308
			.Sample ID	MS\BH12	MS\BH11
			Depth	3.81-20.50	4.07-11.40
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	0.50	0.17
Acenaphthylene	DETSC 3304	0.01	ug/l	0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.08	0.02
Fluorene	DETSC 3304	0.01	ug/l	0.04	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.05	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.01
Pyrene	DETSC 3304	0.01	ug/l	0.03	0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.76	0.22
Phenols					
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100
VOC TIC					
TAME	DETSC 3431*			None Detected	None Detected

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890309	1890310
			.Sample ID	MS\BH08	DUPLICATE A
			Depth	5.70-13.30	3.81-20.50
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	13	2.3
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	460	240
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	14	8.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.06	0.06
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5	1.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	3.8	17
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	4.5	26
Zinc, Dissolved	DETSC 2306	1.3	ug/l	1.8	2.0
Inorganics					
pH	DETSC 2008		pH	7.8	11.6
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20
Thiocyanate	DETSC 2130	20	ug/l	44	< 20
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	388	393
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	1.5	1.3
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.2	1.1
Nitrate as NO3	DETSC 2055	0.1	mg/l		
Nitrate as N	*	0.1	mg/l	0.17	0.17
Nitrite as NO2	DETSC 2055	0.1	mg/l		
Nitrite as N	DETSC 2201	0.035	mg/l	< 0.035	0.082
Sulphate as SO4	DETSC 2055	0.1	mg/l	710	140
Total Organic Carbon	DETSC 2085	1	mg/l	32	57

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890309	1890310
			.Sample ID	MS\BH08	DUPLICATE A
			Depth	5.70-13.30	3.81-20.50
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	33	35
Aliphatic C12-C16	DETSC 3072*	1	ug/l	8.6	6.7
Aliphatic C16-C21	DETSC 3072*	1	ug/l	8.2	3.7
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	51	47
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	51	47
EPH (C10-C40)	DETSC 3311	10	ug/l	54	200
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1890309	1890310
			.Sample ID	MS\BH08	DUPLICATE A
			Depth	5.70-13.30	3.81-20.50
			Other ID	100	100
			Sample Type	EW	EW
			Sampling Date	11/08/2021	11/08/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	0.42	0.50
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.08	0.02
Fluorene	DETSC 3304	0.01	ug/l	0.02	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.52	0.56
Phenols					
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100
VOC TIC					
TAME	DETSC 3431*			None Detected	None Detected

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1890309
.Sample ID	MS\BH08
Depth	5.70-13.30
Other ID	100
Sample Type	EW
Sampling Date	11/08/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	3
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1890309
.Sample ID	MS\BH08
Depth	5.70-13.30
Other ID	100
Sample Type	EW
Sampling Date	11/08/2021
Sampling Time	n/s

Test	Method	LOD	Units	
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1
SVOCs				
Phenol	DETSC 3434*	1	ug/l	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-17181
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside

Lab No	1890309
.Sample ID	MS\BH08
Depth	5.70-13.30
Other ID	100
Sample Type	EW
Sampling Date	11/08/2021
Sampling Time	n/s

Test	Method	LOD	Units	
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-17181
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1890307	MS\BH12 3.81-20.50 WATER	11/08/21	GB 1L x5, GV x3, PB 1L, PU		
1890308	MS\BH11 4.07-11.40 WATER	11/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890309	MS\BH08 5.70-13.30 WATER	11/08/21	GB 1L x4, GV x3, PB 1L, PU		
1890310	DUPLICATE A 3.81-20.50 WATER	11/08/21	GB 1L x5, GV x3, PB 1L, PU		

Key: G-Glass P-Plastic B-Bottle V-Vial U-Tube

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-24680	*Issued:*	10-Dec-21

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	21-24680
Client Reference	4339
Order No	(not supplied)
Contract Title	Preliminary Onshore Ground Investigation for Net Zero Teeside (
Description	10 Water samples.
Date Received	18-Nov-21
Date Started	18-Nov-21
Date Completed	10-Dec-21
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936445	1936446	1936447	1936448
			.Sample ID	MS\BH14	MS\BH17	MS\BH13	MS\BH13
			Depth	3.60-8.00	5.64-20.00	2.35-20.00	2.28-9.50
			Other ID	300	300D	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.5	1.6	1.0	10
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12	< 12	650	620
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.20	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	1.6	1.5	1.2
Iron, Dissolved	DETSC 2306	5.5	ug/l	40	81	83	890
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.26	0.49	0.69	0.10
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	15	1.3
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.43	0.61	< 0.25
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	< 0.6	1.6	< 0.6	2.0
Zinc, Dissolved	DETSC 2306	1.3	ug/l	3.0	< 1.3	18	8.8
Inorganics							
pH	DETSC 2008		pH	11.3	11.3	7.0	8.0
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0045	0.076	0.0009	< 0.0001
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	< 0.0001	< 0.0001	0.0009	< 0.0001
Thiocyanate	DETSC 2130	20	ug/l	210	120	< 20	7400
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	4.49	27.5	6140	433
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	5.8	3.3	6.4	6.4
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	4.8	2.7	5.3	5.3
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.82	< 0.10		
Nitrate as N	*	0.1	mg/l			< 0.10	< 0.10
Nitrite as NO2	DETSC 2055	0.1	mg/l	1.8	< 0.10		
Nitrite as N	DETSC 2201	0.035	mg/l			< 0.035	< 0.035
Sulphate as SO4	DETSC 2055	0.1	mg/l	400	920	2600	350
Total Organic Carbon	DETSC 2085	1	mg/l	5.9	4.3	1.8	6.1
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. $ -subcontracted. n/s -not supplied. U/S -unsuitable sample.

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936445	1936446	1936447	1936448
			.Sample ID	MS\BH14	MS\BH17	MS\BH13	MS\BH13
			Depth	3.60-8.00	5.64-20.00	2.35-20.00	2.28-9.50
			Other ID	300	300D	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	120	120	58	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Phenols							
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	1200	170
VOC TIC							
Tame	DETSC 3432*			Not Detected	Not Detected	Not Detected	Not Detected
Subcontracted PAH's							
Naphthalene	$*	0.1	ug/l	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	$*	0.013	ug/l	0.013	0.021	<0.013	<0.013
Acenaphthene	$*	0.013	ug/l	0.157	0.184	<0.013	<0.013
Fluorene	$*	0.014	ug/l	0.026	0.037	<0.014	<0.014
Phenanthrene	$*	0.011	ug/l	<0.011	0.034	<0.011	<0.011
Anthracene	$*	0.013	ug/l	<0.013	<0.013	<0.013	<0.013
Fluoranthene	$*	0.012	ug/l	0.266	0.032	0.012	<0.012
Pyrene	$*	0.013	ug/l	0.168	0.025	0.013	<0.013
Benzo(a)anthracene	$*	0.015	ug/l	<0.015	<0.015	<0.015	<0.015
Chrysene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	$*	0.018	ug/l	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	$*	0.016	ug/l	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	$*	0.195	ug/l	0.630	0.333	<0.195	<0.195
Benzo(b)fluoranthene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Subcontracted PAH's Low Levl							
Naphthalene	$*	0.1	ug/l	u/s	u/s	u/s	u/s
Acenaphthylene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Acenaphthene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Fluorene	$*	0.014	ug/l	u/s	u/s	u/s	u/s
Phenanthrene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Anthracene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Fluoranthene	$*	0.012	ug/l	u/s	u/s	u/s	u/s

Key: * -not accredited. $ -subcontracted. n/s -not supplied. U/S -unsuitable sample.

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936445	1936446	1936447	1936448
			.Sample ID	MS\BH14	MS\BH17	MS\BH13	MS\BH13
			Depth	3.60-8.00	5.64-20.00	2.35-20.00	2.28-9.50
			Other ID	300	300D	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Pyrene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Benzo(a)anthracene	$*	0.015	ug/l	u/s	u/s	u/s	u/s
Chrysene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Benzo(bk)fluoranthene	$*	0.018	ug/l	u/s	u/s	u/s	u/s
Benzo(a)pyrene	$*	0.016	ug/l	u/s	u/s	u/s	u/s
Indeno(123cd)pyrene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Dibenzo(ah)anthracene	$*	0.01	ug/l	u/s	u/s	u/s	u/s
Benzo(ghi)perylene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
PAH 16 Total	$*	0.195	ug/l	u/s	u/s	u/s	u/s
Benzo(b)fluoranthene	$*	0.01	ug/l	u/s	u/s	u/s	u/s
Benzo(k)fluoranthene	$*	0.01	ug/l	u/s	u/s	u/s	u/s

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

				Lab No	1936449	1936450	1936451	1936452
				.Sample ID	MS\BH04	MS\BH04	MS\BH03	MS\BH15
				Depth	2.40-28.50	2.35-5.00	1.98-28.50	3.57-12.00
				Other ID	300D	300S	300D	300D
				Sample Type	EW	EW	EW	EW
				Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
				Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.3	4.0	2.0	8.2
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	640	550	430	64
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	< 0.4	< 0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	430	1600	360	11
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01	0.09	0.17
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.6	0.7	0.8	0.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.60	0.49	0.30	2.0
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	< 0.6	< 0.6	1.5	0.6
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.4	2.6	1.5	< 1.3
Inorganics								
pH	DETSC 2008		pH	8.1	7.7	7.1	10.3
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0086	0.0078	0.0005	0.011
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	0.0021	0.0025	0.0001	0.0002
Thiocyanate	DETSC 2130	20	ug/l	< 20	< 20	< 20	280
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	576	1160	1490	2230
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.085	0.12	3.4	2.2
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.070	0.10	2.8	1.9
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.17	< 0.10		< 0.10
Nitrate as N	*	0.1	mg/l			< 0.10	
Nitrite as NO2	DETSC 2055	0.1	mg/l	1.4	14		0.42
Nitrite as N	DETSC 2201	0.035	mg/l			< 0.035	
Sulphate as SO4	DETSC 2055	0.1	mg/l	1400	1500	2100	1300
Total Organic Carbon	DETSC 2085	1	mg/l	12	4.6	4.1	100
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	14	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	9.9	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	23	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. $ -subcontracted. n/s -not supplied. U/S -unsuitable sample.

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1936449	1936450	1936451	1936452
			.Sample ID	MS\BH04	MS\BH04	MS\BH03	MS\BH15
			Depth	2.40-28.50	2.35-5.00	1.98-28.50	3.57-12.00
			Other ID	300D	300S	300D	300D
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	24	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	93	64	1100	130
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Phenols							
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	330	< 100
VOC TIC							
Tame	DETSC 3432*			Not Detected	Not Detected	Not Detected	Not Detected
Subcontracted PAH's							
Naphthalene	$*	0.1	ug/l	<0.1	<0.1	0.3	<0.1
Acenaphthylene	$*	0.013	ug/l	<0.013	<0.013	<0.013	<0.013
Acenaphthene	$*	0.013	ug/l	<0.013	<0.013	<0.013	0.074
Fluorene	$*	0.014	ug/l	<0.014	<0.014	0.033	<0.014
Phenanthrene	$*	0.011	ug/l	<0.011	<0.011	<0.011	0.011
Anthracene	$*	0.013	ug/l	<0.013	<0.013	<0.013	<0.013
Fluoranthene	$*	0.012	ug/l	<0.012	<0.012	<0.012	<0.012
Pyrene	$*	0.013	ug/l	<0.013	<0.013	<0.013	<0.013
Benzo(a)anthracene	$*	0.015	ug/l	<0.015	<0.015	<0.015	<0.015
Chrysene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	$*	0.018	ug/l	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	$*	0.016	ug/l	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	$*	0.011	ug/l	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	$*	0.195	ug/l	<0.195	<0.195	0.333	<0.195
Benzo(b)fluoranthene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	$*	0.01	ug/l	<0.01	<0.01	<0.01	<0.01
Subcontracted PAH's Low Levl							
Naphthalene	$*	0.1	ug/l	u/s	u/s	u/s	u/s
Acenaphthylene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Acenaphthene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Fluorene	$*	0.014	ug/l	u/s	u/s	u/s	u/s
Phenanthrene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Anthracene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Fluoranthene	$*	0.012	ug/l	u/s	u/s	u/s	u/s

Key: * -not accredited. $ -subcontracted. n/s -not supplied. U/S -unsuitable sample.

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1936449	1936450	1936451	1936452
			.Sample ID	MS\BH04	MS\BH04	MS\BH03	MS\BH15
			Depth	2.40-28.50	2.35-5.00	1.98-28.50	3.57-12.00
			Other ID	300D	300S	300D	300D
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Pyrene	$*	0.013	ug/l	u/s	u/s	u/s	u/s
Benzo(a)anthracene	$*	0.015	ug/l	u/s	u/s	u/s	u/s
Chrysene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Benzo(bk)fluoranthene	$*	0.018	ug/l	u/s	u/s	u/s	u/s
Benzo(a)pyrene	$*	0.016	ug/l	u/s	u/s	u/s	u/s
Indeno(123cd)pyrene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
Dibenzo(ah)anthracene	$*	0.01	ug/l	u/s	u/s	u/s	u/s
Benzo(ghi)perylene	$*	0.011	ug/l	u/s	u/s	u/s	u/s
PAH 16 Total	$*	0.195	ug/l	u/s	u/s	u/s	u/s
Benzo(b)fluoranthene	$*	0.01	ug/l	u/s	u/s	u/s	u/s
Benzo(k)fluoranthene	$*	0.01	ug/l	u/s	u/s	u/s	u/s

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1936453	1936454
			.Sample ID	MS\BH15	DUPLICATE B
			Depth	3.53-5.00	3.60-8.00
			Other ID	300S	300
			Sample Type	EW	EW
			Sampling Date	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	7.9	23
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	58	< 12
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.07
Chromium III, Dissolved	DETSC 2306*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.6	0.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	22	16
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.57
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.19	0.36
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.9	5.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	5.2	2.5
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	96	6.6
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	3.1
Inorganics					
pH	DETSC 2008		pH	10.9	11.3
Cyanide, Total Low Level	DETSC 2131	0.0001	mg/l	0.0082	0.0052
Cyanide, Free Low Level	DETSC 2131	0.0001	mg/l	0.0003	0.0002
Thiocyanate	DETSC 2130	20	ug/l	220	230
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	1060	437
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	1.8	5.7
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.5	4.7
Nitrate as NO3	DETSC 2055	0.1	mg/l	0.12	< 0.10
Nitrate as N	*	0.1	mg/l		
Nitrite as NO2	DETSC 2055	0.1	mg/l	1.7	< 0.10
Nitrite as N	DETSC 2201	0.035	mg/l		
Sulphate as SO4	DETSC 2055	0.1	mg/l	970	420
Total Organic Carbon	DETSC 2085	1	mg/l	6.3	5.1
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0

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Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1936453	1936454
			.Sample ID	MS\BH15	DUPLICATE B
			Depth	3.53-5.00	3.60-8.00
			Other ID	300S	300
			Sample Type	EW	EW
			Sampling Date	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	96	120
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0
Phenols					
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100
VOC TIC					
Tame	DETSC 3432*			Not Detected	Not Detected
Subcontracted PAH's					
Naphthalene	$*	0.1	ug/l	<0.1	<0.1
Acenaphthylene	$*	0.013	ug/l	0.180	<0.013
Acenaphthene	$*	0.013	ug/l	0.361	0.130
Fluorene	$*	0.014	ug/l	0.185	0.025
Phenanthrene	$*	0.011	ug/l	0.096	<0.011
Anthracene	$*	0.013	ug/l	0.015	<0.013
Fluoranthene	$*	0.012	ug/l	0.031	0.225
Pyrene	$*	0.013	ug/l	0.020	0.143
Benzo(a)anthracene	$*	0.015	ug/l	<0.015	<0.015
Chrysene	$*	0.011	ug/l	<0.011	<0.011
Benzo(bk)fluoranthene	$*	0.018	ug/l	<0.018	<0.018
Benzo(a)pyrene	$*	0.016	ug/l	<0.016	<0.016
Indeno(123cd)pyrene	$*	0.011	ug/l	<0.011	<0.011
Dibenzo(ah)anthracene	$*	0.01	ug/l	<0.01	<0.01
Benzo(ghi)perylene	$*	0.011	ug/l	<0.011	<0.011
PAH 16 Total	$*	0.195	ug/l	0.888	0.523
Benzo(b)fluoranthene	$*	0.01	ug/l	<0.01	<0.01
Benzo(k)fluoranthene	$*	0.01	ug/l	<0.01	<0.01
Subcontracted PAH's Low Levl					
Naphthalene	$*	0.1	ug/l	u/s	u/s
Acenaphthylene	$*	0.013	ug/l	u/s	u/s
Acenaphthene	$*	0.013	ug/l	u/s	u/s
Fluorene	$*	0.014	ug/l	u/s	u/s
Phenanthrene	$*	0.011	ug/l	u/s	u/s
Anthracene	$*	0.013	ug/l	u/s	u/s
Fluoranthene	$*	0.012	ug/l	u/s	u/s

Key: * -not accredited. $ -subcontracted. n/s -not supplied. U/S -unsuitable sample.

Summary of Chemical Analysis
Water Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

			Lab No	1936453	1936454
			.Sample ID	MS\BH15	DUPLICATE B
			Depth	3.53-5.00	3.60-8.00
			Other ID	300S	300
			Sample Type	EW	EW
			Sampling Date	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Pyrene	$*	0.013	ug/l	u/s	u/s
Benzo(a)anthracene	$*	0.015	ug/l	u/s	u/s
Chrysene	$*	0.011	ug/l	u/s	u/s
Benzo(bk)fluoranthene	$*	0.018	ug/l	u/s	u/s
Benzo(a)pyrene	$*	0.016	ug/l	u/s	u/s
Indeno(123cd)pyrene	$*	0.011	ug/l	u/s	u/s
Dibenzo(ah)anthracene	$*	0.01	ug/l	u/s	u/s
Benzo(ghi)perylene	$*	0.011	ug/l	u/s	u/s
PAH 16 Total	$*	0.195	ug/l	u/s	u/s
Benzo(b)fluoranthene	$*	0.01	ug/l	u/s	u/s
Benzo(k)fluoranthene	$*	0.01	ug/l	u/s	u/s

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936446	1936448	1936449	1936450
			.Sample ID	MS\BH17	MS\BH13	MS\BH04	MS\BH04
			Depth	5.64-20.00	2.28-9.50	2.40-28.50	2.35-5.00
			Other ID	300D	300S	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
VOCs							
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1

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Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936446	1936448	1936449	1936450
			.Sample ID	MS\BH17	MS\BH13	MS\BH04	MS\BH04
			Depth	5.64-20.00	2.28-9.50	2.40-28.50	2.35-5.00
			Other ID	300D	300S	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1
SVOCs							
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthylene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

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Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

			Lab No	1936446	1936448	1936449	1936450
			.Sample ID	MS\BH17	MS\BH13	MS\BH04	MS\BH04
			Depth	5.64-20.00	2.28-9.50	2.40-28.50	2.35-5.00
			Other ID	300D	300S	300D	300S
			Sample Type	EW	EW	EW	EW
			Sampling Date	16/11/2021	16/11/2021	16/11/2021	16/11/2021
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	1.1	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Fluorene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	1.2	< 1.0	< 1.0
Fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chrysene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1936453
.Sample ID	MS\BH15
Depth	3.53-5.00
Other ID	300S
Sample Type	EW
Sampling Date	16/11/2021
Sampling Time	n/s

Test	Method	LOD	Units	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1936453
.Sample ID	MS\BH15
Depth	3.53-5.00
Other ID	300S
Sample Type	EW
Sampling Date	16/11/2021
Sampling Time	n/s

Test	Method	LOD	Units	
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
Naphthalene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1
SVOCs				
Phenol	DETSC 3434*	1	ug/l	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
Acenaphthylene	DETSC 3434*	1	ug/l	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
Acenaphthene	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water VOC/SVOC Samples

Our Ref 21-24680
Client Ref 4339
Contract Title Preliminary Onshore Ground Investigation for Net Z

Lab No	1936453
.Sample ID	MS\BH15
Depth	3.53-5.00
Other ID	300S
Sample Type	EW
Sampling Date	16/11/2021
Sampling Time	n/s

Test	Method	LOD	Units	
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
Fluorene	DETSC 3434*	1	ug/l	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Phenanthrene	DETSC 3434*	1	ug/l	< 1.0
Anthracene	DETSC 3434*	1	ug/l	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0
Fluoranthene	DETSC 3434*	1	ug/l	< 1.0
Pyrene	DETSC 3434*	1	ug/l	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0
Benzo(a)anthracene	DETSC 3434*	1	ug/l	< 1.0
Chrysene	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l	< 1.0
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l	< 1.0
Benzo(a)pyrene	DETSC 3434*	1	ug/l	< 1.0
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l	< 1.0
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l	< 1.0
Benzo(ghi)perylene	DETSC 3434*	1	ug/l	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 21-24680
Client Ref 4339
Contract Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1936445	MS\BH14 3.60-8.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936446	MS\BH17 5.64-20.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936447	MS\BH13 2.35-20.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936448	MS\BH13 2.28-9.50 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936449	MS\BH04 2.40-28.50 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936450	MS\BH04 2.35-5.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936451	MS\BH03 1.98-28.50 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936452	MS\BH15 3.57-12.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936453	MS\BH15 3.53-5.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	
1936454	DUPLICATE B 3.60-8.00 WATER	16/11/21	GB 1L x5, GV x3, PB 1L, P(other)	pH/Cond/TDS (1 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Quality Control

Quality Systems

Derwentside Environmental Testing Services (DETS) employs numerous measures to ensure high levels of confidence in the results produced. Our laboratory has been accredited by the United Kingdom Accreditation Service (UKAS) since its inception and operates in full compliance with the internationally recognised standard ISO 17025:2017 and the Environment Agency's MCERTS (Monitoring & Certification Scheme) standard for soils and waters, which provides greater assurance to all parties of the reliability of data from chemical analysis.

2139

To obtain a copy of our full UKAS schedule visit the UKAS website at [redacted] search for our laboratory number 2139, or scan the QR code.

Proficiency Testing Schemes

DETS participates in six external proficiency testing schemes in order to monitor and ensure the continuing quality of analysis. These schemes cover soil, water and fuel analysis and the schemes are:

Internal Quality Control

DETS runs a strict internal quality control system. A minimum of 5% of all samples that undergo analysis in our laboratories are quality control samples. This way we can ensure a high level of confidence in all of the analytical data produced. In addition, MCERTS accredited tests must meet strict, ongoing limits for precision and bias, to maintain their accreditation status.

The types of internal Analytical Quality Control (AQC) samples undertaken by DETS include Blanks, Internal QC, Calibration Checks, Surrogates and Internal Standards.

In addition to internal AQC, DETS also checks aspects of instrument performance. These checks are in general method specific. Examples are, but not limited to, retention time, peak area, signal to noise, SPE column, peak shape and peak tailing check standards.

Quality Control

Methods

DETS currently have over 140 documented methods for analytical analysis. The analytical methods are always available to employees for reference purposes. All the methods follow a documented procedure for content and headings, including health and safety, interferences, reagents and standards preparation, quality control, method procedure, analysis of results, acceptability criteria and disposal of waste.

Procedures

DETS currently have over 170 documented Standard Operating Procedures (SOPs), covering every section of the business.

The Key Quality procedures include:

DETSC.SOP 1002 - Contract Review
DETSC.SOP 1003 - Deviating Samples
DETSC.SOP 1010 - Checking a Report
DETSC.SOP 1206 - Supplier/Subcontractor Approval and Review
DETSC.SOP 1401 - FERA Plant Health License
DETSC.SOP 3001 - Analysis of AQC Samples
DETSC.SOP 3004 - QC Chart Review
DETSC.SOP 3005 - AQC Failure Reporting
DETSC.SOP 3010 - Control of Nonconforming Testing
DETSC.SOP 3102 - Complaint Handling
DETSC.SOP 3103 - Corrective & Preventive Action
DETSC.SOP 3201 - Uncertainty of Measurement
DETSC.SOP 3204 - Validation, Evaluation and Revalidation of Methods
DETSC.SOP 3401 - Documentation of Methods
DETSC.SOP 3402 - Document Control - Issuing and Removal of Controlled Documents
DETSC.SOP 3404 - Internal Audit Procedure
DETSC.SOP 3407 - Training
DETSC.SOP 3408 - Control of Records & Data
DETSC.SOP 3411 - Archiving of Documents and Records
DETSC.SOP 3412 - Competency
DETSC.SOP 3501 - Handling PT Schemes
DETSC.SOP 4203 - Handling Scheduled Samples
DETSC.SOP 4204 - Handling Unscheduled Samples
DETSC.SOP 4205 - Sending Subcontracted Samples

DETS also have documented procedures for equipment calibration and scheduled checks, including procedures for balances, hotblock digesters, furnaces, shakers, ovens, fridges, incubators, sonic baths, thermometers, timers, auto-dispensers and syringes.

Quality Control

Training

All new employees at DETS undergo a formal induction on the first day, covering an introduction to the Company, followed by an overview of the Quality Systems, the Environmental Systems and the Health and Safety Systems, Human Resources Systems, Information Technology Systems and finally an overview of the Laboratory Operations.

All new employees at DETS also undertake a Week 1 Induction schedule covering AQC Analysis and Failure Reporting and Basic Laboratory Skills.

All training on analytical methods follows a documented process requiring the employee to read and observe the method being conducted. The employee must then conduct the method under supervision on at least three occasions to the required standard before both the trainer, trainee and section manager sign the training record. Before the trainee can perform the method unsupervised, a method training verification (MTV) audit must be undertaken by a senior member of staff to verify the trainee is undertaking analysis to the required standard.

Competency

All employees will have their competency to undertake analytical methods assessed every year. Competency is usually assessed by PT Scheme Testing Results, Method Audits, MTV Audits or UKAS Audits.

If no record of competency is present within a 12-month period, the employee will have to undergo a MTV audit before undertaking any further analytical method analysis.

DETS INFO 008 – Sample Holding Time Information

Soil

Analyte	Container type	Minimum sample required	Reference	Maximum holding time from sampling	
				pre drying/extraction[1]	post drying/extraction[2]
Acid Herbicides	Glass	20g	EPA SW-846 Chapter 4	14 days	40 days
Aliphatic/Aromatic	Glass	20g	EPA Victoria	14 days	-
Ammonium	Glass or plastic	20g	E DIN 19746	3 days	30 days
Anions	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
Boron	Glass or plastic	50g	BS ISO18512:2007	6 months	30 years
BTEX	60ml glass jar	Full container	EPA SW-846 Chapter 4	14 days	-
Carbonate	Glass or plastic	20g	Lab Validation	4 weeks	1 year
Chloride	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
Conductivity	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Cyanide	Glass or plastic	20g	EPA SW-846 Chapter 3	14 days	-
Heavy metals	Glass or plastic	10g	BS ISO18512:2007	6 months	30 years
Hexavalent chromium	Glass or plastic	20g	BS ISO18512:2007	30 days	-
Loss on ignition	Glass or plastic	10g	EPA SW-846 Chapter 3	28 days	-
Mercury	Glass or plastic	10g	EPA SW-846 Chapter 3	28 days	-
OCP	Glass	20g	BS ISO18512:2007	1 month	-
Oil & grease	Glass	20g	EPA SW-846 Chapter 3	28 days	-
Organic matter/TOC	Glass or plastic	20g	EPA SW-846 Chapter 3	28 days	-
PAH	Glass	20g	EPA Victoria	14 days	-
PCB	Glass	20g	BS ISO18512:2007	1 month	-
pH	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Phenols	Glass	20g	EPA Victoria	14 days	-
PRO	60ml glass jar	Full container	EPA SW-846 Chapter 4	14 days	-
Sulphate	Glass or plastic	50g	BS ISO18512:2007	1 month	3 years
Sulphide	Glass or plastic	20g	EPA SW-846 Chapter 3	7 days	-
SVOC	Glass	20g	EPA SW-846 Chapter 4	14 days	40 days
TEM/CEM	Glass	20g	EPA Victoria	14 days	-
Total sulphur	Glass or plastic	20g	EPA Victoria	7 days	-
TPH (C10-C40)	Glass	20g	EPA Victoria	14 days	-
VOC	60ml glass jar	Full container	EPA SW-846 Chapter 4	7 days	-
Whole Oil Interpretation	60ml glass jar	Full container	-	-	-

[1] From sampling to extraction

[2] Once extracted

DETS INFO 008 – Sample Holding Time Information

Water

Analyte	Container type	Minimum sample required	Reference	Maximum holding time from sampling	
				Preservative required	Holding Time
Acid Herbicides	Glass	500	EPA SW-846 Chapter 4	none	7 days
Alkalinity	Glass or plastic	100	ISO 5667 3:2018	none	2 weeks
Aluminium (Reactive)	Glass or plastic	50	DETS Stability Study	none	2 days
Ammonium	Glass or plastic	20	ISO 5667 3:2018	Sulphuric acid	3 weeks
BOD	Glass or plastic	500	DETS Stability Study	none	2 days
Boron	Plastic	20	ISO 5667 3:2018	HNO3	6 months
Bromide	Glass or plastic	20	ISO 5667 3:2018	none	1 month
BTEX	Glass vial	Full container	EPA SW-846 Chapter 4	none	7 days
Chloride / Fluoride	Glass or plastic	20	ISO 5667 3:2018	none	1 month
COD	Glass or plastic	20	ISO 5667 3:2018	Sulphuric acid	6 months
Conductivity	Glass or plastic	100	ISO 5667 3:2018	none	1 day
Cyanide	Glass or Plastic	50	EPA SW-846 Chapter 3	NaOH	14 days
Hexavalent chromium	Glass or plastic	20	ISO 5667 3:2018	none	4 days
Metals (including Hardness)	Glass or plastic	20	EPA SW-846 Chapter 3	HNO3	6 months
Mercury	Glass or plastic	20	ISO 5667 3:2018	HNO3	6 months
Nitrate	Glass or plastic	20	EPA SW-846 Chapter 3	none	28 days
Nitrite	Glass or plastic	20	DETS Stability Study	none	5 days
OCP	Glass	500	ISO 5667 3:2018	Dark Glass	7 days
Oil & grease	Glass	500 (Separate bottle)	ISO 5667 3:2018	HCl / HNO3 / H2SO4	1 month
PAH	Glass	500	ISO 5667 3:2018	none	4 days
pH	Glass or plastic	50	ISO 5667 3:2018	none	1 day
PCB	Glass	500	EPA Victoria	none	7 days
Phenols	Glass	500	ISO 5667 3:2018	H3PO4 / H2SO4	21 days
Phosphate	Glass or plastic	20	DETS Stability Study	none	5 days
Phosphorus	Glass or plastic	20	EPA Victoria	HNO3	28 days
PRO	Glass vial	Full container	ISO 5667 3:2018	HCl / HNO3 / H2SO4	7 days
Sulphate	Glass or plastic	20	ISO 5667 3:2018	none	1 month
Sulphide	Plastic	50	ISO 5667 3:2018	Zinc acetate / Na2CO3	7 days
Suspended solids	Glass or plastic	100	ISO 5667 3:2018	none	2 days
SVOC	Glass	500	EPA SW-846 Chapter 4	none	7 days
TDS / Total Solids	Glass or plastic	500	ISO 5667 3:2018	none	7 days
Thiocyanate	Glass or plastic	50	DETS Stability Study	none	3 days
TOC/DOC	Glass or plastic	20	EPA SW-846 Chapter 3	H2SO4	28 days
TON	Glass or plastic	20	DETS Stability Study	none	5 days
TPH/EPH	Glass	500 (Separate bottle)	ISO 5667 3:2018	none (HCl / HNO3)	4 days (1 Month)
VOC	Glass vial	Full container	ISO 5667 3:2018	HCl / HNO3 / H2SO4	7 days
Whole Oil Interpretation	60ml glass jar	Full container	-	-	-

DETS INFO 008 – Sample Holding Time Information

Fuel

Due to the nature of fuel samples, no sample holding time is appropriate.

Asbestos

Due to the nature of asbestos samples, no sample holding time is appropriate.

Whole Oil Interpretation

Due to the nature of whole oil interpretation, no sample holding time is appropriate.

Unaccredited Methods

As unaccredited methods may not have undertaken a full validation programme, no sample holding time study has been undertaken. A study will be conducted (if required) during the process of accreditation of the method.

Sample Transport Environment

5 ± 3°C

Sample Storage environment

3 ± 2°C

DETS INFO 001 - Analytical Method Summary

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 1001	**Sample Pre-Treatment and Preparation of Solids**	Solid samples are classified and identified. Samples requiring analysis for unstable or volatile determinands are analysed as received. Samples requiring analysis for stable and non-volatile determinands are dried at <30◦C or 50◦C, depending on requirements, for a minimum of 16hrs (overnight). Dried samples are crushed in a jaw crusher, if necessary, and then ground using a mechanical mixer mill and sieved through a 250µm sieve to ensure they are homogenous.	BS1377:1990 – Soils for Civil Engineering Purposes The preparation and pre-treatment of potentially contaminated soils prior to chemical analysis – MEWAM – 2006 – Environment Agency	n/a	Not Accredited
DETSC 1002	**Description of Soil Sample Type**	This method outlines the procedure used to describe soil samples with respect to basic type, predominant colour and inclusions. The procedure is carried out during the sample preparation stage.	BS 5930:Section 6:1999	n/a	Not Accredited
DETSC 1003	**Stone and Glass / Metal / Plastic Content of Soil**	This method outlines the procedure used to determine the Stone and Glass/Metal/Plastic content of soil samples. The procedure is carried out during the sample preparation stage.	BS 3882:2007 BS 1377:1990	0.10%	Not Accredited
DETSC 1004	**Natural Moisture Content / Loss on Drying of Soil**	Loss on drying is determined by loss of mass on drying in an oven set at 28ºC. Moisture content is determined by loss of mass on drying in an oven set at 105ºC. The procedure is carried out during the sample preparation stage.	Practical Environmental Analysis. Radojevic & Bashkin. RSC 1999 BS 1377: Part 2:1990 DETS drying time study	0.10%	Not Accredited
DETSC 1005	**Soil Crushing**	Dried samples are crushed in a jaw crusher, if necessary, and then ground using a mechanical mixer mill to ≤250µm to ensure they are homogenous.	In-house Method	n/a	Not Accredited
DETSC 1006	**Soil Weighing**	Soil samples are weighed to predefined tolerances into batches in preparation for extraction and analysis by documented methods.	In-house Method	n/a	Not Accredited
DETSC 1007	**Batch Scanning**	Batches of soil prepared as per DETSC 1006 – Soil Weighing are scanned to create LIMS worksheets for individual method extraction and analysis. Addition of extraction reagents followed by shaking or standing overnight of certain methods is also conducted.	In-house Method	n/a	Not Accredited
DETSC 1008	**Handling Liquid Samples**	Liquid samples are filtered and/or fixed before analysis by documented methods.	In-house Method	n/a	Not Accredited
DETSC 1009	**Leachate Preparation (NRA Method and BS EN 12457 Parts 1-3)**	Leachates are prepared as per the NRA (1994) method and as per BS EN 12457 Parts 1 - 3 one and two stage leachate preparation.	Leaching Test Method for the Assessment of Contaminated Land, Interim Guidance, NRA(1994) BS EN 12457 Part 1,2 & 3	n/a	Not Accredited
DETSC 1010	**Leaching Characteristics of Moulded and Monolithic Building or Waste Materials**	A block of the material to be analysed is placed into an appropriate container ensuring that there is a gap of at least 2cm around the test piece on all sides (including the base). The container is then filled with deionised water and covered. At set time periods, the water is drained from the container which is then re-filled. The water drained out of the container is retained and analysed for the components of interest.	EA NEN 7375:2004 – Leaching Characteristics of Moulded or Monolithic Building and Waste Materials	n/a	Not Accredited
DETSC 1101	**Asbestos - Bulk Analysis**	Samples are examined visually for the presence of asbestos containing materials or asbestos fibres. Suspect fibres are removed from the sample and examined using polarised light microscopy to determine whether they are asbestos fibres. If no asbestos fibres are identified by the method after an adequate length of examination time, and after at least two small pinch samples have been examined, then the sample may be reported as 'NAD' (no asbestos detected).	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 McCrone W.C., Asbestos Identification (Second Edition), The McCrone Research Institute, 1987 LAB 30, Application of ISO/IEC17025 for Asbestos Sampling and Testing, UKAS, Edition 3, January 2015	n/a	UKAS

DETSC 1102	**Quantification of asbestos in soils, loose aggregates and ballast**	The method of quantification is divided into three procedures: Gravimetric analysis, detailed gravimetric analysis and PCOM analysis. The analysis may be affected by the client's requirements as determined by contract review, and by the nature of the asbestos found in the sample, e.g. whether ACMs are present, and whether fibre bundles large enough to pick out using tweezers are have been found in the sample.	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 McCrone W.C., Asbestos Identification (Second Edition), The McCrone Rese HSG264 Asbestos: The survey guide. HSE Books, 2010 Davies, L. S.T., Wetherill, G. Z., McIntosh, C., McGonagle, C., Addison, J. 1996. Development and validation of an analytical method to determine the amount of asbestos in soils and loose aggregates. HSE Contract Research Report N0. 83/1996. HSE Books	Gravimetric Analysis: 0.01% for 1kg sample Detailed Gravimetric Analysis: 0.001% for 50g sample PCOM Analysis: 0.001%	UKAS
DETSC 1103	**Asbestos Water Absorption Test**	This test involves a sample of the asbestos product being dried and weighed before being immersed in water for a period of time. The sample is then removed from the water and re-weighed. If the amount of water absorbed is <30% by weight, then the sample should be reported as 'Not Licensed'. If ≥30% water is absorbed then the sample should be reported as being 'Licensed', i.e. an asbestos material for which a licence is required to work on.	Work with Materials Containing Asbestos: Approved Code of Practice and Guidance. HSE Books, 2006.	n/a	UKAS
DETSC 1104 (DRAFT)	**Respirable Fibres in Soil and Dust**	The analysis can follow-on from a quantitative analysis, or be scheduled as a test on its own, according to client requirements. A known mass of between 8g and 12g is removed and mixed with 1000ml of water. The mixture is stirred for 1 hour using a magnetic stirrer. A portion of the mixture is filtered through a 10 micron pore size filter, to collect a filtrate containing a sample of the respirable dust. The mass of respirable (PM10) dust per ml of the filtrate is calculated, and this value is used to decide how much of the filtrate is to be used for the rest of the analysis. Then, a known quantity of the filtrate is filtered through a cellulose-ester filter papers with a pore size of 0.8-1.2 microns. The filter is then placed onto a microscope slide, allowed to air dry, and then cleared and fixed using the acetone/triacetin method described in HSG 248. The filter is then evaluated using PCOM. From the number of respirable fibres observed on the slide the number of respirable fibres per mg of dust is calculated.	Asbestos: The analyst's guide for sampling, analysis and clearance procedures. HSG248, HSE Books, 2005 Asbestos: The survey guide. HSG264, HSE Books, 2012.	n/a	Not Accredited
DETSC 2002	**Organic matter content of soil**	The procedure is based upon Walkley and Black's method. Organic matter in soil is oxidised with potassium dichromate in the presence of concentrated sulphuric acid. The excess dichromate is titrated with ferrous sulphate using diphenylamine as an external indicator. The organic matter content is calculated from the amount of dichromate used during the oxidation process based on an empirical relationship.	BS1377 : Part 3 : 1990 Method 3 BS1377 : Part 1 : 1990 BS 3882:2007	0.10%	MCERTS(Soils)
DETSC 2003	**Loss On Ignition**	Soil is ignited at 440C and the amount of sample lost on ignition is determined gravimetrically. Other specified temperatures may be used but are not accredited.	BS1377 : Part 3 : 1990 Method 4 BS1377 : Part 1 : 1990	0.01%	MCERTS(Soils)
DETSC 2004	**Sulphate and Total Sulphur Content of Soil, Aggregate and Water**	The sulphate in the soil is dissolved in dilute hydrochloric acid, or in an aqueous extract having a water:soil ratio of 2:1 and the insoluble residue is removed by filtration. Waters are also filtered prior to analysis. The sulphate in the filtrate is precipitated as barium sulphate which is then filtered, ignited and weighed. Aggregate analysis is not comparable to BS EN 1744.	BS1377 : Part 3 : 1990 Method 5 BS1377 : Part 1 : 1990 BRE SD1: 2005 Concrete in Aggressive Ground	**Acid Soluble:** 0.01% **Water Soluble:** 100mg/l **Waters:** 10mg/l	MCERTS(Soils) Not Accredited (Aggregates)
DETSC 2005	**Carbonate content of soil by Rapid Titration**	The carbonate present in the soil reacts with a known excess of hydrochloric acid liberating carbon dioxide. The acid remaining after the reaction is determined by titration against sodium hydroxide. The result is calculated in terms of the equivalent proportion of carbon dioxide.	BS 1377: Part 1: 1990 BS 1377: Part 3: 1990: Method 5	1%	UKAS
DETSC 2006	**Water Soluble Chloride Content of Soil & Chloride Content of Water**	Chloride in the soil is extracted in deionised water and the insoluble material is removed by filtration. Water samples are filtered prior to analysis. The chloride in solution is analysed by titration using Mohr's method titration with standard silver nitrate solution using potassium chromate as an indicator.	BS1377 : Part 3 : 1990 Method 7.2 BS1377: Part 1: 1990	**Soil:** 0.01% **Water:** 10mg/l	UKAS
DETSC 2007	**Acid Soluble Chloride Content of Soil and Concrete**	The chloride in the sample is dissolved in nitric acid and the insoluble material is removed by filtration. The dissolved chloride is analysed by Volhard's method. The chloride in solution is precipitated with a known excess of standard silver nitrate. The excess silver nitrate is titrated against standard ammonium thiocyanate using ferric alum as an indicator. The colour change is white to red.	BS1377 : Part 3 : 1990 Method 7.3 BS1377: Part 1: 1990 BS 1881-124:1988	0.01%	UKAS

DETSC 2008	**pH Value of Soil and Water**	The pH value of a soil suspension in water or a groundwater sample is determined electrometrically using a glass electrode.	BS1377: Part 3: 1990 – Soils for Civil Engineering Purposes – Chemical and Electrochemical Methods	n/a	MCERTS (Soils) UKAS (Waters)
DETSC 2009	**Electrical Conductivity of Soil & Water**	The electrical conductance of a soil suspension in water or of a water sample is determined by voltammetry using a conductivity meter. In some cases, the soil may need to be extracted with an aqueous solution of an inorganic salt e.g. the conductivity of topsoil is determined by preparing a suspension of the soil in saturated calcium sulphate.	Standard Methods for the Examination of water and Wastewater Part 2510B 21st Edition 2005 APHA, AWWA, WEF BS3882:2007 Specification for Topsoil	1uS/cm	UKAS
DETSC 2010	**Chloramine in Water Samples**	Free available residual chlorine reacts with diethyl-p-phenylenediamine (DPD) to produce a pink/red coloured complex. The addition of a small amount of potassium iodide causes mono-chloramine to produce the same pink/red colour with the same reagent. Further addition of an excess of iodide causes di-chloramine and any nitrogen tri-chloride to react and produce a colour. The pink/red coloured complex is titrated with ferrous ammonium sulphate to a clear endpoint.	In-house Method	100µg/l	Not Accredited
DETSC 2011	**Acid Alkali Reserve**	An initial pH value is obtained for the sample. The sample is then titrated with either hydrochloric acid or sodium hydroxide to a pH of 7.00. From this result, the acid/alkali reserve value can be calculated.	In-house Method	TBC	Not Accredited
DETSC 2012	**Biofilm Potential of Sewage and Sludges**	Sodium hypochlorite solution is added to the sample in small increments. The sample temperature is monitored during the additions until no further changes in temperature occur due to all of the bacteria in the sample having been effectively neutralised.	In-house Method	TBC	Not Accredited
DETSC 2013	**Gravimetric Carbonate Content of Soils**	A dried and finely crushed portion of the sample is ashed in a muffle furnace at 440ºC for 4 hours to burn off any organic materials in the sample. The crucible containing the sample is then allowed to cool and is re-weighed and then returned to the furnace at a temperature of 950ºC which will break down any carbonates present and release them as carbon dioxide gas. The carbonate content of the sample is then determined by calculation.	The British Calcium Carbonates Federation–Calcium Carbonate – Occurrence and uses	0.10%	Not Accredited
DETSC 2014	**Total and Available Lime Content**	Samples for Total Lime are extracted with hot hydrochloric acid and analysed for calcium by ICP-OES. Samples for available lime content are extracted with hot water using granulated sugar as a catalyst and analysed by titration with standardised hydrochloric acid.	BS 4551: Part 2: 1998– Methods of testing mortars, screed and plasters. Chemical analysis and aggregate grading	TBC	Not Accredited
DETSC 2015	**Initial Consumption of Lime**	The pH of a saturated calcium hydroxide solution is measured at ambient temperature. Several portions of the sample to be analysed are weighed out and differing amounts of lime are added to each one. The samples are mixed with water and then shaken. After shaking the pH of each portion is determined and a graph plotted of pH against percentage of lime. From this graph, the initial consumption of lime is determined (this is the lime percentage at which the sample pH is the same as that of the saturated calcium hydroxide solution).	BS 1924: Part 2: 1990 – Stabilized materials for civil engineering purposes. Methods of test for cement-stabilized and lime-stabilized materials	TBC	Not Accredited
DETSC 2016	**Redox Potential of Soil and Water**	Redox potential is measured using a probe with two electrodes, one of platinum and the other of silver chloride between which the potential of the solution being tested is measured in millivolts. The probe is placed into the sample and a direct reading in millivolts is given on the meter attached to the redox probe. Soils are analysed by preparation of a 2:1 water to soil sludge.	Encyclopaedia of Soils in the Environment 2005 – Redox Potential	n/a	Not Accredited
DETSC 2017	**Salinity of Soils and Waters by Calculation**	The conductivity of the sample is measured in µS/cm and from this result the salinity is calculated.	Method 2520B - Standard Methods for the Examination of Water and Wastewater - 21st Edition – 2005	n/a	Not Accredited
DETSC 2018	**Specific Gravity of Sludge**	The 'as received' sample is transferred to a dry, tared measuring cylinder and the volume recorded. The cylinder and its contents are then weighed, and the specific gravity of the sample is calculated.	In-house Method	n/a	Not Accredited

DETSC 2019	**Loose Packed Dry Soil Density**	Dried, ground soil is transferred to a dry, tared measuring cylinder and the volume recorded. The cylinder and its contents are then weighed and the density of the soil calculated.	BS3882:2007 Specification for Topsoil	n/a	Not Accredited
DETSC 2024	**Sulphide in Soil and Water by Iodometry**	Hydrogen sulphide is liberated by acidification of the sample with hydrochloric acid in a steam distillation unit. The hydrogen sulphide produced is carried over with the steam and is absorbed in alkaline zinc acetate. The zinc sulphide produced reacts with iodine formed when iodate-iodide is acidified and the excess iodine titrated with standard thiosulphate.	In House Method based on: Environment Agency - The determination of easily liberated sulphide in soils and similar matrices (2010) - Blue Book 228 Method D - The determination of easily liberated sulphide in as received or air-dried samples following acid steam distillation with iodometric titration The determination of sulphide in waters and associated materials (2007) Draft Method D - The determination of easily liberated sulphide in as received or air-dried samples following phosphoric acid steam distillation with iodometric titration.	**Soils:** 10mg/kg **Waters:** 250ug/l	Not Accredited
DETSC 2025	**Volatile Fatty Acids in Waters and Sludges**	Volatile fatty acids are esterified with acidic ethylene glycol. The resultant esters are reacted with hydroxylamine to form hydroxamic acids. Addition of iron (II) chloride causes formation of purple coloured ferric hydroxamates which are determined spectrophotometrically at 500nm.	Determination of Volatile Fatty Acids in Environmental Aqueous Samples - Polish Journal of Environmental Studies Volume 17, No. 3 (2008), 351-356. Volatile Fatty Acids Production By Anaerobic Fermentation Of Urban Organic Wastes – C. Sans, J. Mata-Alvarez, Department of Chemical Engineering, University of Barcelona Determination of Volatile Fatty Acids in Sewage Sludge – Methods for the Examination of Waters and Associated Materials Book 21 ISBN 011-751462-4	20mg/l	Not Accredited
DETSC 2026	**AOC, pH and Alkalinity of Solid Soaps and Detergents**	A representative portion of the sample is weighed out and dissolved in water. The pH is measured on the liquid produced using a calibrated pH meter. The same solution is then titrated with standard sulphuric acid using methyl orange as an indicator and from this result the alkalinity is calculated. The active oxygen content is measured by digesting the sample with sulphuric acid and then titrating with potassium permanganate solution.	ISO 4321:1977 – Washing Powders - Determination of AOC – Titrimetric Method	TBC	Not Accredited
DETSC 2030	**Alkalinity in Water**	The alkalinity of a sample of water or leachate is determined by potentiometric or indicator end point titration with a strong acid from sample pH to pH 8.3 (where applicable) and then to pH 4.5. From the titres obtained the total alkalinity and concentrations and types of alkalinity present can be calculated.	SCA Method ISBN 0 11 751601 5 The Determination of Alkalinity and Acidity in Water 1981 Instruction Manual for Skalar SP50 Robotic Analyser	20mg/l as CaCO3	UKAS
DETSC 2031	**5 Day Biochemical Oxygen Demand**	The sample, either diluted or undiluted, is placed in a BOD bottle and the initial dissolved oxygen content of the sample is measured using a dissolved oxygen meter. The bottle is placed in an incubator at 20ºC in the dark for 5 days. After this time the bottle is removed and the residual dissolved oxygen content of the sample is measured. The BOD of the sample is calculated from the reduction in the concentration of dissolved oxygen over 5 days.	SCA Method ISBN 0 117522120 5 Day Biochemical Oxygen Demand (BOD5) Second Edition 1988	1 mg/l	UKAS
DETSC 2032	**Chemical Oxygen Demand**	Oxidisable substances react with sulphuric acid – potassium dichromate solution in the presence of silver sulphate as a catalyst. Chloride is masked by mercury sulphate. The reduction in the yellow colouration of Cr6+ is evaluated using a spectrophotometer for the low range tubes (LCK 314) whilst the green colouration of Cr3+ is evaluated for the medium and high range tubes (LCK 014 and LCK 114).	Environment Agency The determination of chemical oxygen demand in waters and effluents (2007) Methods for the Examination of Waters and Associated Materials	10 mg/l	UKAS MCERTS - Trade Effluent ONLY
DETSC 2033	**Total and Dissolved Organic Carbon in Water**	The term TOC (Total Organic Carbon) is used to describe the total content of organically bound carbon in dissolved and undissolved compounds. The TOC content is expressed in mg/l. If DOC (Dissolved Organic Carbon) is required, samples are filtered through a 0.45µm filter paper prior to analysis. Inorganic carbon is expelled by acidification of the sample. TOC is then determined by digestion of the sample with sulphuric acid and peroxodisulphate. Carbon containing compounds are transformed into carbon dioxide. The carbon dioxide evolves and reacts with an indicator solution. The colour change is measured using a spectrophotometer.	Hach-Lange Technical Instructions: LCK 385, LCK 386	2 mg/l	UKAS
DETSC 2034	**Suspended and Settleable Solids in Water**	Suspended matter is removed from a measured volume of sample by filtration under reduced pressure through a pre-treated, pre-weighed glass fibre filter paper. The paper is washed with deionised water to remove dissolved salts and the total suspended matter is determined gravimetrically after drying at 105 ±5°C. Settleable solids are determined by subtracting the solids left in suspension after settlement for 1 hour (or other agreed time) from the total suspended matter in the sample.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980	5 mg/l	**Suspended Solids:** UKAS **Settleable Solids:** Not Accredited

DETSC 2035	**Total Solids, Total Dissolved Solids and Total Volatile Solids in Water**	For total dissolved solids determination: Water samples are pre-filtered to remove any suspended solids and evaporated in an oven at 180°C. The amount of residual dissolved solids is determined gravimetrically. An estimate of the total dissolved solids can be obtained by measuring the conductivity of the sample and performing an empirical calculation from the conductivity obtained. For total solids and total volatile solids: The sample is shaken to ensure homogeneity of any suspended matter. The sample is then evaporated and the result is determined gravimetrically as for total dissolved solids. If total volatile solids is required on the sample, the container used for the total solids determination is retained and heated in a muffle furnace to 440ºC and a further gravimetric determination is made.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980. BS1377: Part 3 : 1990 Section 8	5 mg/l	**Total Dissolved Solids:** UKAS **Total Solids & Total Volatile Solids:** Not Accredited
DETSC 2036	**Combustibility of Solids**	A representative sample of 10 to 20g of the material to be tested is placed on a gauze mat and heated using a blowtorch. The sample is observed during and after heating and a determination of the behaviour of the sample during the test is made using a standard set of definitions.	EN ISO 1182:2010 Reaction to Fire Tests for Products – Non-Combustibility Test	n/a	Not Accredited
DETSC 2037	**Turbidity in Waters**	Samples are measured on a turbidity meter. The instrument measures turbidity in the sample by passing light at a wavelength of 860nm through a glass vial containing the liquid to be analysed. Light scattered by the sample is detected at an angle of 90º by a photo-diode and a result is displayed on the instrument screen, with results being based on a set of calibration standards for which the instrument stores a calibration graph.	Standard Methods for the Examination of Water and Wastewater 21st Edition	1.00 NTU	Not Accredited
DETSC 2038	**Total and Free Chlorine in Water**	The sample is reacted with diethyl-p-phenylenediamine (DPD) in an ethylene diamine tetra-acetic acid (EDTA) buffer for free chlorine. For total chlorine analysis, potassium iodide is added as well to break down any chloramine compounds in the sample so that the chlorine is released to react with the DPD. Samples for both tests are then analysed colourimetrically at a wavelength of 510nm using a small bench top photometer.	Methods for the Examination of Waters and Associated Materials - Chemical disinfecting agents in waters and effluents (2008)	0.1mg/l	Not Accredited
DETSC 2039	**Cation Exchange Capacity of Soil**	The sample is saturated with Ba2+ ions by mixing with in a barium chloride solution. The barium is then exchanged with Mg2+ by reaction with magnesium sulphate forming a precipitate of barium sulphate. The quantity of Mg2+ ions adsorbed (i.e. the CEC value) is determined by loss from magnesium sulphate solution added. This is determined by titration with an ethylene diamine tetra-acetic acid solution using eriochrome black as an indicator.	CEC & Kd Determination in Landfill Performance Evaluation - A review of methodologies and preparation of standard materials for laboratory analysis. BaCl2/triethanolamine method. PR: P1/254/01	1 meq/100g	Not Accredited
DETSC 2040	**Sediment Oxygen Demand**	The sample to be analysed is placed into a BOD bottle and covered with water saturated with oxygen, which also contains nutrients to promote bacterial growth. The oxygen level in the supernatant liquid is monitored for up to three hours. From the decrease in oxygen content of the supernatant liquid, the SOD rate can be determined.	Nutrient Release and Sediment Oxygen Demand in a Eutrophic Land-Locked Embayment in Hong Kong – Environment International Journal Volume 26 (2001) Sediment Oxygen Demand and Biochemical Oxygen Demand: Patterns of Oxygen Depletion in Tidal Creek Sites - Program in Marine Science, University of North Carolina at Wilmington (2003)	n/a	Not Accredited
DETSC 2047	**Formaldehyde in Water**	Formaldehyde in soil is extracted in water, with a water to soil ratio of 10:1. The insoluble residue is removed by filtration prior to analysis. Waters are filtered prior to analysis to remove any particulates in suspension. Formaldehyde in the extract or water sample reacts with chromatropic acid-sulphuric acid solution to form a purple coloured complex. The absorbance of the coloured solution is read at 580nm using a suitable visible spectrophotometer.	Formaldehyde by visible absorption spectrophotometry – Method 3500, Issue 2 – NIOSH Manual of Analytical Methods, Fourth edition, August 1994	**Soil:** 0.2mg/kg **Water:** 20µg/l	Not Accredited
DETSC 2048	**Dissolved Oxygen Content of Water**	The dissolved oxygen content of the sample is measured using a dissolved oxygen meter either electrochemically or by fluorescence, or by the titrimetric method developed by Winkler.	SCA Method ISBN 0.11 751442X. Dissolved Oxygen in Natural and Waste Waters 1979	0.1 mg/l	Not Accredited
DETSC 2055	**Anions in Water and Aqueous Soil Extracts by Ion Chromatography**	Liquid samples and aqueous soil extracts are filtered through a 0.22µm syringe filter prior to analysis. The filtered samples are injected into an Ion Chromatograph. The anions of interest are separated on the basis of their affinity for the active sites of the column packing material. The separated anions are converted into their highly conductive acid forms and measured by conductivity. The anions are identified on the basis of retention time as compared to standards and quantisation is by measurement of peak area.	Standard Methods for the Examination of Water and Wastewater Section 4110 21st Edition 2005 APHA, AWWA, WEF	**Soil:** 1.0 mg/kg **Water:** 0.1 mg/L	UKAS (except Br)
DETSC 2065	**Cement Content of Concrete and Mortor**	The concrete or mortar sample is dried and finely crushed, then digested with hydrochloric acid and filtered to remove the remaining solids, collecting the filtrate for further analysis. The remaining solids are then re-digested using an alkaline solution of sodium carbonate and ammonium chloride and re-filtered. The resulting filtrate is combined with that produced during the first stage of the extraction which is then analysed for calcium and silicon contents by ICP-OES. The remaining solids are ashed at 800ºC to determine the insoluble residue content of the sample. A loss on ignition of the original sample is also performed. From these results a series of calculations can be made to determine the soluble silica, calcium oxide and cement content of the sample.	BS1881:Part124:1988 Methods for analysis of hardened concrete	n/a	Not Accredited
DETSC 2066	**Gypsum Content of Soil by Acetone Precipitation**	The sample is mixed with water and filtered. The filtrate is then mixed with acetone to precipitate out the gypsum. The precipitate is separated out using a centrifuge then re-dissolved in water. The conductivity of the resulting solution is measured from which the gypsum content is calculated.	ASTM C 471M-01 Standard Test Methods for Chemical Analysis of Gypsum and Gypsum Products	TBC	Not Accredited
DETSC 2067	**Rapid Chemical Test for Detecting High Alumina Cement Concrete**	This is an empirical test to determine the presence or absence of high alumina cement in the sample, it does not provide a quantitative result. The sample is reacted with Oxine reagent in acidic solution. If high alumina cement is present, a yellow precipitate is formed.	BRE Centre for Concrete Construction Special Digest 3 – HAC Concrete in the UK: Assessment, Durability Management, Maintenance and Refurbishment	n/a	Not Accredited

DETSC 2073	**Acid Neutralisation Capacity of Soils and Other Solids**	ANC is a measure of the buffering capacity of soils and other waste materials. The analysis measures the amount of acid required to bring the sample to a fixed pH. The initial pH of the sample extract must be measured before analysis begins. Analysis is performed by the addition of acid in conjunction with pH measurement by pH meter until the specified pH has been reached as indicated by the meter. The result is expressed in mol/kg (dry wt).	Annex B (Preliminary determination of the acid/base consumption) – CEN/TC 292 – WI 292046 – Characterization of waste – Leaching behaviour tests – Acid and Base neutralization capacity test	1.0 mol/kg	Not Accredited
DETSC 2076	**Sulphate and Magnesium Content of 2:1 Aqueous Extract of Soil by ICP-OES**	The sulphate and magnesium in the soil are extracted in an aqueous extract having water: soil ratio of 2:1 and the insoluble material is removed by filtration. The concentrations of sulphate and magnesium in the filtrate are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelengths used for identification and quantification are 181.972nm for sulphate and 285.213nm for magnesium.	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1: 1990 TRL 447 Sulphate Specification for Structural Backfills 2005. BRE SD1:2005 Concrete in Aggressive Ground 2005	10mg/L	**Sulphate:** MCERTS(Soils) **Magnesium:** Not Accredited
DETSC 2084	**Total Organic Carbon by PrimacATC Analyser**	Soil samples are treated with phosphoric acid to expel any inorganic carbonates. The samples are then heated at high temperature in a continuous flow of air so that any organic carbon is oxidised to carbon dioxide. The gas is then allowed to cool and analysed by an infra-red detector.	PrimacsATC Analyser – User Manual, Skalar	0.47%	MCERTS(Soils)
DETSC 2085	**Total and Dissolved Organic Carbon in Water**	**Direct TOC Analysis** - The sample is acidified, stirred and purged to remove the IC before the sample is injected and handled as in the TC Analysis. The sample is filtered before acidification for DOC. **TC Analysis** - The sample is injected by an automated septum less rotary port into a high temperature reactor. In the reactor, at a temperature of 750 - 950°C all organic and inorganic carbon is oxidized to the gaseous carbon dioxide (CO_2). The catalyst that is present in the reactor catalysis the oxidation to completion. A flow of air transports these oxidation products to the detectors. The oxygen required for reaction is taken from the airflow. The products are led into the non-dispersive infrared detector where the carbon dioxide is determined. The carbon dioxide is measured at a wavelength of 4.2 µm by NDIR detection.	Standard Methods for the Examination of Water and Wastewater Section 5310 B 21st Edition 2005 APHA, AWWA, WEF. HMSO Methods for the Examination of Waters and Associated Materials – The Instrumental Determination of Total Organic Carbon and Related Determinands 1995	lmg/l as C	UKAS
DETSC 2119	**Exchangeable Ammonia in Soil**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	MAFF/ADAS Reference Book 427 – the Analysis of Agricultural Materials – Method 53, Ammonium, Nitrate and Nitrite-Nitrogen, Potassium Chloride Extractable	0.5mg/kg	MCERTS(Soils)
DETSC 2120	**Ammonia in Water by Spectrophotometry**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	Environment Agency Ammonia in Waters 1981 ISBN 0117516139. Methods for the Examination of Waters and Associated Materials	20µg/l	UKAS
DETSC 2121	**Total Kjeldahl Nitrogen Content of Soils and Waters**	The sample is digested with sulphuric acid and a mixture of catalysts to convert organic nitrogen to ammonia. The sample is then distilled under alkaline conditions, and the distilled ammonia is absorbed in sulphuric acid. The ammonia content of the distillate is then determined colorimetrically either using the UV/vis spectrophotometer or the Konelab 60i. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm	The Analysis of Agricultural Materials – MAFF/ADAS Reference Book 427 – HMSO. BS 3882: 2007 Specification for topsoil. Standard Methods for the Examination of Water and Wastewater Part 4500-N. 21st Edition 2005 APHA, WWA, WEF	**Soil:** 0.01% **Water:** 2mg/l	Not Accredited
DETSC 2122	**UV Light Transmittance in Waters**	The absorbance of a water sample is measured at a wavelength of 254nm in a 10mm glass or quartz cell using deionised water as a blank. The percentage UV transmission of the sample is then calculated from the absorbance result.	Ultraviolet Light Factsheet - Treatment of Residential Drinking Water Using UV – Water Quality Association	n/a	Not Accredited
DETSC 2123	**Water Soluble Boron in Soil & Boron in Water**	Boron in soil is extracted in boiling saline water. Waters are filtered prior to analysis to remove any particulates in suspension. The water soluble boron in the extract or filtrate reacts with azomethine–H to produce a yellow coloured complex. The resulting colour absorbance is measured at 420nm using a suitable visible spectrophotometer.	SecondSite Property (now National Grid Property Holdings) - Guidance for assessing and managing potential contamination on former gasworks and associated sites (Part I) (Version 3) Method 17.12 The analysis of Agricultural materials MAFF/ADAS – reference book 427 HMSO	**Soil:** 0.2mg/kg **Water:** 100ug/L	MCERTS(Soils)
DETSC 2124	**Reactive Aluminium in Waters and Leachates**	Aluminium reacts with Catechol violet in a suitably buffered solution (pH 6.1) to form an aluminium–catechol violet complex which can be measured photometrically at 575nm.	KonelabAquachemLabmedics Method No. ALU001. Standard Methods for the Examination of Water and Wastewater. Part 3111 B – 21stEdition, 2005 APHA, AWWA, WEFT	3µg/l	Not Accredited

DETSC 2125	**Colour in Water**	A filtered (true colour) or unfiltered (apparent colour) sample is analysed on a UV / Visible Spectrometer at 455nm and the result compared against a PtCo Calibration.	HACH - Water Analysis Handbook – Method 8025 Color, True and Apparent. APHA – Standard Methods for the Examination of Water & Wastewater 2005 - 2120 COLOR	1mg/l	Not Accredited
DETSC 2126	**Methylene Blue Active Substances**	Methylene Blue is much more readily soluble in water than in chloroform, however in the presence of anionic surfactants an ion-pair is formed which is readily extracted into chloroform. The sample is mixed with chloroform and methylene blue solution in a separating funnel. The resultant colour change in the chloroform layer is measured on a spectrophotometer at a wavelength of 654nm.	Koga, Yamamichi, Nomoto et al. Analytical Sciences 15, 563-568 (1999)	0.01mg/l	Not Accredited
DETSC 2127	**Acidity, Dissolved CO2 and Aggressive CO2 in Water**	Samples requiring acidity or aggressive CO2 are first digested by heating the sample with sulphuric acid and hydrogen peroxide. Samples for acidity analysis are then titrated with sodium hydroxide to pH 8.3 for total acidity or to pH 3.7 for mineral acidity. For aggressive and dissolved CO2 samples are titrated with sodium hydroxide to pH 8.3. The aggressive or dissolved CO2 in the sample is then calculated from the titration result.	USEPA – Method 305.1 Acidity HMSO – The Determination of Alkalinity and Acidity in Water 1981	10mg/l	Not Accredited
DETSC 2130	**Cyanides & Monohydric Phenols by Skalar**	Water samples are filtered through a 0.45µm syringe filter and solid samples are extracted with 1M caustic soda prior to analysis on the automated flow analyser. The method determines total cyanide, easily liberated cyanide, complex cyanide, thiocyanate and monohydric phenols.	Skalar methods: I295-001 w/r+P7, I295-002 w/r+P7, 293-902 w/r+P7, 497-001	**Soils mg/kg:** Total & Free CN=0.1, Thio=0.6, Phenol=0.3 **Waters ug/L:** Total CN=40, Free CN=20, Thio=20, Phenol=100	**Soils:** MCERTS **Waters:** UKAS
DETSC 2131	**Low Level Cyanides & Monohydric Phenols by SKALAR**	Water samples are filtered through a 0.45µm syringe filter prior to analysis on the automated flow analyser. The method determines total cyanide, easily liberated cyanide, complex cyanide, thiocyanate and monohydric phenols.	Skalar methods: I295-003w/r - Free Cyanide, I295-004w/r - Total Cyanide, 497-001 - Phenol	Total CN=0.1µg/l Free CN=0.1µg/l Phenol=1.5ug/l	UKAS
DETSC 2140	**Sugar in Mixing Water for Cement**	Waters are filtered prior to analysis to remove any particulates in suspension. The sugar in the filtrate reacts with phenol and sulphuric acid to produce a yellow-orange coloured complex. The resulting colour absorbance is measured at 490nm using a suitable visible spectrophotometer.	Colorimetric Method for Determination of Sugars and Related Substances. MICHEL DUBOIS, K. A. GILLES, J. K. HAMILTON, P. A. REBERS, and FRED SMITH - Division of Biochemistry, University of Minnesota, St. Paul, Minnesota.	10mg/l	Not Accredited
DETSC 2141	**Acid Base Accounting & Neutralisation Potential of Soils**	Carbonate content and Sulphur content are first determined on the sample using the current DETS methods (DETSC 2005 and DETSC 5017 respectively). Hydrochloric acid is then added to the sample, the amount being based on the initial carbonate content of the sample. After 22 hours the pH of the sample is checked. If pH is above 2.5 a further addition of acid is made to bring the pH down to around 2.0. Sample is then left to stand for a further 2 hours. Excess acid is then titrated with sodium hydroxide solution, and from this result the neutralisation potential of the sample is calculated. The acid potential of the sample is calculated from the sulphur content of the sample. Further calculations can then be performed using these results to give the neutralisation potential ratio and net neutralisation potential.	BSiPD CEN/TR 16363:2012 Characterisation of Waste – Kinetic testing for assessing acid generation potential of sulphidic waste from extractive industries. BS EN 15875:2011 Characterisation of Waste – Static test for determination of acid potential and neutralisation potential of sulphidic waste.	None available	Not Accredited
DETSC 2142	**Acid Soluble Fluoride in Soils and Sludges**	Samples are tested on an 'as received' basis, without drying and crushing, as fluoride is very volatile and may be lost during normal sample preparation procedures. Samples are treated with sulphuric acid and a mixture of sodium citrate and potassium chloride buffer solutions. The fluoride ions released are then measured potentiometrically using a fluoride ion selective electrode.	Fluoride in Waters, Effluents, Sludges, Plants and Soils 1982 (HMSO Publication ISBN 0117516627	1mg/kg	Not Accredited
DETSC 2143	**Partition Coefficient of Soil (Kd Value)**	The sample to be tested is first equilibrated with water (or any other solvent of interest) by mixing for a set time period (usually 72 hours). A spiking solution containing the compound or element of interest is then added to give a known concentration in the sample and then mixed for a further 48 hours. Analysis is then performed on the spiked samples by a standard method for the compound of interest. An un-spiked portion of the sample is extracted and analysed at the same time and the Kd value is calculated from the results obtained.	Environment Agency Science Report SC020039/4 – Development of the partition coefficient (Kd) test method for use in environmental risk assessments	TBC	Not Accredited
DETSC 2144	**Baumann-Gully Acidity in Soils**	The dried and crushed sample is treated with sodium acetate to produce acetic acid. The acid produced is titrated with standard sodium hydroxide solution to give an indication of the acidity potential of the sample.	BS EN 16502: 2014 – Test method for the determination of the degree of soil acidity according to Baumann-Gully	TBC	Not Accredited

DETSC 2201	**Nitrite in Waters and Leachates by Colourimetric Analysis**	Nitrite is determined colorimetrically using the Konelab60i autoanalyser. The nitrite colour reaction occurs at pH 2.0 to 2.5 by coupling diazotized Sulphanilamide with N-1-naphthyl-ethylenediamine. The absorbance of this compound is measured spectrophotometrically at 540nm.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B – 21st Edition 2005 APHA, AWWA, WEF. Aquakem Method Nitrite in Waters Iss No 2. Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981. EPA Method 354.1 Nitrite, spectrophotometric (Approved at 40 CFR Part 136, not approved at Part 141)	0.04mg/l (as N)	UKAS
DETSC 2202	**Total Oxidised Nitrogen in Waters and Leachates by Colourimetric Analysis**	Nitrate is reduced to nitrite by hydrazine under alkaline conditions. The total nitrite ions are then reacted with sulphanilamide and N-1-naphthylethylenediamine dihydrochloride under acidic conditions to form a reddish purple azo-dye. The absorbance of this compound is measured spectrophotometrically at 540 nm using the Konelab 60i autoanalyser.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B and Part 4500-NO3 H – 21st Edition 2005 APHA, AWWA, WEF. Aquakem Method Total Oxidised Nitrogen. Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981. EPA Method 353.1 Nitrate, Nitrite Colorimetric Automated Hydrazine Reduction (Approved at 40 CFR Part 136, Not approved at Part 141)	0.7mg/l (as N)	UKAS
DETSC 2203	**Hexavalent Chromium in Waters and Leachates by Colourimetric Analysis**	Hexavalent Chromium is determined colorimetrically using the Konelab 60i autoanalyser. Hexavalent chromium reacts with diphenylcarbizide in acid solution and produces a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm.	Standard Methods for the Examination of Water and Wastewater Part 3500-Cr – 21st Edition 2005 APHA, AWWA, WEF. USEPA 7196-A. Aquakem Method. Hexavalent Chromium	10µg/l	UKAS
DETSC 2204	**Hexavalent Chromium in Soil by Colourimetric Analysis**	Hexavalent Chromium is determined colourimetrically using the Konelab 60i or Smartchem 600 autoanalyser. Hexavalent chromium reacts with diphenylcarbazide in acid solution producing a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm	Aquakem Method. Hexavalent Chromium	1mg/kg	Not Accredited
DETSC 2205	**Reactive & Total Phosphorus in Waters and Leachates by Colourimetric Analysis**	Phosphate is determined colorimetrically using the Konelab 60i or Smartchem 600 autoanalyser. The orthophosphate ion reacts with ammonium molybdate and antimony potassium tartrate under acidic conditions to form a 12-molybdophosphoric acid complex. The complex is then reduced with ascorbic acid to form a blue heteropoly compound. The absorbance of this compound is measured spectrophotometrically at wavelength 880nm. The Konelab 60i analyses a series of manually prepared standards. An intermediate calibrator is diluted by the Smartchem 600 autoanalyser, to produce a series of standards. These standards are used to produce a calibration graph. Filtered samples are analysed and the phosphate content determined by comparison of the sample absorbance with the calibration graph. Samples for total phosphate analysis are digested by boiling with sulphuric acid and ammonium peroxodisulphate, then analysed as above.	Standard Methods for the Examination of Water and Wastewater Part 4500-P E– 21st Edition 2005 APHA, AWWA, WEF. Aquakem Method. Phosphate in Waters Issue 2	0.01mg/l	**Reactive Phosphorus:** UKAS **Total Phosphorus:** Not Accredited
DETSC 2207	**Ammonia in Waters and Leachates by Colourimetric Analysis**	NOTE THAT AMMONIA ANALYSIS IS PERFORMED IN TWO STAGES USING A HIGH-RANGE METHOD AND A LOW-RANGE METHOD. ALL SAMPLES ARE ANALYSED BY THE HIGH-LEVEL AMMONIA METHOD FIRST. SAMPLES THAT GIVE AN AMMONIA RESULT BELOW 2.5mg/l WILL AUTOMATICALLY BE ANALYSED BY THE INSTRUMENT USING THE LOW-LEVEL AMMONIA METHOD. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm and is related to the ammonia concentration by means of a calibration curve. The Konelab 60i analyses a series of manually prepared standards for low-range ammonia analysis and prepares a series of calibration standards from a single stock solution for high-range analysis. The Smartchem 600 single stock solutions to prepare standards for both analysis ranges. These standards are used to produce a calibration graph. The ammonia content in the analysed samples is determined by comparison of the sample absorbance with the calibration graph.	Methods for the Examination of Waters and Associated Materials Ammonia in Waters 1981 ISBN 0117516139. Aquakem Method. Ammonia in Waters Issue 2	0.015mg/l	UKAS
DETSC 2208	**Sulphide in Waters and Leachates by Colourimetric Analysis**	Sulphide is determined colorimetrically using the Konelab60i autoanalyser. Potassium Dichromate converts N-N-Diethyl-p-phenylenediamine to the free radical which reacts rapidly with sulphide to produce the coloured 'DPD Blue' or 'Ethylene Blue'. The absorbance can then be measured at wavelength 660nm.	The determination of sulphide in waters and associated materials (2007) - SCA - Draft (March 2007). Aquakem Method. Sulphide SP001 Issue 2. Standard Methods for the Examination of Water and Wastewater, 21st Edition 2005, Part 4500. ISBN0-87553-223-3	10µg/l	UKAS

DETSC 2210	**Ferrous Iron in Waters and Leachates by Colourimetric Analysis**	Three molecules of phenanthroline chelate with each atom of ferrous iron to form an orange/red complex. The intensity of the coloured solution is stable between pH3 to pH9. Rapid colour development occurs between pH2.9 and pH3.5 in the presence of excess phenanthroline. The resulting colour absorbance is measured at 510nm	Aquakem Method Ferrous Iron FIR001 Issue 2	0.1mg/l	Not Accredited
DETSC 2211	**Silicate in Waters and Leachates by Colourimetric Analysis**	Reactive forms of silicon in acid solution, below pH2, react with ammonium molybdate ions to form a yellow silicomolybdate. Ascorbic acid reduces the yellow silicomolybdate to produce a blue silicomolybdate complex. Oxalic acid is added to destroy any molybdophosphoric acid formed.	ASTM D7126 - 10 Standard Test Method for On-Line Colorimetric Measurement of Silica. Aquakem Method Silica SIL Issue 2	0.25mg/l	Not Accredited
DETSC 2212	**Chloride Content of Waters and Leachates by Colourimetric Analysis**	Chloride reacts with mercury (II) thiocyanate to form a soluble non-ionic compound. The thiocyanate ions released react in acid solution with iron (III) nitrate to form a red/brown iron (III) thiocyanate complex. The resulting intensity of the stable colour produced is measured spectrophotometrically at a wavelength of 480nm and is related to the chloride concentration by means of a calibration curve.	EPA Method 325.1 Chloride Colorimetric, Automated Ferricyanide, Automated Analyzer I	10mg/l	Not Accredited
DETSC 2301	**Metals in Soil by ICP-OES** As, Ba, Be, Cd, Cr, Co, Cu, Fe, Mn, Mo, Ni, Pb, Se, V, Zn	Metals in soils and associated materials are extracted by boiling in a mixture of hydrochloric and nitric acids. The metal concentrations in the sample extract are determined by inductively coupled plasma optical emission spectroscopy (ICP-OES).	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005, AWWA, WEF	**mg/kg:** As, Be Cu =0.2, Ba=1.5, Cd=0.1, Cr=0.15, Co=0.7, Mn=20, Mo=0.4, Pb=0.3, Fe=12, Se=0.5, V=0.8, Ni, Zn=1.0	UKAS (all listed) MCERTS (All soils listed except Fe)
DETSC 2303	**Total Hardness (By Calculation)**	The concentrations of calcium and magnesium are determined by following the procedures given in DETSC 2306 - Metals in Waters By ICP-MS. The hardness is calculated from the results obtained.	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005 APHA, AWWA, WEF	n/a	UKAS
DETSC 2304	**Zinc Equivalent in Soil (By Calculation)**	The concentrations of copper, nickel and zinc concentrations are determined using the appropriate methodologies. The zinc equivalent is a measure of the combined toxicity of the three metals, relative to the toxicity of zinc.	In-house Method	n/a	Not Accredited
DETSC 2306	**Metals in Waters by ICP-MS** Ag, Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, V, Zn	Concentrations of metals in water are determined by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Any metals not listed can be determined but are not accredited under UKAS.	Standard Methods for the Examination of Water and Wastewater Part 3125 B – 21st Edition 2005 APHA, AWWA, WEF	**High Level µg/l:** Ag=0.13, Al=10.0, As=0.16, Ba=0.26, Ca=90, Cd=0.03, Co=0.16, Cr=0.25, Cu=0.40, Fe=5.50, Hg=0.01, K=80, Mg=20, Mn=0.22, Mo=1.1, Na=70, Ni=0.50, P=18.0, Pb=0.09, Sb=0.17, Se=0.25, Sn=0.40, V=0.60, Zn=1.3 **Low Level µg/l** Al=10.0, Cd=0.02, Cr=0.25, Cu=0.21, Fe=6.50, Ni=0.31, P=3.0, Pb=0.09, Zn=0.50	**High Level Dissolved:** UKAS (all listed except Mo, Sn) **High Level Total:** Not Accredited **Low Level Dissolved:** UKAS (Al, Cd, Cr, Cu, Fe, Ni, Pb, Zn) **Low Level Total:** UKAS (Al, Cd, Cr, Cu, Fe, Ni, P, Pb, Zn)
DETSC 2307	**Boron, Sulphur and Tin Content of Waters and Leachates by ICP-OES**	Filtered water and leachate samples are analysed for boron, sulphur and tin content by ICP-OES. The wavelengths used for the determination are 249.772nm for boron, 181.972nm for sulphur and 189.925nm for tin.	Standard Methods for the Examination of Water and Wastewater Part 3125 B – 21st Edition 2005 APHA, AWWA, WEFT	Boron: 5µg/l Tin: 17µg/l Sulphur: 0.65mg/l	Not Accredited
DETSC 2308	**Copper, Nickel and Zinc Content of Topsoil**	Dried and crushed soil samples are digested on a temperature controlled hotblock with hydrogen peroxide and nitric acid. The digested sample is then filtered and made up to a set volume before analysis for copper, nickel and zinc by ICP-OES.	BS 3882 – Specification for Topsoil	Copper: 0.40mg/kg Nickel: 0.65mg/kg Zinc: 0.65mg/kg	Not Accredited
DETSC 2309	**Extractable Magnesium and Potassium in Soil by ICP-OES**	Extractable metals in soil are extracted by shaking the soil in 1M Ammonium Nitrate for 30 minutes. The concentration of each metal extracted is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES)	BS 3882:2015 - Specification for topsoil. The Analysis of Agricultural Materials – MAFF/ADAS Reference Book 427	n/a	Not Accredited
DETSC 2310	**Extractable Phosphorus in Soil by ICP-MS**	Extractable phosphorus in soil is extracted by shaking the soil in 0.5M Sodium Hydrogen Carbonate for 30 minutes. The concentration of phosphorus extracted is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS 3882:2015 - Specification for topsoil. The Analysis of Agricultural Materials – MAFF/ADAS Reference Book 427	n/a	Not Accredited

DETSC 2311	**Water Soluble Boron in Soil by ICP-OES**	The sample is mixed with boiling water and then heated on a hotblock for 20 minutes. The sample is then filtered to remove the solid materials and then analysed for boron by ICP-OES at a wavelength of 249.772nm.	The analysis of Agricultural materials MAFF/ADAS – reference book 427 HMSO	0.20mg/kg	Not Accredited
DETSC 2312	**Metals in Oils by ICP-OES**	The sample is first oxidised using potassium permanganate and sulphuric acid. The oxidised sample is then digested in aqua regia on a hotplate, followed by analysis of the extract by ICP-OES.	US EPA Method 3031 – Acid Digest of Oils for Metals Analysis	**mg/kg:** As, Be Cu =0.2, Ba=1.5, Cd=0.1, Cr=0.15, Co=0.7, Mn=20, Mo=0.4, Pb=0.3, Fe=12, Se=0.5, V=0.8, Ni, Zn=1.0	Not Accredited
DETSC 2320	**Total Sulphur in Soil and Aggregate by ICP-OES**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. Aggregate analysis is not comparable to BS EN 1744.	TRL 447 Sulphate Specification for Structural Backfills 2005. BRE SD1 Concrete in Aggressive Ground 2005	0.01%	UKAS (Soils) Not Accredited (Aggregates)
DETSC 2321	**Total Sulphate Content of Soil and Aggregate by ICP-OES**	The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Aggregate analysis is not comparable to BS EN 1744.	BS1377 : Part 3: 1990 Method 5. BRE SD1 Concrete in Aggressive Ground 2005	0.01%	MCERTS(Soils) Not Accredited (Aggregates)
DETSC 2322	**Total Potential Sulfate and Total Oxidisable Sulphur (By Calculation)**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The wavelength used for identification and quantification of sulphate is 181.972nm. The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelength used for identification and quantification of sulphate is 181.972nm. The two results obtained from the above tests may then be combined to calculate the Total Potential Sulphate and Total Oxidisable Sulphur content	BS1377 : Part 3: 1990 Method 5. BS1377 : Part 1 : 1990	0.01%	Not Accredited
DETSC 2324	**Mercury in Waters by Atomic Fluorescence Spectroscopy**	Waters and aqueous samples are preserved by fixing with concentrated nitric acid. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry. For low level analysis, samples are filtered for dissolved mercury, but left un-filtered for total mercury. Samples are then digested with hydrochloric acid and bromide solution before analysing as above.	Standard Methods for the Examination of Water and Wastewater Part 3112 B – 21st Edition 2005 APHA, AWWA, WEF. PSA Method – Millennium Merlin Method for Total Mercury in Drinking, Surface, Ground, Industrial and Domestic Wastewaters and Saline Waters. USEPA Method 1631 – Determination of Low Level Mercury in Water	0.05µg/l 1.00ng/l (low level)	UKAS (Low level ONLY)
DETSC 2325	**Mercury in Soil Atomic Fluorescence Spectroscopy**	The mercury is extracted from soil in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments	0.05 mg/kg	MCERTS(Soils)
DETSC 2332 (DRAFT)	**Inorganic and Methyl Mercury Speciation**	Soils are air-dried and crushed before being subjected to hotblock extraction. Waters and aqueous samples are filtered to remove particulates. An aliquot is treated with bromate-bromide and tin (II) chloride to generate mercury and the mercury is determined by atomic fluorescence spectroscopy.	In-house Method	**Soil:** 100µg/kg **Water:** 1µg/l	Not Accredited
DETSC 2333	**Elemental Mercury Speciation**	Soils, waters and aqueous samples are tested on an as-received bases. A known quantity of sample is extracted using argon and the released elemental mercury is trapped. The trapped mercury is released upon heating in a scarifier module and determined by atomic fluorescence spectroscopy.	In-house Method	**Soil:** 0.6µg/kg **Water:** 1µg/l	Not Accredited
DETSC 2400	**Unified Barge Bioaccessible Metals in Soils**	The Unified BARGE Method (UBM) is a an in vitro method for simulating the human digestive system. Synthetic digestive fluids are used to simulate the fluids present in the body. Both inorganic solutions (Containing inorganic salts such as KCl, NaCletc), and organic solutions (Containing organic compounds such as Urea, Glucose etc) are mixed with enzymes to produce 4 Synthetic digestive fluids saliva (S), Gastric fluid (G), duodenal fluid (D) and bile (B). These solutions are then used to mimic the effect of a sample passing through a human gastro intestinal tract by shaking portions of the sample at 370C, human body temperature (17.4).	EPA 9200.2-86 April 2012- Standard Operating Procedure for an In Vitro Bioaccessibility Assay for Lead in Soil. BGS Chemical& Biological Hazards Programme Open Report OR/07/027 - Inter-laboratory Trial of a Unified Bioaccessibility Procedure	V = 1.0mg/kg, Cr = 5.0mg/kg, Co = 1.0mg/kg, Ni = 5.0mg/kg, As = 0.5mg/kg, Se = 0.5mg/kg, Cd = 0.5mg/kg, Pb = 1.0mg/kg	Not Accredited

DETSC 2501	**Leachate Preparation by Up-Flow Percolation**	The sample to be tested is compacted into a 5cm diameter column. A continuous vertical up-flow of water is then pumped through the sample and the resulting leachate is collected, changing the collection vessel every 24 hours. The leachates are then analysed using existing test methods for the components requested by the client.	Draft British Standard BS EN 14405 – Characterisation of Waste – Leaching Behaviour Test- Up- Flow Percolation Test	n/a	Not Accredited
DETSC 2502	**Particle Size Distribution of Topsoils**	Samples to be analysed are first air dried at 28±2°C. The dried sample is passed through sieves of 50, 20 and 2mm pore sizes. The portion of the sample passing the 2mm sieve is mixed with a dispersant solution to assist in breaking down any soil aggregates into the component sand/clay/silt particles. The sample is then wet-sieved through a 63µm sieve. The portion of sample passing this final sieve is allowed to settle out and separate into clay and silt fractions. From the weights of sample retained on each sieve and from the settled fractions, the proportions of cobbles, gravel, sand, silt and clay can be determined.	BS 7755 – Soil Quality; Section 5.4: Determination of particle size distribution in mineral soil material – Method by sieving and sedimentation BS 1377 – Soils for civil engineering purposes; Part 2: Classification tests Simplified Method for Soil Particle-Size determination to Accompany Soil-Quality Analyses – Kettler, Doran & Gilbert, American Journal of Soil Science May/June 2001	n/a	Not Accredited
DETSC 3001	**Solvent Extractable Matter in Soil**	Soil samples are extracted with a water-immiscible solvent and filtered to remove the water. The solvent is evaporated and the amount of extractable matter in the sample is determined gravimetrically.	In-house method based on:- Problems Arising from the Redevelopment of Gas Works and Similar Sites - AERE Harwell Laboratory 1981. Environmental Agency - The Determination of Material Extractable by Carbon Tetrachloride and of Certain Hydrocarbon Oil and Grease Components in sewage Sludge – 1978	40mg/kg	Not Accredited
DETSC 3002	**Oil & Grease/Solvent Extractable Matter in Waters**	A known volume of sample is acidified to pH<2 and extracted three times with an organic solvent, such as n-Hexane, in a separating funnel. The solvent is removed by evaporation and the amount of extractable matter in the sample is determined gravimetrically.	APHA 21st Edition, 2005 – Method 5520 B. Oil & Grease - Partition Gravimetric Method. USEPA Method 1664, Revision A: n-Hexane Extractable Material (HEM: Oil & Grease) and Silica Treated N-Hexane Extractable Material (SGT-HEM; Non Polar Material) by Extraction and Gravimetry.	1mg/l for 500ml sample	UKAS
DETSC 3049	**Elemental Sulphur in Soils and Waters by HPLC**	Soils are extracted in dichloromethane (DCM) by sonication. The elemental sulphur concentration is determined by high performance liquid chromatography (HPLC) with UV detection using a C_{18} (e.g. 250mm x 4.6mm) column and a mobile phase composed of 95% methanol and 5% water. Waters and aqueous extracts of soils are extracted using DCM in a separating funnel, filtered, and the concentration determined using HPLC.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis: Elemental Sulphur.	**Soil:** 0.75mg/kg **Waters:** 90ug/l	**Soil:** MCERTS **Water:** UKAS
DETSC 3072	**Aliphatic / Aromatic TPH by GC-FID**	Aliphatic and aromatic petroleum hydrocarbons (C_{10}-C_{35}) are extracted from soil and water using n-Hexane. The fractions are separated by solid phase extraction using silica columns, whereby the aliphatic fraction is eluted first with n-Hexane and the aromatic portion is eluted second with dichloromethane. The total, aliphatic, and aromatic concentrations are determined by gas chromatography flame ionisation detection (GC-FID) using a capillary column and hydrogen as the carrier gas. The chromatographic data is further characterized by subdivision into approximate boiling point/carbon number ranges with respect to n-alkane retention time markers.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis:Draft TNRCC Method 1006	**Soil mg/kg:** AL10-12 =1.5, AL12-16 =1.2, AL16-21 =1.5, AL21-35 =3.4, AR10-12 =0.9, AR12-16 =0.5, AR16-21 =0.6, AR21-35 =1.4 **Water:** 1ug/l	**Soil:** MCERTS(C10-C35 only) **Water:** Not Accredited
DETSC 3301	**PAH in Soil by GC-FID**	Soils and associated materials are extracted in dichloromethane (DCM) using sonication. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.5 mg/kg each 1.6 mg/kg Total PAH	UKAS (16 PAH's only)
DETSC 3302	**Hexane / Acetone Extracted PAH in Soil by GC-FID**	Soils are extracted into hexane: acetone by shaking. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.1 mg/kg each 1.6 mg/kg Total PAH	Not Accredited
DETSC 3303	**Polyaromatic Hydrocarbons in Soils by GC-MS**	The PAHs in the soil sample are extracted into hexane: acetone by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision C, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	0.03 mg/kg each 0.10 mg/kg Total PAH	UKAS (All 16 PAH's) MCERTS (not Fluorene, Anthracene, Chrysene or Total)
DETSC 3304	**Polyaromatic Hydrocarbons in Waters by GC-MS**	The PAHs in the water sample are extracted into dichloromethane by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the Instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS). In-house method based on EPA Method 3510C- EPA Method 3510C, Revision 3, Separatory Funnel Liquid-Liquid Extraction	10 ng/l each	UKAS (16 PAH's only)

DETSC 3311	**Extractable Petroleum Hydrocarbons (EPH) in Soil, Ballast and Water**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid and aqueous matrices. This method uses a dichloromethane (DCM) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10-C24), and "mineral oil range" (C24-C40).	USEPA Method 3550C – Ultrasonic Extraction. USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 10 mg/kg **Ballast:** 10mg/kg **Water:** 10µg/l	**Soil:** MCERTS **Water:** UKAS
DETSC 3312	**Hexane Extractable Petroleum Hydrocarbons (HPH)**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid matrices. This method uses a hexane: acetone (9.4) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10- C24) and "mineral oil range" (C24-C40).	USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 5 mg/kg	Not Accredited
DETSC 3321	**BTEX, MTBE & PRO in Soils by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	0.01 mg/kg	MCERTS(Soils) Not accredited for PRO range (C5-10)
DETSC 3322	**BTEX, MTBE & PRO in Waters & Leachates by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	1 µg/l	UKAS
DETSC 3401	**PCBs in Soils by GC-MS**	An as-received soil sample is extracted in Hexane:Acetone (1:2) using sonication methodology. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the instrument software.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**µg/kg** PCB 28=1.25 PCB 52=1.12 PCB 101=1.32 PCB 118=1.43 PCB 153=2.08 PCB 138=1.35 PCB 180=1.42	MCERTS(Soils)
DETSC 3402	**Polychlorinated Biphenols in Waters by GC/MS**	The water sample is extracted in DCM on a reciprocal shaker. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the GC-MS software using an internal standard.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**ng/l** PCB 28=208, PCB 52=161, PCB 101=211, PCB 118+123=513, PCB 153=163, PCB 138=107, PCB 180=132, PCB 105=133, PCB 114=253, PCB 126=399, PCB 156=253, PCB 157=119, PCB 167=248, PCB 169=181, PCB 189=271, PCB 77=202, PCB 81=186.	UKAS
DETSC 3421	**Organotin Compounds in Soils and Waters by GCMS**	Organotin compounds are extracted from soil and liquid samples by shaking with hexane. The extract is derivatised with tetraethyl borate before being analysed by GC MS with selected ion monitoring (SIM).	TBC	**Soil: 0.2**mg/kg **Water:** 1µg/l	Not Accredited
DETSC 3431	**Volatile Organic Compounds in Soils by Headspace GC-MS**	The method covers the range of volatile organic compounds with boiling points up to 220°C. Soil samples in salty water are heated and agitated in a crimp cap vial. This drives the volatile components in to the headspace. An aliquot of the headspace is taken and injected in to a gas chromatograph with mass selective detection (GC-MS).The detector operates in full scan mode and is calibrated with standards containing known concentrations of the compounds of interest.	USEPA Method 8260B, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 2, December 1996	0.01mg/kg except: Chloroethane - 0.019mg/Kg Styrene - 0.025mg/Kg	UKAS
DETSC 3432	**Volatile Organic Compounds in Waters by Headspace GC-MS**	The method covers the range of volatile organic compounds with boiling points up to 220°C. Water samples are heated and agitated in a crimp cap vial. This drives the volatile components in to the headspace. An aliquot of the headspace is taken and injected in to a gas chromatograph with mass selective detection (GC-MS).The detector operates in full scan mode and is calibrated with standards containing known concentrations of the compounds of interest.	USEPA Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 2, December 1996	1 ug/l except: DCM (27), 2,2-Dichloropropane (2), Bromochloromethane (4), Bromodichloromethane (4), m+p-Xylene (2), 1,3-Dichlorobenzene (2)	UKAS except: Trichlorofluoromethane, Methylene Chloride, 1,1,1-Trichloroethane,
DETSC 3433	**Semi-Volatile Organic Compounds in Soils by GCMS**	The SVOCs in the soil sample are extracted into DCM: Acetone by shaking. The SVOCs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each SVOC is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semi volatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	Individual SVOCs: 0.1 mg/kg	UKAS

DETSC 3434	**Semi-Volatile Organic Compounds and Pesticides in Waters by GCMS**	The SVOCs in the water sample are extracted into DCM using a liquid liquid extraction. The SVOCs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each SVOC is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semi volatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	Individual SVOCs: 1mg/l	Not Accredited
DETSC 3447	**Acid Herbicides in Soils by LCMSMS**	Acid herbicides in the sample are extracted with formic acid fortified acetonitrile by shaking. Samples are centrifuged, extracts diluted with mobile phase and directly injected into an LCMSMS. The sample is separated by LC and identified by MSMS detector. Quantification is carried out within the LCMSMS software using an internal standard.	EPA Method 536 EPA Method 615 EPA Method 8151A	35ug/kg	UKAS
DETSC 3448	**Acid Herbicides in Liquids by LCMSMS**	Samples are filtered and directly injected into an LCMSMS. The sample is separated by LC and identified by MSMS detector. Quantification is carried out within the LCMSMS software using an internal standard	EPA Method 536 EPA Method 615 EPA Method 8151A	20ng/l	UKAS
DETSC 3451	**Phenol and British Gas Phenols in Soils and Waters by GCMS**	The phenols in the water sample are extracted by solid phase extraction. Phenol is eluted from the SPE column with DCM evaporated to dryness under nitrogen and re-dissolved in DCM. Soils and associated materials are extracted in dichloromethane: acetone using sonication.	TBC	Phenol Liquids0.1ug/l Phenol Soils0.01mg/kg British Gas Phenol Liquids0.1ug/l British Gas Phenol Soils0.5mg/kg	Not Accredited
DETSC 3501	**Target Based Screening of Water Samples by GCMS**	This method uses a target MS library that contains over 1000 compounds, including both volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) allowing rapid identification and reporting of organic pollutants in an extracted water sample. This is a semi-quant method. Some of the VVOCs elute either before, or underneath, the DCM solvent peak so can therefore not be identified.	Agilent note 5991-4127EN	0.1ug/l	Not Accredited
DETSC 3511	**Whole Oil Interpretation**	This method is designed to give an interpretation of the type of oil or the type of contamination of oil in solid and aqueous matrices. Neat oil samples, oil samples diluted in dichloromethane (DCM), DCM extract from soil samples, supernatant oil from liquid samples can be tested with method. A product or a solvent extract is directly injected onto a gas chromatograph and is analysed by temperature programmed capillary chromatography and flame ionisation detection (FID). The chromatogram obtained serves as a "fingerprint" of the sample components and allows the determination of the bulk characteristic of the sample. A sample of crude oil and a window definer standard are analysed daily to check the retention times of the n-alkanes and compare to those within the sample. The pattern produced in the sample chromatogram is best matched to a series of 'in-house' reference materials which have been analysed previously under the same GC-FID conditions.	TBC	n/a	Not Accredited
DETSC 5002	**Ash & LOI Content of Solid Biomass & Solid Recovered Fuels**	The ash and LOI content of the sample is determined gravimetrically. A known weight of the sample is placed in a prepared ash crucible and placed in a furnace. The furnace is heated to 550ºC ±10ºC where the temperature is maintained. Following combustion the crucible and sample are removed, cooled and reweighed.	BS EN 14775:2009. BS EN 15403:2011	0.10%	UKAS
DETSC 5003	**Volatile Matter Content of Solid Biomass, Solid Recovered Fuels and Coal**	A known weight of the sample produced for volatile matter determination is placed in a suitable crucible fitted with a lid. The crucible and sample is weighed and heated in a furnace with a limited air through put at a temperature of 900ºC ±10ºC for 7 minutes. The sample and crucible are re-weighed and the volatile matter content determined by difference.	BSEN15148:2009 – Solid Biofuels Determination of the Content of Volatile Matter. BS EN 15402:2011 - Solid Recovered Fuels - Determination of the Content of Volatile Matter	0.10%	UKAS (except Coal)
DETSC 5004	**Total Moisture / Dry Solids Content of Solid Biomass & Solid Recovered Fuels & Coal**	The sample produced for general analysis is placed into a suitable prepared and weighed tray and reweighed. The sample is dried at 105ºC to constant weight and the total moisture / dry solids content is calculated from the reduction in weight.	BSEN 14774 Parts 1 & 2 2009. DD CEN/TS 15414 Parts 1 & 2: 2010	0.10%	UKAS (except Coal)
DETSC 5005	**Analysis Moisture Content of Solid Biomass, Solid Recovered Fuels & Coal**	The sample produced for total moisture determination in accordance with DETSC 5009 or DETSC 5010 is placed in a suitable pre-weighed tray and reweighed. The sample is then dried at 105°C ±2°C to constant weight and then weighed again. The analysis moisture content is calculated from the reduction in weight.	BS EN 14774-3 2009. BS EN 15414-3 2011. BS 1016-104.1 -1999. ISO 11722 – 1999	n/a	UKAS (except Coal)

DETSC 5007	**Calorific Value of Solid Biomass, Solid Recovered Fuels & Coal**	Calorific value of a material is determined in an Isoperbol calorimeter by burning it in pure oxygen in a combustion bomb. A known amount of sample is placed in a combustion bomb which is then pressurised to 30bar with oxygen. A calorimeter bucket is filled with a known amount of deionised water which is placed in the calorimeter and the bomb placed in the bucket. The system is allowed to equilibrate and the bomb fired by electrical connection. The difference in temperature of the water in the calorimeter bucket caused by the ignition of the material in the bomb is measured and the calorific value calculated	BS EN 14918: Solid biofuels – Determination of calorific value. BS EN 15400: Solid recovered fuels - Determination of calorific value	1MJ/kg	UKAS (except Coal)
DETSC 5008	**Calorific Value of Soil**	A known amount of sample material is burnt in a combustion bomb that is immersed in water in a calorimeter and the difference in the water temperature before and after ignition measured. The calorific value of the sample material is calculated making any necessary corrections for heat generation not associated with the combusting sample. A gelatine capsule will be required to assist combustion which is also corrected for in the final calculations.	BS 1016-105 1992. ISO 19208. ASTM 5865	1MJ/kg	UKAS
DETSC 5009	**Sample Preparation of Solid Biomass & Solid Recovered Fuels**	If analysis is required on the original material (i.e. Bulk Density) a sub-sample will be taken after initial mixing after which the sample is then reduced by cutting/chopping oversized pieces of material. The material is then mixed and subdivided by manual means during which process representative samples are taken for analysis i.e. total moisture. The remainder of the sample is dried and then reduced to <1mm and again mixed and subdivided to produce the sample for laboratory analysis.	BS EN 14780:2011. BS EN 15413:2011	n/a	Not Accredited
DETSC 5011	**Calculation of Fixed Carbon Content of Coal, SRF and Solid Biomass Fuels**	The total moisture, analysis moisture, ash and volatile matter content are determined by approved methods. The values obtained are deducted from 100 and this gives the fixed carbon value of the fuel.	DD CENT/S 15296:2006. BS 1016.100:1994. BS ISO 17246:2005	0.10%	Not Accredited
DETSC 5012	**Determination of Biomass Content of SRF**	A portion of the sample is mixed with sulphuric acid and allowed to stand for at least 16 hours. Hydrogen peroxide is then added, and the sample is left for an additional 5 hours. At the end of this period the unreacted acid and peroxide are diluted down with deionised water. The residue is filtered off using a glass fibre filter and washed with deionised water to remove any remaining acid or peroxide. The filter and residue are placed in a pre-weighed crucible and dried at 1050C. The filter is re-weighed after drying and the non-biomass residue determined. A correction for carbonate content is made by determining the ash content of the original sample. By performing a calorific value on the solid captured on the filter paper, the result can also be expressed as a percentage.	BS EN 15440 Solid recovered fuels - Methods for the determination of biomass content	n/a	UKAS
DETSC 5013	**Determination Of Carbon, Hydrogen, Nitrogen & Oxygen In Solid Biomass, Solid Recovered Fuels & Coal**	A known mass of sample is introduced into a high temperature combustion reactor and burnt in a stream of pure oxygen. The sample is broken down into its elemental components N2, CO2, and H2O. High performance copper wires absorb the excess oxygen not used for sample combustion. The gases are separated and analysed by infra-red or thermal conductivity detectors, dependent on the instrument used. The oxygen content of the sample is determined by calculation from the results obtained for carbon, hydrogen and nitrogen.	BS EN 15104:2011 Solid biofuels - Determination of total content of carbon, hydrogen and nitrogen - Instrumental methods. BS EN 15407:2011 Solid recovered fuels - Methods for the determination of carbon (C), hydrogen (H) and nitrogen(N) content. BS EN 15296:2011 Solid biofuels - Conversion of analytical results from one basis to another	Carbon 0.10%, Nitrogen 0.30%, Hydrogen 0.30%, Oxygen 3.55%	UKAS (except Coal)
DETSC 5014	**Metals in Coal, SRF and Biomass by ICP**	Metals in coal, solid recovered fuel (SRF) and biomass samples are extracted by microwave using Hydrogen Peroxide (to oxidise and break down organic matter) and Aqua Regia (to dissolve the matrix and hold the metals in solution). Their concentrations are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS EN 15410 - Solid recovered fuels - Methods for the determination of the content of major elements (Al, Ca, Fe, K, Mg, Na, P, Si, Ti). BS EN 15411 - Solid recovered fuels - Methods for the determination of the content of trace elements (As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, Tl, V and Zn). BS EN 15290 - Solid biofuels - Determination of major elements - Al, Ca, Fe, Mg, P, K, Si, Na and Ti. BS EN 15297 - Solid biofuels - Determination of minor elements - As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V and Zn	**0.1 mg/kg:** As, Be, Cd, Co, Mn, Ni, P, Pb, Sb, Se, Sn, Ti, V, Zn **0.2mg/kg:** Cr, Cu, Tl **0.5mg/kg:** Mo **1mg/kg:** Al, Fe, K, Mg **5mg/kg:** Ca **10mg/kg:** Ag, Ba, Rh, Sr, Te	UKAS (except Coal): Al, As (SRF only), Ca, Cd, Co, Cr, Cu, K, Mg, Mn, Na (SRF only), Ni, P, Pb, Se, Sn, Tl, V, Zn All other metals not accredited
DETSC 5015	**Mercury in Coal, SRF and Biomass by Atomic Fluorescence Spectroscopy**	The mercury is extracted from coal, SRF and biomass in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment of the resulting solution with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is then quantitatively detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments.	0.055mg/kg	UKAS (except Coal)
DETSC 5016	**Total Sulphur Content Of Coal, SRF And Biomass**	Sulphur compounds in SRF and biomass are extracted using aqua regia / hydrogen peroxide and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The use of hydrogen peroxide enhances the oxidation properties of nitric acid especially in the digestion of organics. Sulphur compounds in coal are determined by ICP-OES from the aqueous washings of the combustion products after firing in a bomb calorimeter.	TRL Report TRL447 (Updated) - Sulphate specification for structural backfills 2005	0.001mg/kg	UKAS (Except Coal)

DETSC 5017	**Sulphur, Chlorine, Fluorine & Bromine Content of Solid Biomass, Solid Recovered Fuels and Coal by IC**	A known weight of fuel is burnt in a pressurised bomb in pure oxygen. After firing of the bomb, it is stood for a minimum of five minutes to allow the combustion products to settle then the oxygen is slowly released over a period of at least three minutes. The bomb is then taken apart and the bomb electrodes rinsed with deionised water into the inside of the bomb. These washings are then decanted into a 50ml volumetric flask. The inside of the bomb is rinsed with deionised water and the washings added to those in the volumetric flask. The contents of the volumetric flask are made up to volume with deionised water and stored for the analysis of sulphur, chloride, fluoride and bromide by ion chromatography.	Operating Instruction Manual No. 442M 6200 Parr Oxygen Bomb Calorimeter. Operating Instruction Manual No. 205M 1108 Oxygen Combustion Bomb. Operating Instruction Manual No. 454M 6510 Water Handling System	0.01% Chlorine, 0.01% Fluorine, 0.01% Bromine, 0.04% Sulphur (Coal only)	UKAS (Except Coal and Br)
DETSC 5018	**XRF Analysis of Coal, Biomass, SRF and Cement**	When X-rays are targeted at a material they will cause electrons to be ejected from the component atoms (Ionisation). The ejection of electrons will cause the electronic structure of the component atoms to become unstable resulting in electrons from the higher energy outer orbitals "falling" into the inner orbitals to compensate. This causes a release of energy in the form of a photon equal to the energy difference between the two orbitals involved. Thus the material emits radiation which has energy characteristics of the atoms present. In energy dispersive X-ray fluorescence the fluorescent X-rays emitted are directed to a detector from which the data is processed by a multichannel analyser, producing a digital spectrum which is processed to obtain analytical data. The instrument analytical parameters are set up for the matrix type. A sample cell is prepared by placing a piece of prolene film over the outer cell and then inserting the inner cell. This gives a complete cell with a clear prolene base. A portion of the sample is placed into the cell and then analysed.	Rigaku NEX CG EDXRF instruction manual	**Cement:** 0.01% BaO, Cr_2O_3, CuO, PbO, Rb_2O, SrO, ZnO 0.02% Cl, V_2O_5 0.05% TiO_2 0.1% Mn_2O_3, P_2O_5, SO_3 0.5% K_2O 1% Al_2O_3, CaO, CdO, Co_2O_3, Fe_2O_3, MgO, Na_2O, NiO, SiO_2, Y_2O_3 **Fuel:** 0.01% Co, Cr, Cu, I, Li, Mn, Ni, P, Pb, Sn, Ti, V, Zn 0.02% Al, Ba, S, Si 0.1% Mg 0.2% Ca 0.5% As, Cd, Hg, Mo, Na, Sb, Se, Th, Tl 1% Ag	Not Accredited
DETSC 5019	**Determination of Biodegradable Municipal Waste Content (Compositional Analysis)**	The method is based on handpicking the BMW fraction from the municipal waste sample, and then weighing the amount of BMW sorted and expressing this as a percentage on a wet weight basis of the weight of the whole municipal waste sample.	ENVIRONMENT AGENCY: Guidance on monitoring of MBT and other treatment processes for the landfill allowances schemes (LATS and LAS) for England and Wales	n/a	Not Accredited
DETSC 5020	**Determination of Bulk Density in Solid Biomass and Solid Recovered Fuels**	The test portion is filled into a standard container of a given size and shape and weighed afterwards. Bulk density is calculated from the net weight per standard volume and reported for the moisture content.	BS EN 15103:2009 Solid Biofuels- Determination of bulk density DD CEN/TS 15401:2010 Solid Recovered Fuels- Determination of bulk density	0.5kg/m^3	Not Accredited
DETSC 5021	**Auto Ignition Temperature**	A quantity of the sample is placed into a metal tray or crucible and placed into an oven or furnace. The temperature of the oven / furnace is increased in predefined increments and the temperature in which the sample ignites is noted.	None	25°C	Not Accredited
DETSC 5022	**LOI Content of Fines**	The sample is dried to constant weight and its particle size reduced to <2mm. The LOI content of the sample is then determined gravimetrically. A known weight of the prepared sample is placed in a crucible and placed in a furnace. The furnace is heated to set temperature and following combustion the crucible and sample are removed, cooled and reweighed.	The Landfill Tax (Qualifying Material) Order 2011	0.10%	Not Accredited
DETSC 5023	**Crude Fibre**	The sample after defatting is sequentially treated with boiling dilute sulphuric acid, and with boiling potassium hydroxide solution. The loss in mass resulting from incineration corresponds to the mass of crude fibre.	FAO - Quality Assurance for Animal Feed Analysis Laboratories – Part II Analysis Section	1%	Not Accredited
DETSC 5024	**Void Space**	Water is added to a known volume of biofilter media until it fills all the void spaces and percentage voids is calculated.	https://www.sdstate.edu/abe/faculty/upload/Determining-Pressure-Drop-through-Compost-No-014080.pdf	0.1%	Not Accredited
DETSC 5025	**Theoretical Biogas Potential**	The Baserga equation determines how much biogas a feedstock may theoretically produce based on nutrient content.	An Analysis of Available Mathematical Models for Anaerobic Digestion of Organic Substances for Production of Biogas. Mandy Gerber, Chair of Thermodynamics, Germany, International Gas Union Research Conference, 2008. Biogas: Calculation of Gas Yield of co-substrates	0.1% Total Methane 1m^3/tonne Yield	Not Accredited
DETSC 5026	**Determination of Particle Size Distribution**	A sample is subjected to sieving through horizontally oscillating sieves, sorting the particles in decreasing size classes either manually or by machine sieving. For particles less than 25mm, only machine sieving is used, for particles greater than 25mm, manual or machine sieving is applied.	BS EN 15415-1 – Solid recovered fuels - Determination of particle size distribution BS EN 15149-2 – Solid biofuels - Determination of particle size distribution	n/a	Not Accredited

DETSC 5027	**Flammability Potential Screening Analysis**	The method is split into three parts which can be ran independently of each other: • exposure to heat and flame • exposure to a spark source • exposure to heat and a spark source (flash point) Exposure to heat and flame: the as-received sample is exposed to heat and flame. Observations are used to report if the sample has a negative or positive flammability potential. Exposure to a spark source: the as-received sample is placed into a beaker with a watchglass placed on top. Sparks are introduced to the vapour space above the sample and observations made to report if the sample has a negative or positive flammability potential. Exposure to heat and a spark source (flash point): the as-received sample is placed into a beaker with a watchglass placed on top. Sparks are introduced to the vapour space above the sample and if the sample flashes, the temperature is reported. The analysis is repeated at 5°C intervals until the vapour flashes or the temperature of 100°C is reached.	ASTM D4982-12: Standard Test method for Flammability Potential Screening Analysis of Waste	n/a	Not Accredited
DETSC 5028	**Determination of Length and Diameter of Pellets**	The length and diameter of fuel pellets of a representative sample of fuel pellets are measured by using a calliper. The length of a pellet is always measured along the axis of the cylinder. The diameter is measured perpendicular to the axis.	BS EN 16127 – Solid biofuels - Determination of length and diameter of pellets	n/a	Not Accredited

APPENDIX II

CPT Report

(Tested Externally by Lankelma)

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PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

SOIL INVESTIGATION

CPT REPORT

Cone penetration testing
Magnetometer testing
Dissipation testing
Parameter interpretation

Project ref.: P-107755-7

Report No.: P-107755_2




PROJECT:	Preliminary Onshore Ground Investigation for NZT

CLIENT:	AEG

FIELDWORK

CPT rig(s)	18.5-tonne rubber-tracked CPT unit (UK8)
Date fieldwork started	24th May 2021
Date fieldwork completed	28th May 2021
Lankelma's representative	Emma Stickland
Client's representative	Frank Ellingham

DOCUMENT CHECKING

Action	Date	Name
Completed	28/07/2021	Chris Player
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CONTENTS

1 INTRODUCTION 1

2 DISCLAIMER 1

3 COMPLETED WORKS 1

4 FIELDWORK GENERAL 1

5 CONE PENETRATION TESTS 2

5.1 Glossary of CPT Terms and Symbols 2

5.2 CPT Data Reduction and Presentation 4

5.3 In-situ Stress Conditions 5

5.4 Soil Unit Weight 5

5.5 Soil Behaviour Type 6

5.6 Soil Behaviour Type Index – I_c 7

5.7 Relative Density 8

5.8 Undrained Shear Strength 8

5.9 Overconsolidation Ratio 9

5.10 SPT N60 Values 10

5.11 Friction Angle 11

5.12 Coefficient of Volume Change 12

5.13 Young's Modulus 13

6 DISSIPATION TESTS 13

6.1 Coefficient of Consolidation 14

6.2 Permeability 15

7 CPT INTERPRETATION NOTES 16

8 MAGNETOMETER TESTING 17

9 REFERENCES 18

APPENDIX A SUMMARY TABLES

APPENDIX B GENERAL INFORMATION

APPENDIX C CONE PENETRATION TEST RESULTS

APPENDIX D INTERPRETATION RESULTS - SET 1

APPENDIX E INTERPRETATION RESULTS - SET 2

APPENDIX F INTERPRETED DISSIPATION TEST RESULTS

APPENDIX G RAW DISSIPATION TEST RESULTS

1 INTRODUCTION

At the request of AEG, a soils investigation was carried out on project *Preliminary Onshore Ground Investigation for NZT.*

Site location:

(In the general region of)

Tod Point Road
Redcar
TS10 5BE

2 DISCLAIMER

The investigation information, raw data and interpretations provided in this report are for the sole benefit of the Client identified at the front of the report.

Lankelma has exercised reasonable skill and care in the fieldwork and preparation of this report. This report has been completed based on information available to Lankelma at the time of preparation. The measurement and interpreted data in this report do not constitute recommendations for design purposes. An appropriately qualified person must review and interpret the data given in this report, together with any assumptions we have made that affect the data, before using the data for design or recommendation. Lankelma accepts no responsibility for the accuracy or suitability of any assumptions, derived soil parameters, soil classification descriptions or soil layer boundaries contained in this report.

3 COMPLETED WORKS

- 8 nr. combined magnetometer-cone penetration tests with pore pressure measurement (CPTu)
- 18 nr. dissipation tests
- Factual report including point data interpretation of selected parameters

Several non-scheduled short QA/QC dissipation tests were undertaken during the works during testing downtime, to verify drainage conditions or during temperature stabilisation pauses. These have not been included in the dissipation interpretation but do appear in the AGS 4.0 data file provided.

Appendix A *Summary Tables* contains tabulated details of the works completed together with analysis results where applicable.

4 FIELDWORK GENERAL

Fieldwork was performed with an 18.5-tonne rubber-tracked CPT unit (UK8) equipped with a 15-tonne capacity hydraulic ram set.

The Client was responsible for the positioning and re-survey of all investigative locations.

The target depth for the investigation was 25 m below ground level. Table 1 details the final test depths and reasons for test termination (*refusal factor).* Where penetration refusal was encountered the termination depth was advised to, and agreed with, the Client's on-site representative.

The depths of dissipation tests were advised by the Investigation Supervisor or Engineer's Representative.

5 CONE PENETRATION TESTS

Cone penetration testing was carried out in general accordance with BS ISO 22476-1:2012.

Penetrometer measurements included cone tip resistance, friction sleeve resistance and dynamic pore water pressure sampled at a 10 mm resolution.

Penetrometers were calibrated in accordance with BS8422:2003 and ASTM E74-13a, and penetrometers with down-hole digitisation and incorporating load cell temperature sensors were calibrated in accordance with ISO 376:2011. The BS8422:2003 calibration provides a single calibration uncertainty value as a percentage of full-scale output (FSO), while ISO 376:2011 calibrations provide an uncertainty value for each calibration force or pressure and extends to the very low range (tip pressure >= 0.06 MPa) required to quantify uncertainty in low strength soils. The management of calibration records is in accordance with ISO 10012. Copies of all calibration certificates for the cones used are provided in Appendix B.

The piezometer filter element was in the u2 position and was vacuum saturated in a 99.8% vacuum under 1000 cSt silicone oil for > 7 days prior to mobilisation. The pore pressure system was vacuum saturated in the disassembled state under 500 cSt glycerine oil (dipropylene glycol) and assembled under oil prior to each test.

5.1 GLOSSARY OF CPT TERMS AND SYMBOLS

SYMBOLS & ABBREVIATIONS

B_q	**Pore pressure ratio.** The net pore pressure normalized with respect to the net cone resistance: $B_q = (u_2 - u_0)/(q_t - \sigma_v)$
F_r	**Normalised friction sleeve resistance:** $F_r = f_s / (q_c - \sigma_v)$
f_s	**Friction sleeve resistance:** The total frictional force acting on the friction sleeve, F_s, divided by its surface area A_s: $f_s = F_s/A_s$.
G	**Shear modulus**
g	**Gravitational constant:** g = 9.81 m/s^2
G_0	**Small strain shear modulus**
Gs	**Specific gravity of solids**
HOC	**Heavily overconsolidated**

I_c	**Soil Behaviour Type Index:** Continuous numerical representation of Robertson (1990) soil behaviour type classification chart.
LOC	**Lightly overconsolidated**
NC	**Normally consolidated**
OC	**Overconsolidated**
q_c	**Cone resistance:** The total force acting on the cone Q_c, divided by the projected area of the cone, A_c: $q_c = Q_c/A_c$.
Q_t	**Normalised cone resistance** (Method 1): $Q_t = (q_c - \sigma_v)/\sigma'v$
q_t	**Corrected tip resistance:** The cone tip resistance q_c corrected for pore water pressure effects on the cone shoulder.
$q_{t\text{-}net}$	**Net cone resistance:** $q_{t\text{-}net} = q_t - \sigma_v$. Where q_t is unavailable q_c is applied.
q_{t1}	**Normalised cone resistance** (Method 2): $q_{t1} = (q_t)/(\sigma'_v)^{0.5}$
R_f	**Friction ratio:** The ratio, expressed as a percentage, of the sleeve friction, f_s, to the cone resistance, q_c, at a given depth: $R_f = (f_s/q_c) \cdot 100$
SBT or SBTn	**Soil behaviour type classification**
u_0	**Equilibrium pore pressure**
u_2	**Pore pressure:** Dynamic pore pressure measured at the shoulder position (u_2) during penetration and during dissipation tests. $u_2 = \Delta u_2 + u_0$
Δu_2	**Excess pore pressure:** $\Delta u_2 = \Delta u_2 - u_0$
V_s, V_p	**Shear wave velocity, V_s, and pressure wave velocity, V_p.** Measured with use of a seismic receiver.
z	**Depth below ground level:** Depth as penetration length without correction for inclination, or true depth after correction for inclination.
<u>Greek</u>	
γ	**Unit weight of soil**
γ_w	**Unit weight of water**
ρ	**Volumetric mass density (or specific mass) of soil:** $\rho = \gamma/g$
σ_v	**Total overburden stress**
σ'_v	**Effective overburden stress**
σ_{atm}, or, P_a	**Reference atmospheric stress:** σ_{atm} = 101.3 kPa

<u>TERMS</u>

Cone or 'tip': The conical tip of the cone penetrometer.

Friction sleeve: The section of the cone penetrometer upon which the sleeve friction is measured, located behind the cone tip.

Piezocone: A cone penetrometer with a pore pressure sensor (u_2 or u_1)

Seismic cone: A cone penetrometer with a seismic receiver incorporated inside or behind.

Dynamic pore pressure: The pore pressure measured during penetration (u_2 or u_1) .

Soil behaviour type, or 'SBT': Soil classification scheme or classified soil type according to Robertson (1990, 2016) often abbreviated to SBT or according to normalised cone parameters SBTn.

Rod string: The series of hollow tube push rods that transmit force to the penetrometer.

5.2 CPT DATA REDUCTION AND PRESENTATION

The CPT results are presented in Appendix C. The corrected cone resistance (q_t), local side friction (f_s), dynamic pore water pressure (u_2), friction ratio (R_f) and inclination are all presented against depth and elevation in accordance BS ISO 22476-1:2012. CPT data and the associated derived geotechnical parameters are included in the 4.0 data file provided.

The cone tip and sleeve force measurements were converted to pressure using the nominal dimensions of the penetrometer.

For piezocone tests the total cone resistance (or 'corrected cone resistance') was calculated according to the formula

$$q_t = q_c + u_2 \times (1 - a)$$

Where a is the 'area ratio' and (1- a) is the proportion of cross-sectional area between the cone tip and penetrometer body where pore pressures (positive or negative) can act to add or subtract from the total external axial force on the tip. The difference between measured and corrected values is largest in low strength collapsible soils with large excess pore pressures. The percentage adjustment is described by the curves on the chart below for a = 0.8:

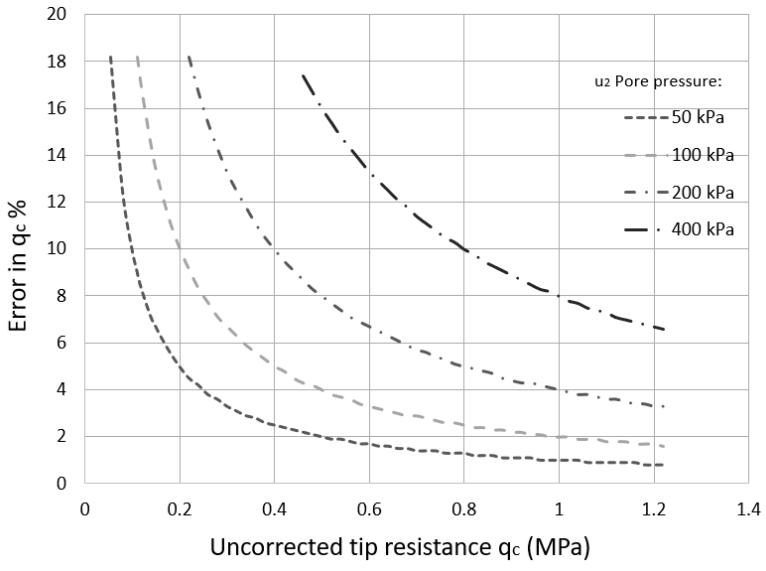

Figure 5-1 Uncorrected tip with measured tip resistance

Penetration length readings were corrected for inclination and sleeve readings were depth corrected for the dimensional offset between cone tip and sleeve during post processing. Rod spikes (artefacts of the pause for push rod addition) were filtered from the cone tip and sleeve data. The data was re-sampled from 10 mm resolution to 20 mm to reduce the size of the data set to a more manageable size for end users. A 20 mm resolution is well within the intrinsic influence zone of the cone tip measurement and the loss of meaningful resolution is negligible.

The raw data are presented in Appendix C. For piezocone tests q_t is reported on all logs, and q_c only appears in the digital AGS data.

Geotechnical parameters appropriate for drained and undrained cone penetration conditions were derived for corresponding drained and undrained derived soil behaviour types (SBTs) respectively, however, to account for uncertainty in the SBT correlation with drainage behaviour, all parameters were derived over a range of transitional soils within the range 2.4 < *Ic* < 2.7 (see section 6.3).

In general, the engineering parameters derived for fine grain soils (undrained) are suitable for soils of both silicate and carbonate composition, whereas parameters derived for coarse soils are intended for non-cemented predominantly silicate composition.

5.3 IN-SITU STRESS CONDITIONS

An estimate of the equilibrium pore pressure and total and effective vertical stress states is required for derivation of many parameters obtained from the CPT and dissipation test.

The total vertical stress with depth was calculated as the sum of the calculated soil unit weight above a given depth. See section 5.4 for information on the empirical estimate of soil unit weight.

The depth of the phreatic surface applied in the calculation of effective stress was estimated for each location based on interpretation of piezocone measurements in drained soils and the final pressure of dissipation tests which proceeded to equilibrium pressure. The project average piezometric depth (or elevation if available) was applied to locations without direct measurements.

The in-situ pore pressure for specific dissipation test interpretation was assumed as above or, where possible, assessed directly from the dissipation plot.

Note: The term phreatic surface is used here, however when it is based on piezocone measurements it is assumed that the piezometric level (under hydrostatic conditions) and phreatic surface coincide. The phreatic or piezometric surface reported is intended to provide information about the assumed pore pressure distribution and may not represent the true position of the groundwater table or perched water bodies. Complex groundwater pressure distributions will be applied if they are observed from the measurements and are sufficiently well defined.

5.4 SOIL UNIT WEIGHT

The soil unit weight was estimated using the following method proposed by Robertson (2010b).

$$\frac{y}{y_w} = 0.27\,Log(R_f) + 0.36\,(Log(q_t/R_f)) + 1.236$$

Throughout pre-drilled zones (inspection pits or drill-out) the soil was assigned a nominal unit weight of 17 kN/m^3.

For depths where the friction sleeve resistance measurement was less than zero due to measurement limitations, the friction sleeve resistance input parameter was substituted with a

nominal 1.0 kPa resistance for the purpose of obtaining an approximate soil unit weight necessary for estimation of total vertical stress over the entire profile.

5.5 SOIL BEHAVIOUR TYPE

Robertson (1990, 2010)

The soil behaviour type (SBT) was interpreted using the Robertson (1990) classification system based on the normalised cone resistance (Qt) and normalised friction sleeve resistance (Fr) for silicate soils.

While the classification based on normalised parameters is considered more accurate, particularly for NC soils exceeding a depth of 15 m, the classification is often significantly in error (artificially granular/drained) at very shallow depth (< 1-3 m). The error at shallow depth is associated with the potentially large difference between the estimated vertical effective stress (applied in normalisation) and the unknown horizontal stress influencing penetration resistance.

Robertson (2010) proposed a non-normalised version of the 1990 chart which uses dimensionless cone resistance (q_c/Pa) and friction ratio, Rf. The classification according to this chart can be more reliable at shallow depth and has been plotted as an approximate SBT index (discussed below) for comparison to the normalised classification.

The SBT chart is provided in Appendix B – *General Information,* titled 'CPT Soil Behaviour Type Chart'.

It should be noted that:

- The SBT classification provides a general soil type and tends to show biased towards the soil fraction that dominates the mechanical behaviour.
- If fine cohesive soils are dry and overconsolidated, the classification tends to shift towards a coarser soil type (or lower I_c index)

While the repeatability and behavioural bias of the SBT is usually beneficial, the classification is not always an appropriate substitute for classification based on particle size and plasticity index tests.

The results are presented in Appendix D.

Layer Analysis

The layer boundaries are manually interpreted based on broad changes in Robertson 1990 SBT classification or variance with depth. Once layer boundaries are defined, the SBT zones classified within each layer are listed together with the corresponding percentage of data points within the layer (excluding null/filtered data). The modal classification is reported in full, with abbreviated short descriptions for all secondary zones, for example - '*Clays – clay to silty clay [74%]; *Silt mixtures [20%]*', where the asterisk represents an abbreviation of the full description '*Silt mixtures – clayey silt to silty clay*'. It is important to consider that the classification zone boundaries do not exist in nature and small shifts in the cone response can lead multiple classifications within layers of relatively uniform behaviour; especially were the layer data plot close to a triple junction and/or has spurious spikes or very thin layers. Therefore, some system

to limit the number of classified zones is usually necessary for clarity in the plot. The logic used by Lankelma for each layer is:

For LT >= 1, C = 85
For 0.5 <= LT < 1, C = 75
For 0 < LT < 0.5, C = 65

Where
C = Minimum % SBT zone classification coverage within the layer
LT = Layer thickness (m)

For layers having a thickness of less than 1 m then 10% of data at the top and bottom of the layer are excluded to limit the effect of transition zone data (mobilised resistance influenced by overlying or underlying strata) being included in the classification.

The continuous SBT index I_c should be used to assess the classification distribution and variation not accounted for by the layer description.

5.6 SOIL BEHAVIOUR TYPE INDEX - I_C

The principal trend in soil behaviour type (SBT) variation can be expressed by a continuous index, I_C, proposed by Robertson and Wride (1998) based on a similar index proposed by Jefferies and Davies (1993). The index provides a continuous profile of SBT variation with depth for end-user analysis of soil units and variation within units.

The equivalent non-normalised version, as proposed by Robertson (2010), is provided for comparison.

The basis of I_c and its approximation of the original chart classification zones may be seen from Appendix B figure 'CPT Soil Behaviour Type Chart'. The method does not identify zones 1 (*sensitive fine grained)* or zones 8 & 9 (*overconsolidated or cemented*).

Normalised SBT index I_C (Robertson and Wride, 1998)*:*

$$I_c = [(3.47 - \log Q_t)^2 + (logF_r + 1.22)^2]^{0.5}$$

Non-normalised SBT index I_C (Robertson, 2010)*:*

$$I_c = \left[\left(3.47 - \log\left(\frac{q_c}{\sigma_{atm}}\right)\right)^2 + (logR_f + 1.22)^2\right]^{0.5}$$

The normalised version if I_c is generally more accurate, while the non-normalised version is intended for compatibility with the non-normalised Robertson's (2010) SBT chart and may be more accurate at shallow depths in overconsolidated soils.

The results are presented in Appendix D.

5.7 RELATIVE DENSITY

The relative density of sands was calculated based on an empirical relationship proposed by Jamiolkowski *et al.* (2001) based on a large database of undisturbed frozen samples and calibration chamber tests. The expected accuracy may be evaluated from the figures presented below.

$$D_r = 100 \left[0.268 \cdot \ln\left(\frac{q_t/\sigma_{atm}}{\sqrt{\sigma_{vo}'/\sigma_{atm}}} \right) - k \right]$$

k = Compressibility dependant constant can be taken as -0.675 for medium compressibility (applied value in our interpretation), <= 1 for high compressibility and >= 2 for compressible sands.

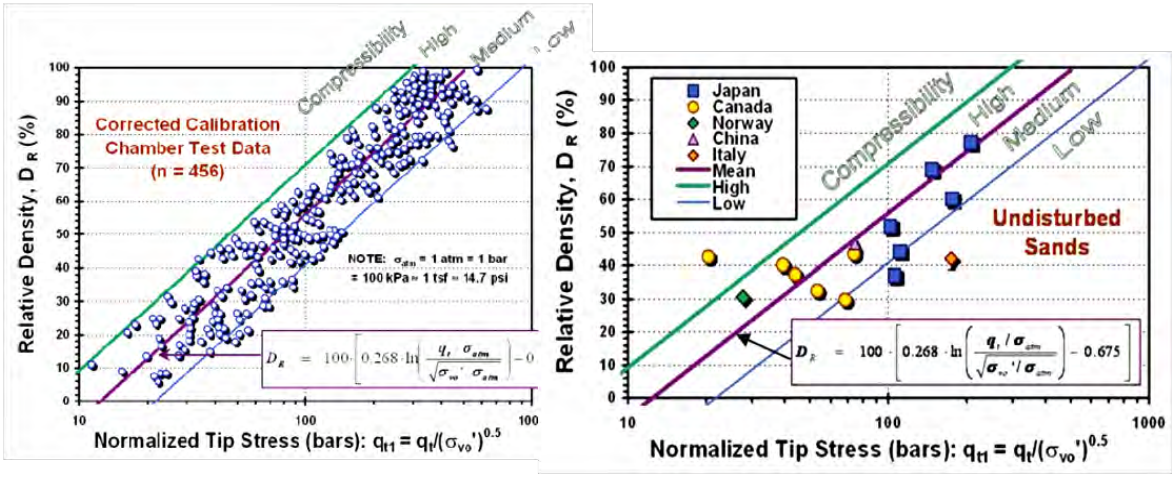

Figure 5-2 Relative density with normalised tip stress and sand compressibility from calibration chamber tests (left) and undisturbed frozen samples (right). Jamiolkowski *et al.* (2001). Reproduced from Mayne (2007).

The results are presented in Appendix E- *Standard interpretation results (set 2)*.

5.8 UNDRAINED SHEAR STRENGTH

The undrained shear strength s_u is usually estimated by dividing the net tip resistance by a factor N_k (Lunne *et al*, 1981):

$$s_u = \frac{q_c - \sigma_{v0}}{N_k}$$

Where N_k is an empirical factor which varies with soil type, stress history, structure/fabric, plasticity, and the mode of shear.

Mayne and Peuchen (2018) performed and evaluation of 407 high-quality undrained anisotropically consolidated triaxial compression tests (CAUC) with net tip resistance to proposed N_{kt} factors with regression analysis details for five categories of clays shown in Table 1.

Table 1 Summary of CAUC s_u versus q_{net} for clays. Reproduced from Mayne and Peuchen (2018).

Clay Group	Number of sites	Nr Data	Correlation Coefficient r^2	Factor N_{kt}	Mean Pore Pressure Parameter B_q
Offshore NC-LOC	17	115	0.98	12.32	0.51
Onshore NC-LOC	30	191	0.867	12	0.53
Sensitive NC-LOC	5	43	0.507	10.33	0.84
OC Intact	5	36	0.862	13.57	0.49
OC Fissured	5	22	0.393	22.47	-0.01
All clays	62	407	0.923	13.33	0.55

Alternatively, a variable N_{kt} factor can be estimated for the profile as a function of the pore pressure parameter B_q, applicable for B_q values of > -0.01. The following equation proposed by Mayne and Peuchen is based on the same database evaluation:

$$N_{kt} = 10.5 - 4.6 \cdot \ln(B_q + 0.1)$$

Where the pore pressure parameter B_q is the ratio of excess pore pressure to net tip resistance:

$$B_q = \frac{u_2 - u_0}{q_t - \sigma_{v0}}$$

The N_{kt} estimate has a standard error of 2.4 N_k and correlation coefficient of 0.645.

The estimate based on B_q is presented as 's_u5' on the parameter plots and is only suitable for tests that have a high-quality pore pressure data, often indicated by a positive, repeatable, and dynamic response.

Note: N_{kt} (with subscript 't') indicates a N_k factor that has been established using the corrected tip resistance q_t. N_{kt} can be applied to the uncorrected tip resistance q_c (non-piezocone tests) but results in a slightly lower estimate of s_u depending on the correction magnitude (q_c - q_t) in lower strength soils.

Undrained shear strengths corresponding to selected values of N_k are presented on the plots of Appendix D. *'s_u3'* on the logs (N_k = 15) has been included as a reference for comparison to traditionally reported N_k values of 15 and 20.

5.9 OVERCONSOLIDATION RATIO

The preconsolidation stress σ'_p was calculated based on the method proposed by Mayne et al (2009):

$$\sigma'_p = k \cdot (q_t - \sigma_{vo})^{m\prime}$$

$$OCR = \sigma_p{}'/\sigma'_{v0}{}'$$

Mayne *et al* found that the trend with mean grain size followed a power law through the addition of exponent m' and that its value can be estimated by relation to soil behaviour type index I_c:

$$m' = 1 - \frac{0.28}{1 + \left(\frac{I_c}{2.65}\right)^{25}}$$

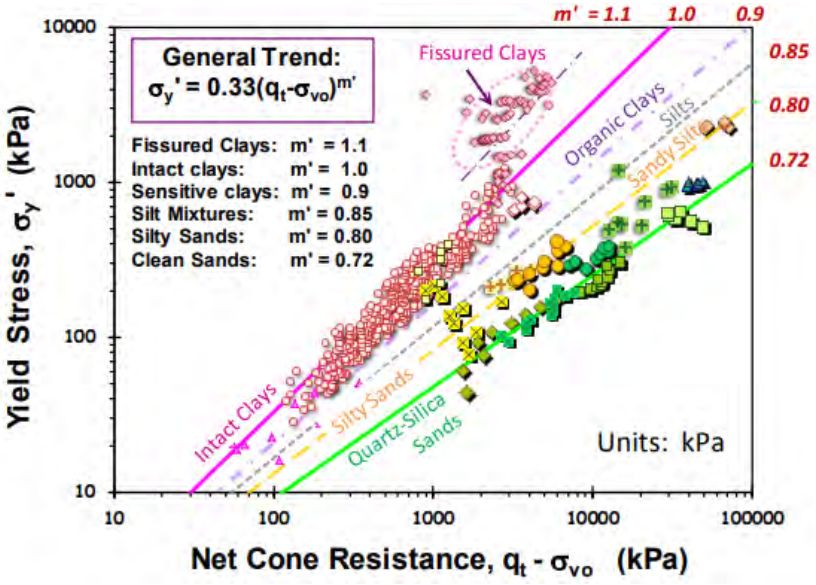

Figure 5-3 Preconsolidation stress with net cone resistance power law, reproduced from Mayne (2014).

An additional set of σ_p' and OCR values were calculated for m' = 1.1 to reflect the upper trend for over consolidated fissured clays not captured by the correlation with I_c.

5.10 SPT N60 VALUES

Equivalent SPT N60 values, defined as the non-normalised SPT blow count over a 30 cm interval, were derived for two correlations.

Method 1 - Jefferies and Davies (1993) cited in Lunne *et al.* (1997):

$$N_{60} = \frac{q_t}{8.5 \cdot \sigma_{atm} \cdot \left(1 - \frac{I_c}{4.6}\right)}$$

Method 2 - Robertson (2012):

$$\frac{\left(\frac{q_t}{p_a}\right)}{N_{60}} = 10^{(1.268 - 0.2817 I_c)}$$

The correlations are intended for clays, silts and sands and not for carbonates or cemented geo-materials.

The results are presented in Appendix D.

5.11 FRICTION ANGLE

Sands

The peak friction angle of granular materials was calculated using the Kulhawy and Mayne (1990) method. The relationship is based on a calibration chamber database from 24 sands of varying mineralogy and is found from:

$$\phi' = 17.6 + 11.0 \cdot \log (q_{t1})$$

Where:

ϕ' = Peak friction angle (degrees)

q_{t1} = stress normalised cone resistance:

$$q_{t1} = \left(\frac{q_t}{\sigma_{atm}}\right) / \left(\frac{\sigma_{v0'}}{\sigma_{atm}}\right)^{0.5}$$

The presence of compressible minerals tends to reduce tip resistance resulting in lower estimate of friction angle, while very coarse (sand) or larger grain size tends to increase tip resistance resulting in higher estimate. Increased penetration resistance due to high k_0 conditions also results in an overestimate of friction angle.

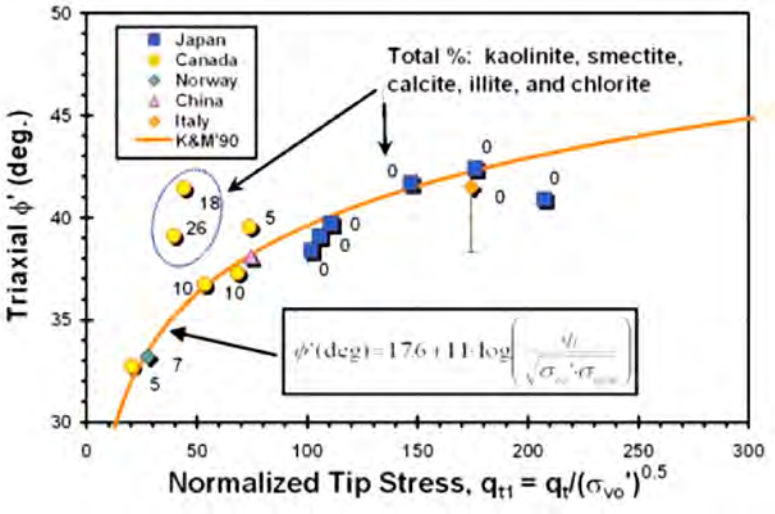

Figure 5-4 Peak triaxial friction angle from undisturbed sands with normalised cone resistance.

Fine grained soils

The effective friction angle for fine grained soils was calculated based on the Senneset *et al.* (1988, 1989) method by applying the approximate closed form solution by Mayne & Campanella (2005) as a direct function of the pore pressure parameter Bq and normalised tip resistance Q. The method is applicable where $0.1 < B_q < 1.0$ and $20^\circ < \phi' < 45^\circ$ and generally appropriate for non-cemented normally consolidated to lightly overconsolidated soils.

$$\phi' = 29.5^\circ \, B_q{}^{0.121} [0.256 + 0.336 \, B_q + \log Q]$$

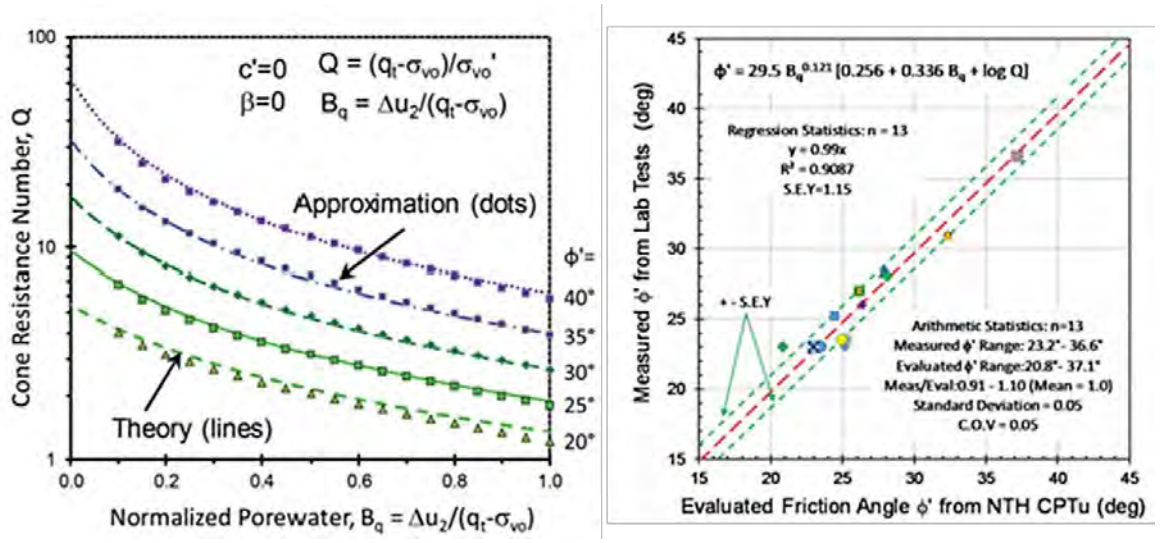

Figure 5-5 [Left] Theoretical curves with function approximation (dots) overlay [Right] calibration data from geotechnical centrifuge tests for a variety of soils. Redrawn from Ouyang & Mayne (2018).

The results are presented in Appendix E.

5.12 COEFFICIENT OF VOLUME CHANGE

Coefficient of volume change m_v defined as the inverse of the constrained modulus M, is evaluated for all soil types using the constrained modulus method proposed by Mayne (2006) cited in Mayne (2007). The value may be used to predict settlement at the end of primary consolidation and is applicable to the present state of vertical effective stress up to the pre-consolidation stress for overconsolidated soils.

$$m_v = \frac{1}{M}$$

Where:

$$M = \alpha \cdot (q_t - \sigma_v)$$

$$\alpha = 5$$

An alpha factor of 8.25 reported by Kulhawy & Mayne (1990) for fine grained soils appears to provide a better fit through the data for intact non-organic clays, reducing to around 1 to 2 for organic plastic clays.

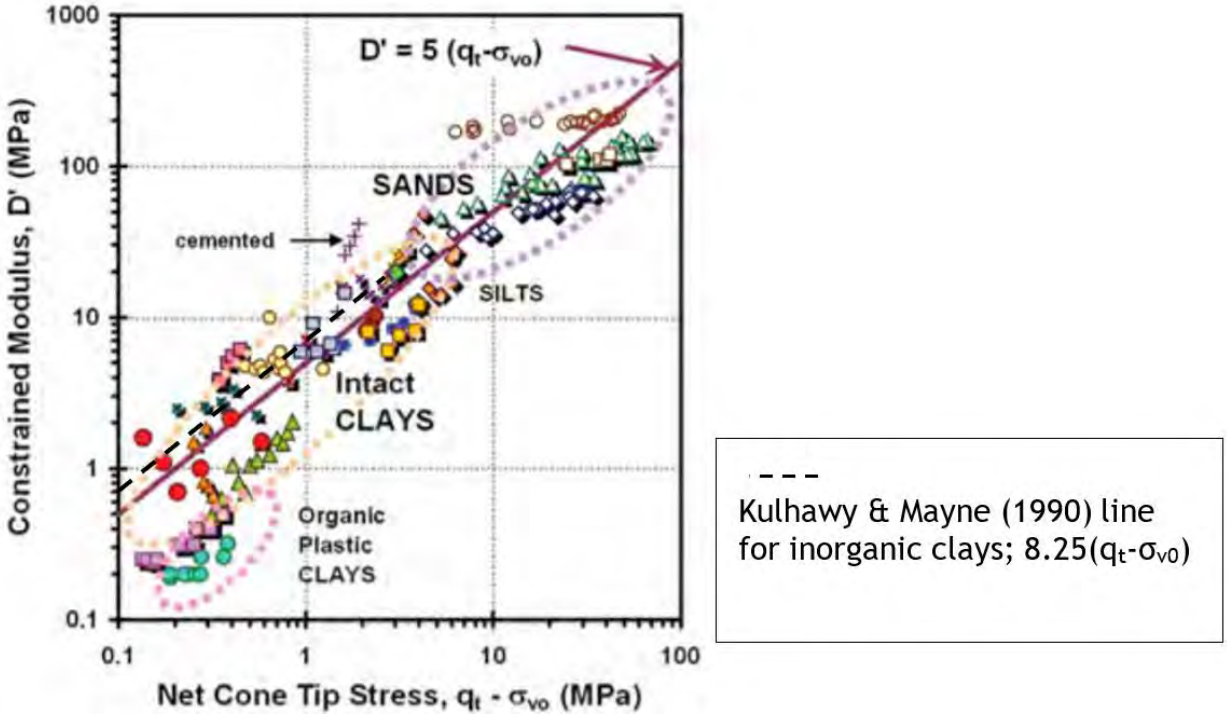

Figure 5-6 Constrained modulus of Mayne (2006). Annotated/redrawn from NCHRP Synthesis 368 (2007).

The results are presented in Appendix D.

5.13 YOUNG'S MODULUS

The secant Young's modulus E' at 25% mobilised shear strength (FOS = 4) was calculated according to the method proposed by Robertson (2009):

$E' = \alpha(q_t - \sigma_v)$
Where:

$\alpha = 0.015(10^{0.55\boldsymbol{Ic}+1.68})$

The method described by Robertson may be adapted to estimate E' for loading at different percentages of mobilised shear strength.

The results are presented in Appendix E.

6 DISSIPATION TESTS

Dissipation tests were performed during the CPT at depths specified by the Client's representative or Investigation Supervisor on site.

The hydraulic clamp was on and maintained pressure for the duration of the test.

Pore pressures were sampled at 1 second resolution up to 300 seconds followed by a 10 second resolution thereafter.

6.1 COEFFICIENT OF CONSOLIDATION

The interpretation of the dissipation test applies the method of Houlsby and Teh (1988). Modified dimensionless time factors T^* have been determined from which values of c_{vh} can be derived by the relationship:

$$T^* = \frac{c_{vh} \cdot t}{r^2 \cdot \sqrt{Ir}}$$

Where r^2 = Radius of the cone, Ir= Rigidity Index (Assumed = 100), T^*= Time factor for a given degree of pore water dissipation (see table below for values), t = Measured time to a given degree of pore water pressure dissipation.

Rigidity index is defined as:

$$Ir = \frac{G_u}{s_u}$$

Where G_u= Shear modulus and s_u= undrained shear strength

A Ir value of 100 has been assumed in the analysis. The initial peak pressure has been corrected for soil dilatancy (initial rise in pressure) using the Sully *et al* (1999) method by backwards extrapolation of the initial decay curve plotted in root time.

The saturated porous filter was in the shoulder (u_2) position in all cases. The results of the dissipation tests are presented in Appendix F.

Table 2 Modified time factors T^* from consolidation analysis (Houlsby and Teh, 1988)

Degree of dissipation (%)	u_1 measuring position	u_2 measuring position
0	0.014	0.038
30	0.032	0.078
40	0.063	0.142
50	0.118	0.245

Where a test is of insufficient duration to perform the above analysis an upper-bound value of c_{vh} will be calculated taking the time of the final value as equal to t_{50}. This should be treated with caution but is usually a safe assumption given that the peak measured pore pressure is very rarely less than 65% of the corrected initial pressure estimated by the Sully *et al*. method described above.

For dissipation tests with t_{50} values of less than ~40 seconds in NC-LOC soils, the estimate of coefficient of consolidation may become significantly influenced by partial consolidation during penetration prior to the test beginning. This results in a lower bound value of c_{vh} and is indicated as such in the results table (Table 2) of Appendix A.

6.2 PERMEABILITY

Method 1: Parez and Fauriel (1988) method based on t_{50}:

$$k = \left(\frac{1}{251 \cdot t_{50}}\right)^{1.25}$$

Where t_{50} is the time to 50% dissipation of excess pore pressure, and k is permeability (cm/s).

This method is based on monotonic dissipation results and should be cautiously applied to dissipations that exhibit dilative behaviour (showing initial rise to peak pressure) where t_{50} is calculated using a corrected initial pore pressure. Permeability values are multiplied by a factor of 1.5 for 15 cm^2 cones.

Method 2: Theoretical method, as discussed by Robertson (2014), which accounts for the effect of soil stiffness:

$$k = \frac{c_{vh} \cdot \gamma_w}{M}$$

Where c_{vh} is the coefficient of consolidation; γ_w is the specific weight of water and M is the constrained modulus. The derivations of c_{vh} and M are described separately within this report.

Robertson (2014) proposed an approximate relationship between permeability (k) and the soil behaviour type index (I_c) as follows:

For $1.0 < I_c \leq 3.27$ $k = 10^{(0.952 - 3.04\, I_c)}$

For $3.27 < I_c < 4.0$ $k = 10^{(-4.52 - 1.37\, I_c)}$

The values have been derived and are presented in the Appendix F.

Where dissipation tests have been performed, it is possible to reverse calculate the 'equivalent' SBT index I_c from the calculated permeability based on dissipation tests. These values have been derived and plotted in the I_c log as K1 and K2 corresponding to permeability method 1 and 2 above. Permeability values for K2 are only evaluated for t_{50} values exceeding 35 seconds.

This equivalent I_c values are not intended as a correction nor a more accurate version of the index; the index value evaluated from the CPT is a parameter describing the soil type which typically has mechanical properties consistent with the CPT measurements, and often represents the soil constituent controlling mechanical behaviour. The equivalent value based on permeability simply provides comparative insight into the soil type in terms of approximate drainage characteristics.

7 CPT INTERPRETATION NOTES

Provided below is a non-exhaustive set of notes on interpretation of the acquired CPT data with reference to examples within the dataset where appropriate.

DRAINED AND UNDRAINED SOIL BEHAVIOUR

Geotechnical parameters appropriate for drained and undrained cone penetration conditions are derived for drained and undrained soil behaviour types (SBTs) respectively, however, to help mitigate the uncertainty in the SBT correlation with drainage behaviour, all parameters are derived over the Soil Behaviour Type range $2.4 < I_c < 2.7$. For partially drained conditions, error will be introduced within derived parameters.

Piezocone dynamic pore pressure and dissipation tests may be used to identify drainage conditions. Dissipation t_{50} values exceeding 50 seconds indicate undrained penetration behaviour based on the findings of Kim *et al.* (2008).

In partially drained materials the friction sleeve resistance may rise significantly immediately following a pause in penetration due to consolidation and increased effective stress on the friction sleeve.

DYNAMIC PORE PRESSURE u_2 (CPTu)

While the piezo system is saturated before use, testing through unsaturated soils may result in some degree of desaturation leading to a less accurate and more 'sluggish' pore pressure response. Desaturation can also occur during penetration due to suction pressure during dilative shear at the cone shoulder. Dissipation tests that are undertaken following desaturation are likely to have a more pronounced initial rise and some degree of error will be present in the analysis.

If the piezometer system becomes desaturated it may re-saturate at higher excess pressures later in the test as gas dissolves under pressure. The pore pressure response in saturated contractive soils should normally have a dynamic 'peaky' appearance.

The tip resistance in lower strength contractive soils without pore pressure measurement in the u_2 position is likely to be significantly lower (up to 20%, typically ~10%) than the equivalent corrected tip resistance depending on the magnitude of excess pore pressure generated during penetration.

CONE TIP AND SLEEVE OFFSET

The accuracy of the SBT over thin layers and at layer boundaries is sensitive to offset error in the friction ratio often resulting in sharp peaks or troughs at boundaries. The friction ratio is often inaccurate in heavily disturbed soils with a 'blocky' macro fabric. The last ~8 cm of data is also not included in the SBT material description as no friction sleeve measurements are recorded.

FRICTION SLEEVE DATA

There are two common causes of friction sleeve measurement issues; 1) unequal pore pressure acting on the sleeve end areas as the sleeve passes though materials of different permeability

and hence excess pore pressure Δu_2, often resulting in a negative/positive spike, and 2) Accuracy limitations and temperature effects in very low strength or sensitive soils. The latter can often be mitigated by temperature stabilisation during the test and at the time of zero output measurement.

CONE TYPE

The reference cone type has a 10 cm^2 projected cone tip area and 150 cm^2 friction sleeve area, however it is common to use a larger 15 cm^2 cone with a 225 cm^2 friction sleeve area for improved sensitivity, temperature stability, damage prevention and penetration depth potential due to the higher bending strength. Use of a 15 cm^2 cone does however require higher penetration force (reaction force) for a given penetration pressure and produces more pronounced transitions zones and thin layer effects due to the larger influence zone.

TRANSITION ZONES AND THIN LAYER EFFECTS

During penetration at the boundary between soils of contrasting stiffness, a transition zone is often evident prior to mobilisation of the true soil stiffness. These should be cautiously ignored in assessment of soil behaviour type and parameter evaluation. Where the stiff layer is thin (<~1 m) mobilised resistance may be significantly less than that of an equivalent thick layer. The effect for thin low stiffness layers is less significant. Procedures for thin-layer effect correction are provided by Robertson and Wride (1998) and Boulanger & DeJong (2018).

GRAVELS

The presence of gravel or larger clasts in a soil is often characterised by short peaks in the CPT tip and sleeve readings, possibly with associate inclinometer 'shake' and/or short sharp reductions in pore water readings due to dilation effects. Frequent gravels in soft or loose soils may generate localised erroneous friction ratio values.

8 MAGNETOMETER TESTING

A combined CPT/magnetometer was used at prescribed locations to provide the data for on-site mitigation of UXO risk.

The magnetometer used in the Lankelma magcone system comprises a Bartington Instruments 3-axis flux gate magnetometer that is capable of measuring disturbances in the Earth's field of less than 1 part in a million. Buried ferrous items, such as UXO, result in localized distortions of the magnetic field. The detection radius of the works undertaken was dependent upon the level of magnetic field distortion noise and the size of the ferrous object(s) of interest. The magnetometer data was reviewed in real-time. As such no data had been processed or provided in this report.

The magnetometer probe was pushed into the soil using a standard CPT rig up to a maximum applied force of 15 Tonnes.

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APPENDICES

APPENDIX A **SUMMARY TABLES**

APPENDIX B **GENERAL INFORMATION**

APPENDIX C **CONE PENETRATION TEST RESULTS**

APPENDIX D **INTERPRETATION RESULTS - SET 1**

APPENDIX E **INTERPRETATION RESULTS - SET 2**

APPENDIX F **INTERPRETED DISSIPATION TEST RESULTS**

APPENDIX G **RAW DISSIPATION TEST RESULTS**

APPENDIX A SUMMARY TABLES

Table 2 CPT summary

Location ID	Stroke number	Final depth (m)	Cone ID	Piezocone test	Pre-drilled (m)	Pre-drilling details	Rig	Primary refusal factor	Applied zero values: qc, fs, u2	Tip zero drift (kPa)	Sleeve zero drift (subtraction) (kPa)	Piezo zero drift (kPa)	Nr dissipation tests	Raw File Name	Easting (m)	Northing (m)	Elevation (m)	Date	Remarks
LF\CPT01	1	7.96	S15-CFIP.1992	YES	1.20	IP-BF	UK8	Lateral support	pre, pre, pre	0.00	0.00	-0.30	1	107755-240521-UK8-LP76.L01	457527.734	525851.478	4.676	25/05/2021	
LF\CPT01A	1	8.04	S15-CFIP.1992	YES	1.20	IP-BF	UK8	Lateral support	pre, pre, pre	22.90	-5.20	-0.30	1	107755-240521-UK8-LP76.L02	457528.447	525852.477	4.705	25/05/2021	
LF\CPT02	1	7.42	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Lateral support	pre, pre, pre	0.00	5.10	0.30	1	107755-240521-UK8-LP76.L03	457548.396	525875.571	3.712	25/05/2021	
LF\CPT02A	1	8.40	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Lateral support	pre, pre, pre	0.00	-0.70	-0.60	1	107755-240521-UK8-LP76.L04	457549.703	525875.634	3.747	25/05/2021	
LF\CPT03	1	25.00	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Target depth	pre, pre, pre	-11.40	0.10	-1.70	4	107755-240521-UK8-LP76.L06	457762.771	525932.348	3.840	26/05/2021	
LF\CPT04	1	24.02	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Lateral support	pre, pre, pre	-11.40	0.10	-1.70	4	107755-240521-UK8-LP76.L05	457834.825	525934.533	2.123	26/05/2021	
LF\CPT05	1	24.10	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Lateral support	pre, pre, pre	0.00	-2.90	-0.30	3	107755-240521-UK8-LP76.L07	457921.134	525982.859	0.424	27/05/2021	
LF\CPT06	1	22.04	S15-CFIP.1992	YES	1.00	IP-BF	UK8	Lateral support	pre, pre, pre	-11.40	1.50	2.90	3	107755-240521-UK8-LP76.L08	458001.597	526043.289	0.786	28/05/2021	

Note: Coordinates and levels have been provided by the Client for inclusion in this report.

CPT test plots are presented in Appendix C.

Table 3 Dissipation test interpretation summary

Location ID	Depth (mBGL)	Assumed piezometric level (mBGL)	In-situ pore pressure u_0 (kPa)	Piezometric level / u_0 origin	Final interpreted time value (s)	Final Interpreted degree dissipation (%)	Coefficient of consolidation C_{vh} (m^2/yr)	UB C_{vh} (m^2/yr) - incomplete diss., final time as t50	LB C_{vh} (m^2/yr) - Partial consolidation significant	Constrained modulus (MPa) - from CPT estimate	Permeability k_1 (m/s)	Permeability k_2 (m/s)	UB k_2 (m/s) based on UB C_{vh}	Remarks
LF\CPT01	7.96	1.80	60.4	Piezocone response in drained soils						217.40				*ID, *UBI.
LF\CPT01A	8.04	1.80	61.2	Piezocone response in drained soils						227.00				*ID, *UBI.
LF\CPT02	7.40	1.70	55.9	Piezocone response in drained soils						238.10				*ID, *UBI.
LF\CPT02A	8.40	1.70	65.7	Piezocone response in drained soils						203.40				*ID, *UR, *UBI.
LF\CPT03	11.96	1.72	100.5	u0 final dissipation pressure	9	50			4218.2	8.70	9.67E-07			*PC, *LBI.
LF\CPT03	12.42	1.72	105.0	Average measured piezometric depth at this location, approx. +- 0.4 mbgl	46	50	825.3			3.80	1.26E-07	6.76E-08		
LF\CPT03	13.42	1.72	114.8	Average measured piezometric depth at this location, approx. +- 0.4 mbgl	1859	50	20.4			2.60	1.24E-09	2.44E-09		
LF\CPT03	21.16	1.72	190.7	Average measured piezometric depth at this location, approx. +- 0.4 mbgl	103	50	368.6			6.50	4.60E-08	1.76E-08		
LF\CPT04	10.00	1.30	85.3	Piezocone response in drained soils						128.20				*ID, *UBI.
LF\CPT04	15.06	1.30	135.0	Piezocone response in drained soils						9.20				*ID, *UBI.
LF\CPT04	15.29	1.30	137.2	Piezocone response in drained soils	128	50	296.6			2.90	3.50E-08	3.18E-08		
LF\CPT04	21.00	1.30	193.3	Piezocone response in drained soils		1				14.90				*ID, *UBI.
LF\CPT05	10.48	0.80	95.0	Piezocone response in drained soils	2759	50	13.8			2.40	7.54E-10	1.78E-09		
LF\CPT05	15.48	0.80	144.0	Piezocone response in drained soils	559	50	67.9			11.70	5.55E-09	1.81E-09		
LF\CPT05	20.46	0.80	192.9	Piezocone response in drained soils	1199	37	16.4			10.30	9.39E-10	4.95E-10		
LF\CPT06	10.20	0.30	97.1	Piezocone response in drained soils	419	22	19.8			2.00	1.19E-09	3.09E-09		
LF\CPT06	15.18	0.30	146.0	Piezocone response in drained soils				111.80		9.00			3.86E-09	*ID, *UBI.
LF\CPT06	20.18	0.30	195.0	Piezocone response in drained soils						20.80				*ID, *UBI.

*Abbreviations:

NEP: No excess pore pressure generated - excess pore pressure is required for interpretation of C_{vh})
ID: Insufficient test duration - insufficient or no decay of excess pore pressure
UR: Uncharacteristic response - uncharacteristic pore pressure dissipation response precludes interpretation
DR: Drained or partially drained response - calculation of C_{vh} is appropriate for undrained cone penetration response only, t_{50} time limit of 30 s is applied
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions
PUS: Potentially unsaturated soil
MD: Monotonic decay
IEP: Insufficient excess pressure generated
LBI: Lower bound interpretation
UBI: Upper bound interpretation
DT: Disrupted test

NI: No interpretation
PC: Partial consolidation/drainage during penetration is significant (t50 < 35 s) - c_{vh} is lower bound

Dissipation test plots are presented in Appendix G

APPENDIX B GENERAL INFORMATION

LIST OF FIGURES

Cone calibration certificate: S15-CFIIP.1992

Data sheet: 18.5-tonne rubber-tracked CPT unit (UK8)

CPT soil behaviour type chart

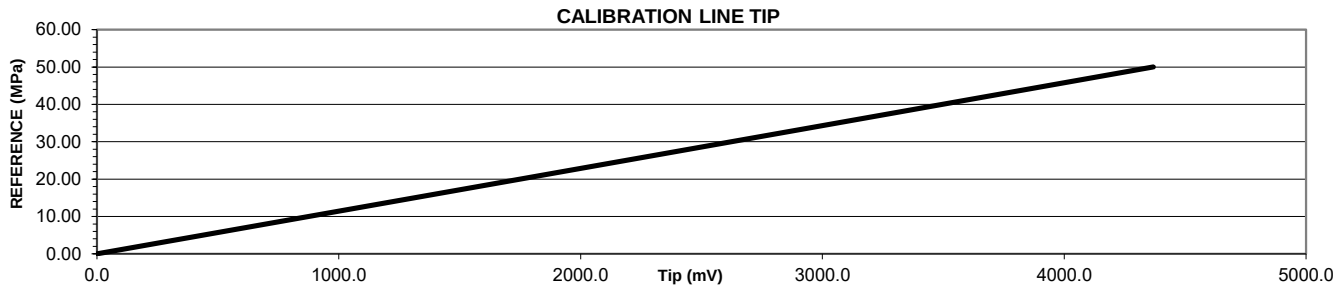
LANKELMA

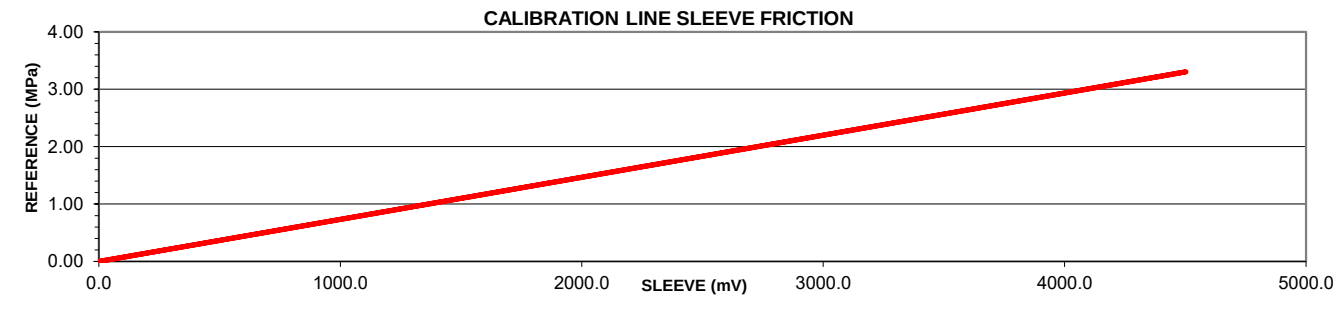
CALIBRATION CERTIFICATE

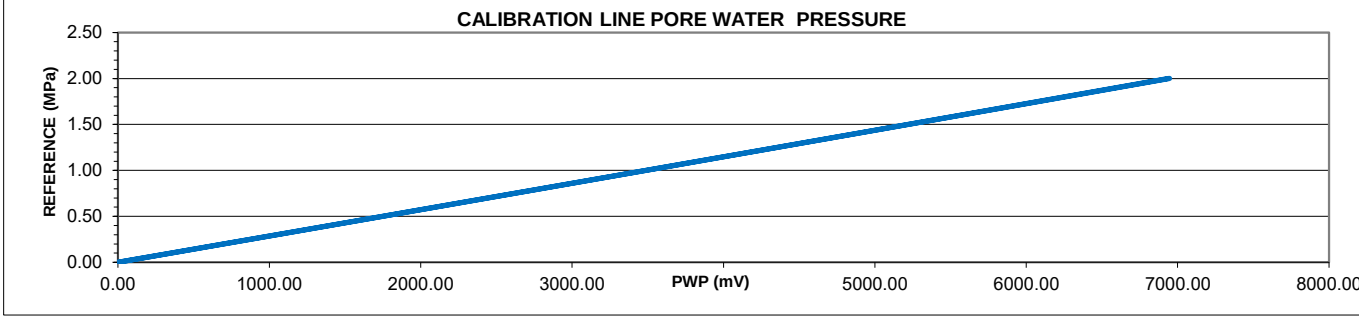
Geopoint-S15-150kN-5MPa

Cone Serial Number: S15-CFIIP.1992

REFERENCE INSTRUMENTS:	CONE END RESISTANCE	SLEEVE FRICTION	PORE WATER PRESSURE
ID	51998	51998	502273
TYPE	AM DSCC-100kN	AM DSCC-100kN	Omega MMG750V1
UNCERTAINTY (±%)	0.01	0.01	0.01
Nominal pressure (MPa,MPa,MPa)	50.00	3.30	0.00
Maximum pressure (MPa,MPa,MPa)	100.00	6.61	5.00
Area (cm²)	15	227	N/A
Sensitivity (mV/MPa)	87.36	1362.56	3487.55
Calibration file scaling factor:			
Nominal cal force (kN, kN, BAR)	75	75	20
Calibration number (mV)	4368	4502	6975
Zero point (mV)	237	219	221
Sensitivity (mV/kN, mV/kN, mV/BAR)	58.241	60.025	348.755
Inclination factors (mV)	X -20°= 544, 0°= 2514, 20°= 4448	/ Y -20°= 497, 0°= 2552, 20°= 4600	
Measured alpha factor:	0.80		
Uncertainty (%):			
Reproducibility	0.03	0.03	0.03
Linearity	0.06	0.08	0.07
Hysteresis	0.08	0.08	0.20
Combined expanded (k=2)	0.17	0.35	0.42
Application class	1	1	1



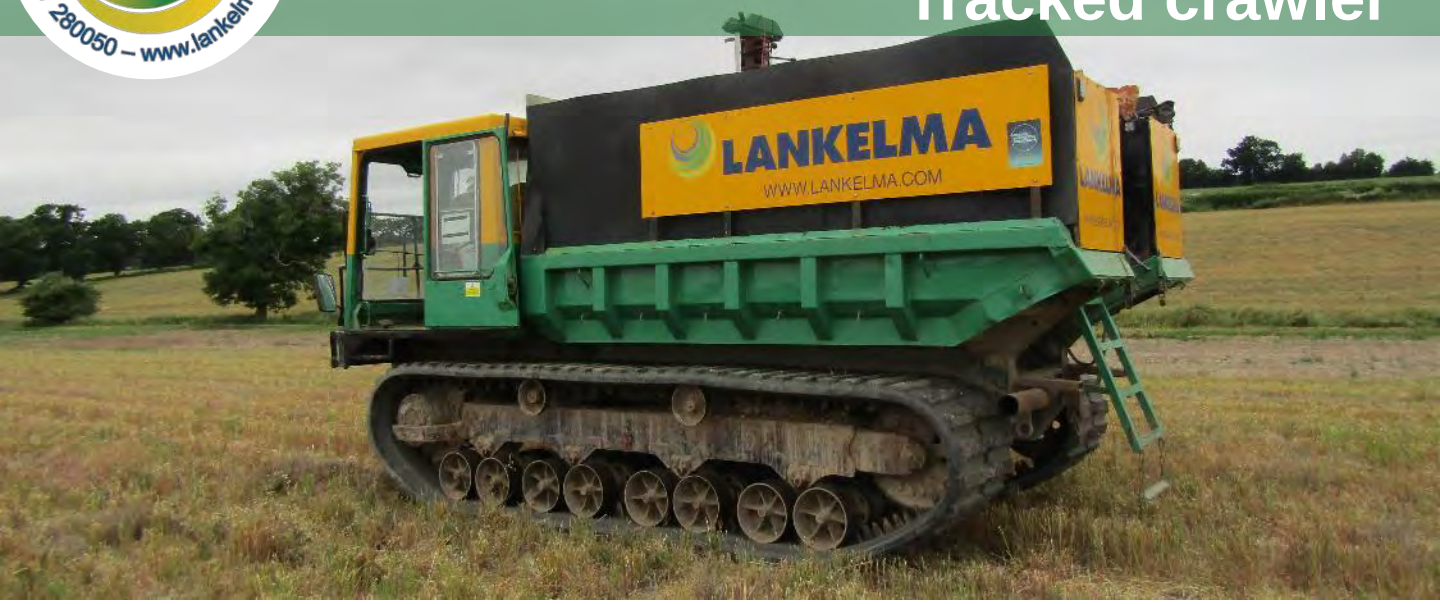




Instrument:	S15-150kN	Location:	Lankelma Calibration Laboratory
Serial Number:	S15-CFIIP.1992	Temperature(° C)	22.1
Manufacturer:	Geopoint	Calibration Engineer	P Metcalf
Date of calibration:	12/05/2021	Calibration Expiry	11/09/2021

Calibration signed and dated by:	Calibration checked and dated by:
P Metcalf	A N Harman

UK8
Tracked crawler



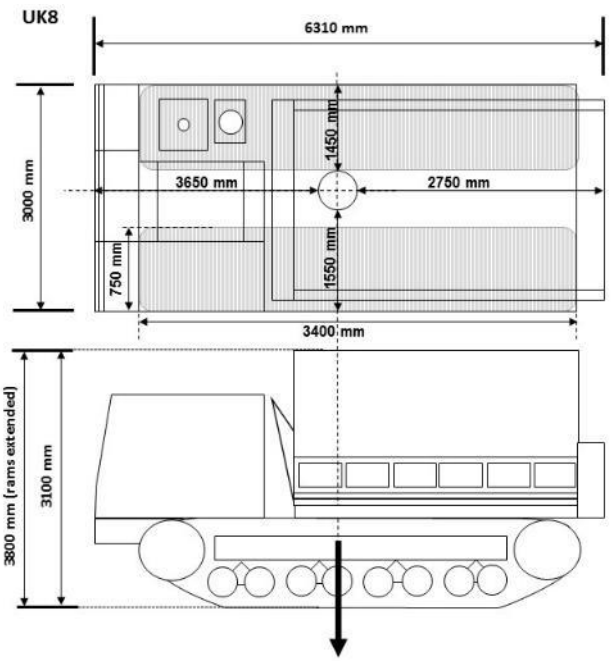
Rig weight	18.5 T
Max. operating ram capacity	15 T
Max. travelling speed	15 km/h
Track material	Rubber
Track length	3.40 m
Track width	0.75 m
Max. ground clearance on jacks	0.21 m
Max. ground bearing pressure	Tracking/testing: 35 kPa Rod extraction: 63 kPa
Max. testing gradient	Flat – no self levelling
Max. traversing gradient	20 degrees (operator assessed)
Noise output at 2 m	Testing – 74 dBA Driving – 95 dBA
Clamp arrangement	36/55 push-pull clamp
Ram stroke	0.70 m
Max. casing size	55 mm
Oil type	Biodegradable
Typical production	100m+ of standard CPTu testing per day (depending on site conditions and access)

The low ground bearing pressures, large footprint and high ground clearance of our 'bogskipper' tracked crawler makes it perfect for working on sites with boggy or very soft ground conditions.

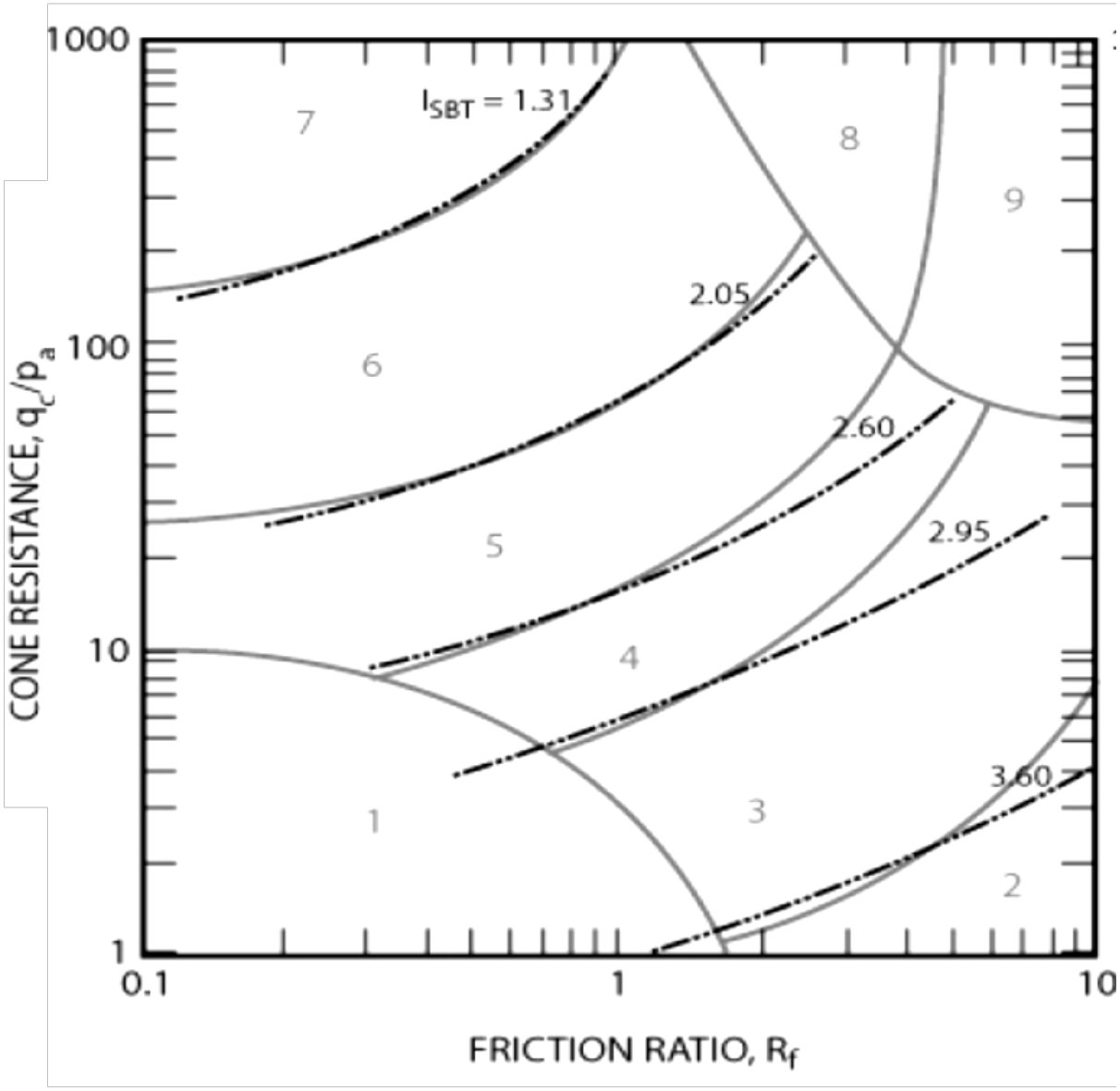
This unique rig has experience working on intertidal projects, peat bogs and weight-sensitive sites.

The rubber tracks minimize the potential for any damage to delicate infrastructure, such as a sea wall.

Biodegradable diesel and hydraulic oil for working on environmentally sensitive sites.



CPT SOIL BEHAVIOUR TYPE CHART

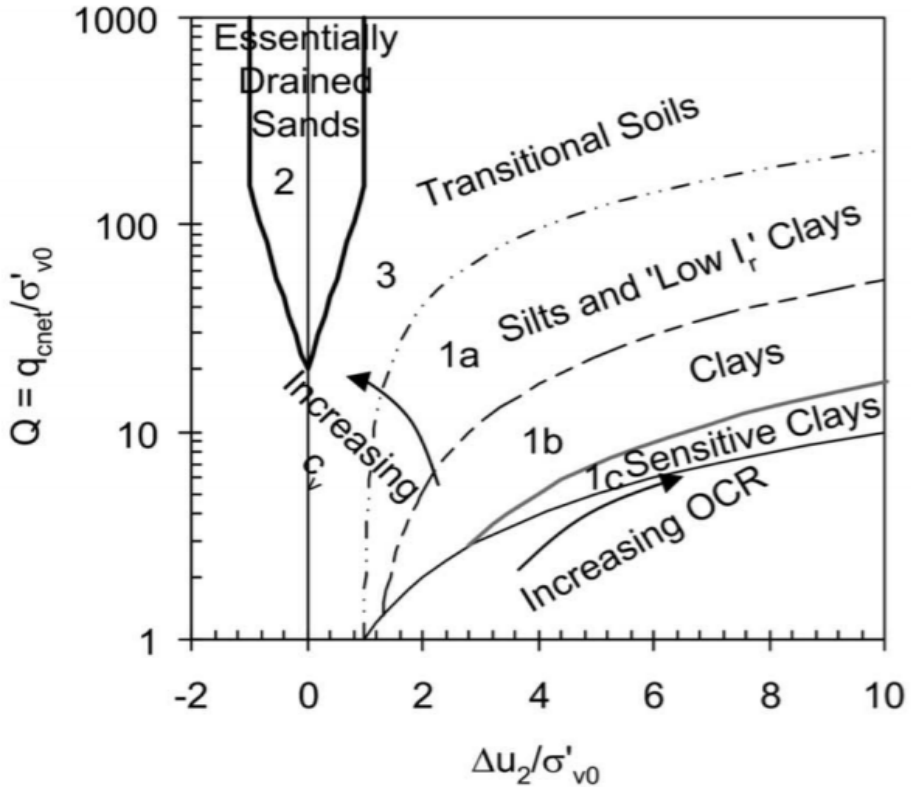


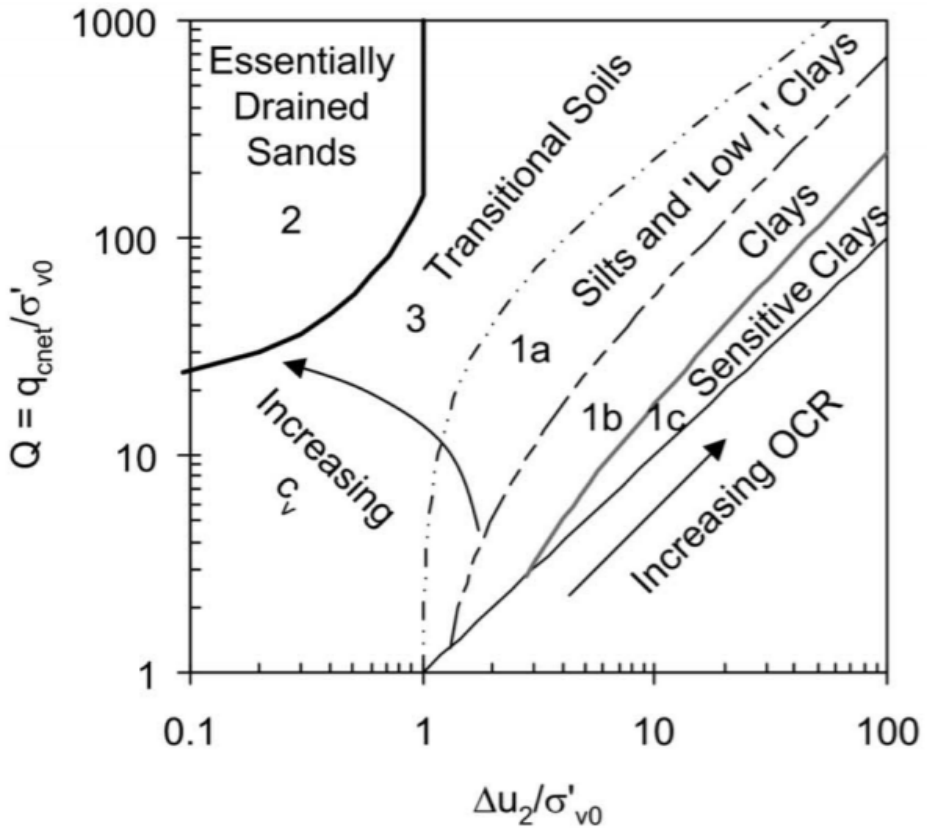
Non-normalised SBT chart by Robertson *et al.* (2010) based on dimensionless cone resistance (q_c/P_a) and friction ration, R_f, showing contours of SBT index I_{SBT} (denoted I_c on the test plots). The chart is also applicable to normalised tip and sleeve values Q_t and F_r.

Zone	Soil Behaviour Type (SBT)		
1	Sensitive fine-grained	6	Sands - clean sand to silty sand
2	Organic soils	7	Gravelly sand to sand
3	Clays – clay to silty clay	8	Very stiff/dense sand to clayey sand*
4	Silt mixtures - clayey silt to silty clay	9	Very stiff fine grained*
5	Sand mixtures – silty sand to sandy silt	*Heavily overconsolidated or cemented	

Note zones 8 and 9 appear as *'Very stiff/dense sand to clayey sand – HOC or cemented'* and *'Very stiff fine grained – HOC or cemented'* within the soil unit descriptions of plots in Appendix D.

SCHNEIDER ET AL (2008) SOIL CLASSIFICATION CHART





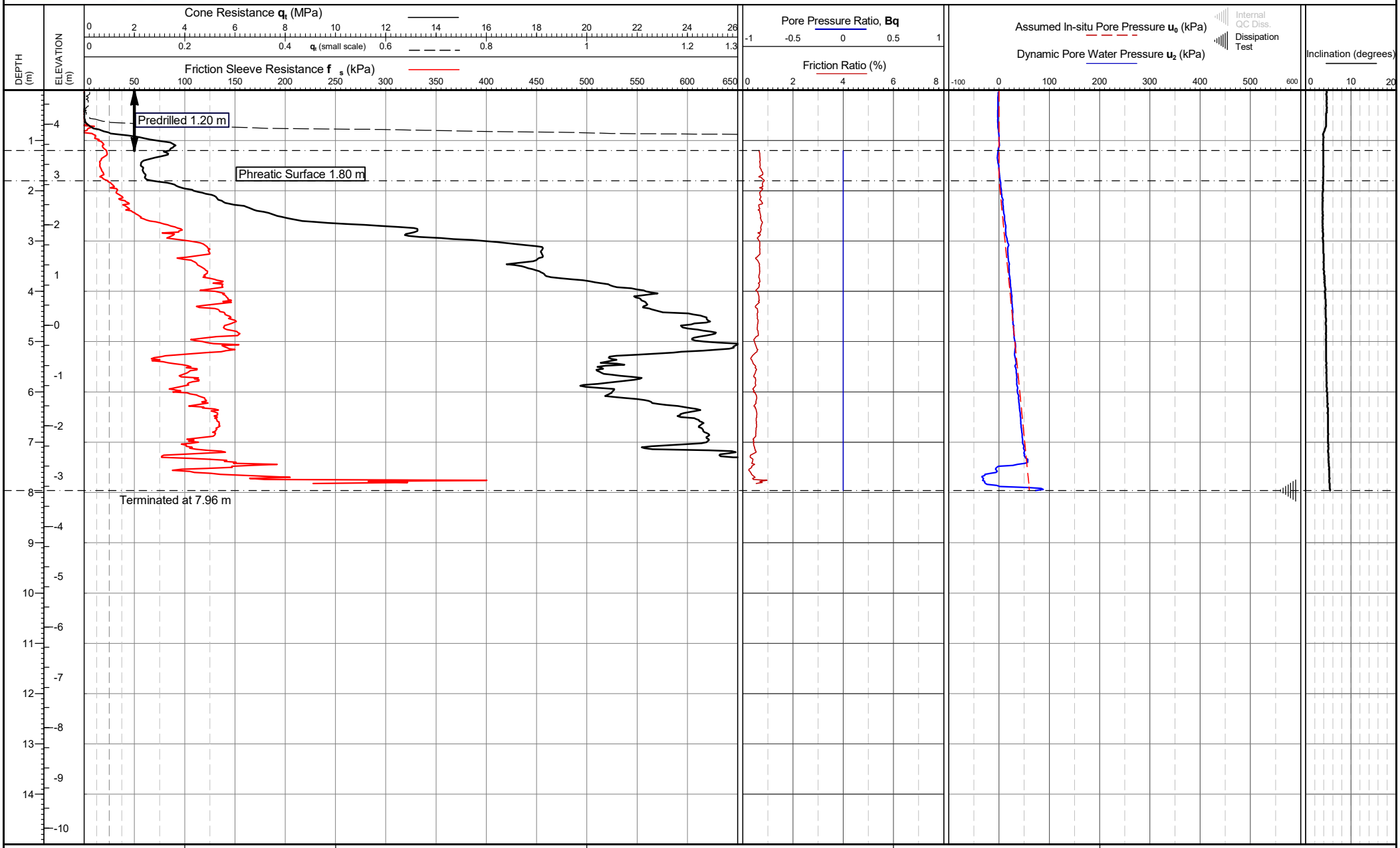
APPENDIX C CONE PENETRATION TEST RESULTS

RAW DATA PLOTS

Plots are provided for all locations

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



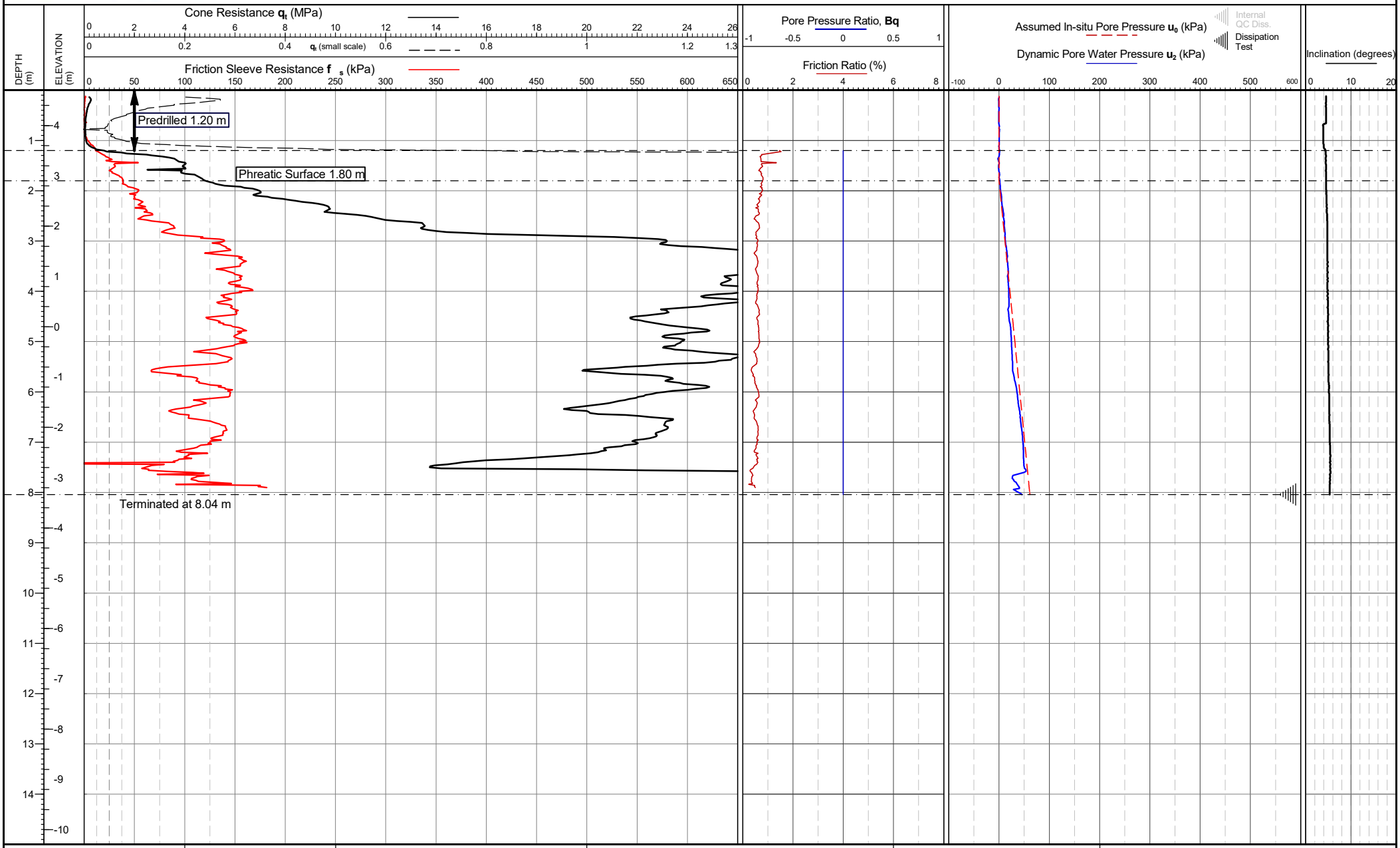
Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 25/05/2021 10:15:59	Zero drift (Pre/post test) q_c (kPa): 0.0 f_s (kPa): 0.0 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -0.3	Location: North Yorkshire, UK Coordinates: 457527.734, 525851.478 Elevation: 4.676 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

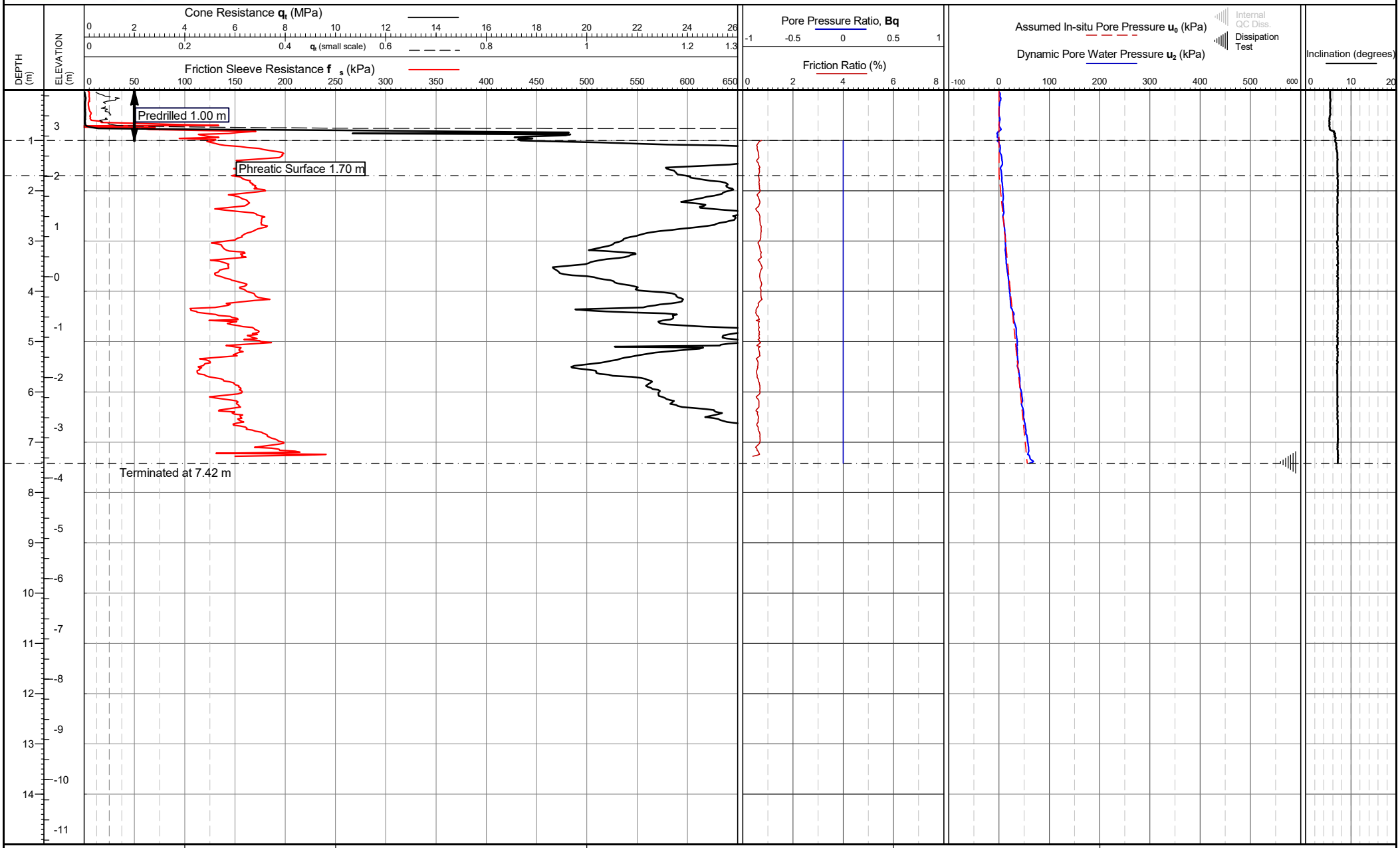


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 25/05/2021 11:35:03	Zero drift (Pre/post test) q_c (kPa): 22.9 f_s (kPa): -5.2 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -0.3	Location: North Yorkshire, UK Coordinates: 457528.447, 525852.477 Elevation: 4.705 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01A

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

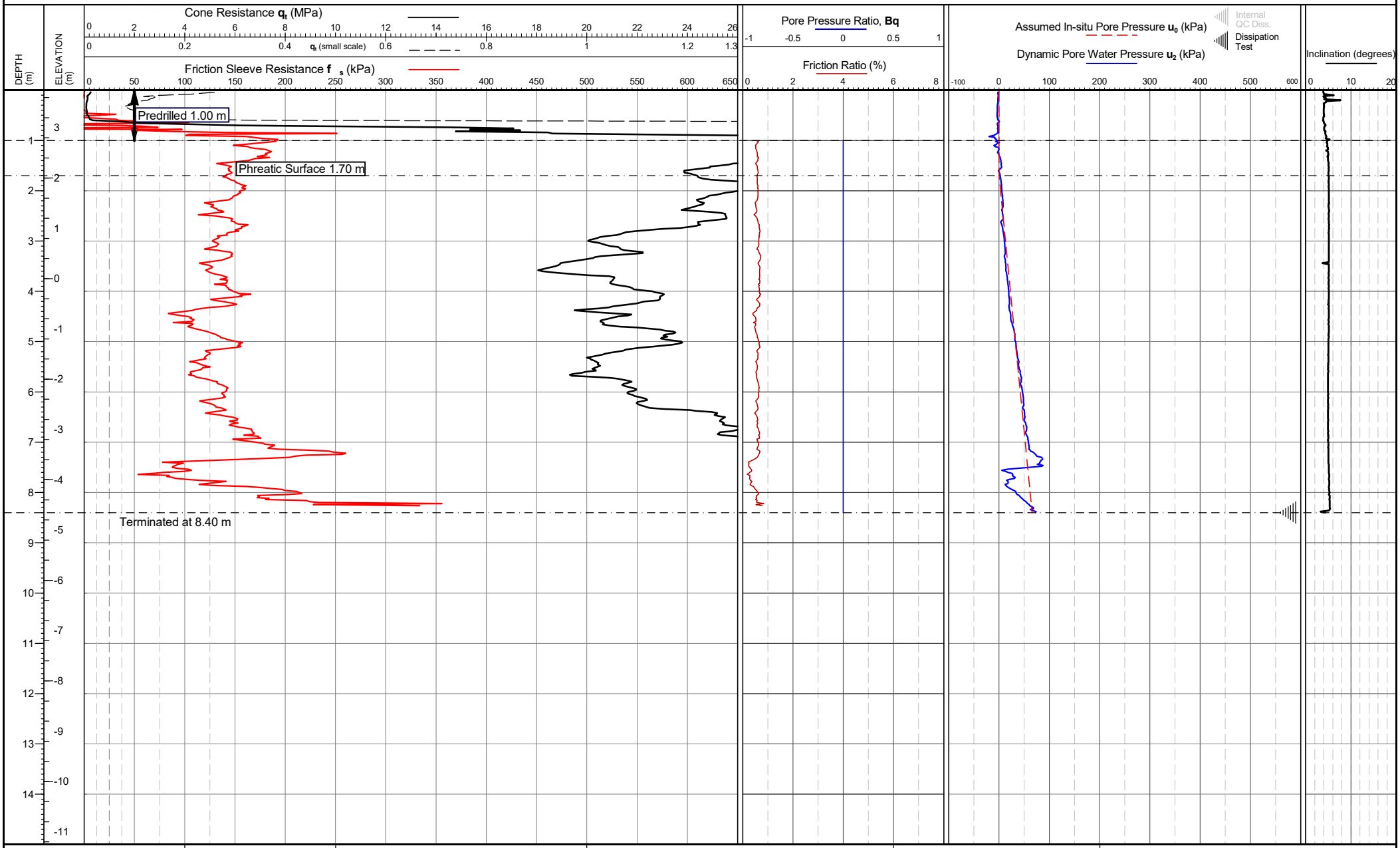


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 25/05/2021 13:52:49	Zero drift (Pre/post test) q_c (kPa): 0.0 f_s (kPa): 5.1 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): 0.3	Location: North Yorkshire, UK Coordinates: 457548.396, 525875.571 Elevation: 3.712 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

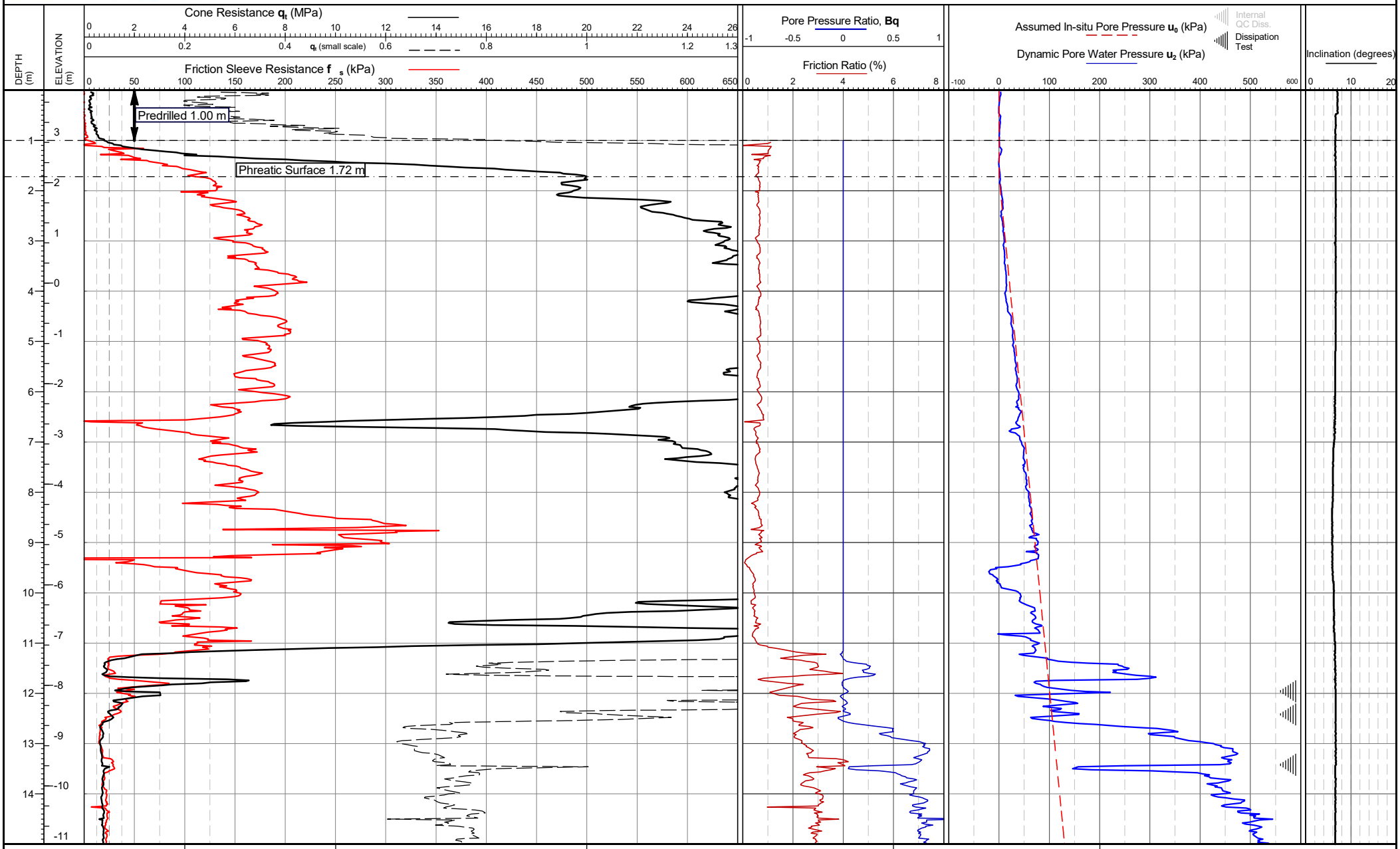


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 25/05/2021 15:13:23	Zero drift (Pre/post test) q_c (kPa): 0.0 f_s (kPa): -0.7 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -0.6	Location: North Yorkshire, UK Coordinates: 457549.703, 525875.634 Elevation: 3.747 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02A

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



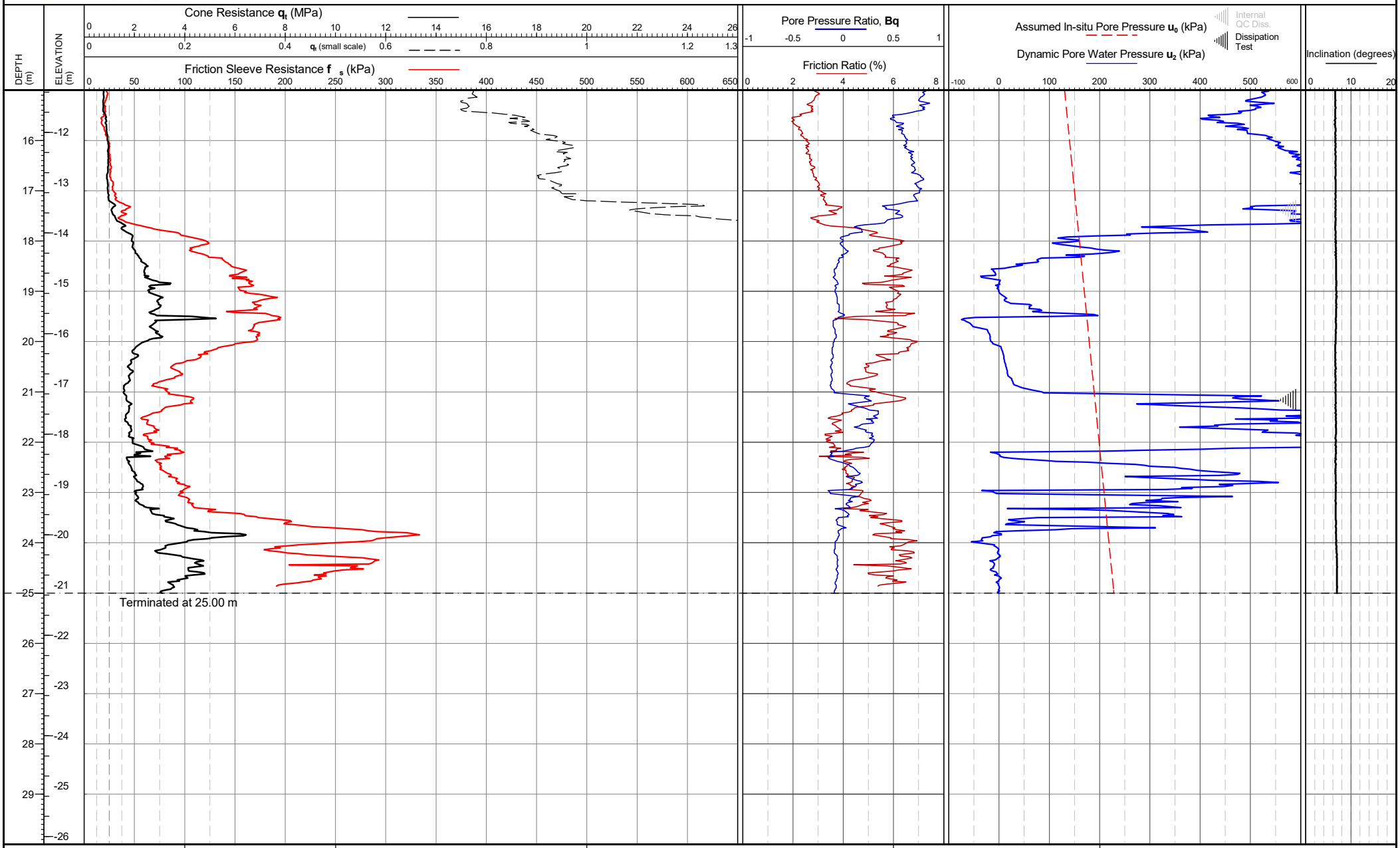
Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 26/05/2021 14:55:39	Zero drift (Pre/post test) q_c (kPa): -11.4 f_s (kPa): 0.1 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -1.7	Location: North Yorkshire, UK Coordinates: 457762.771, 525932.348 Elevation: 3.84 Coordinate system:	Remarks: *Phreatic surface origin: Average measured piezometric depth at this location, approx. +- 0.4 mbgl Termination Remark: Target depth	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

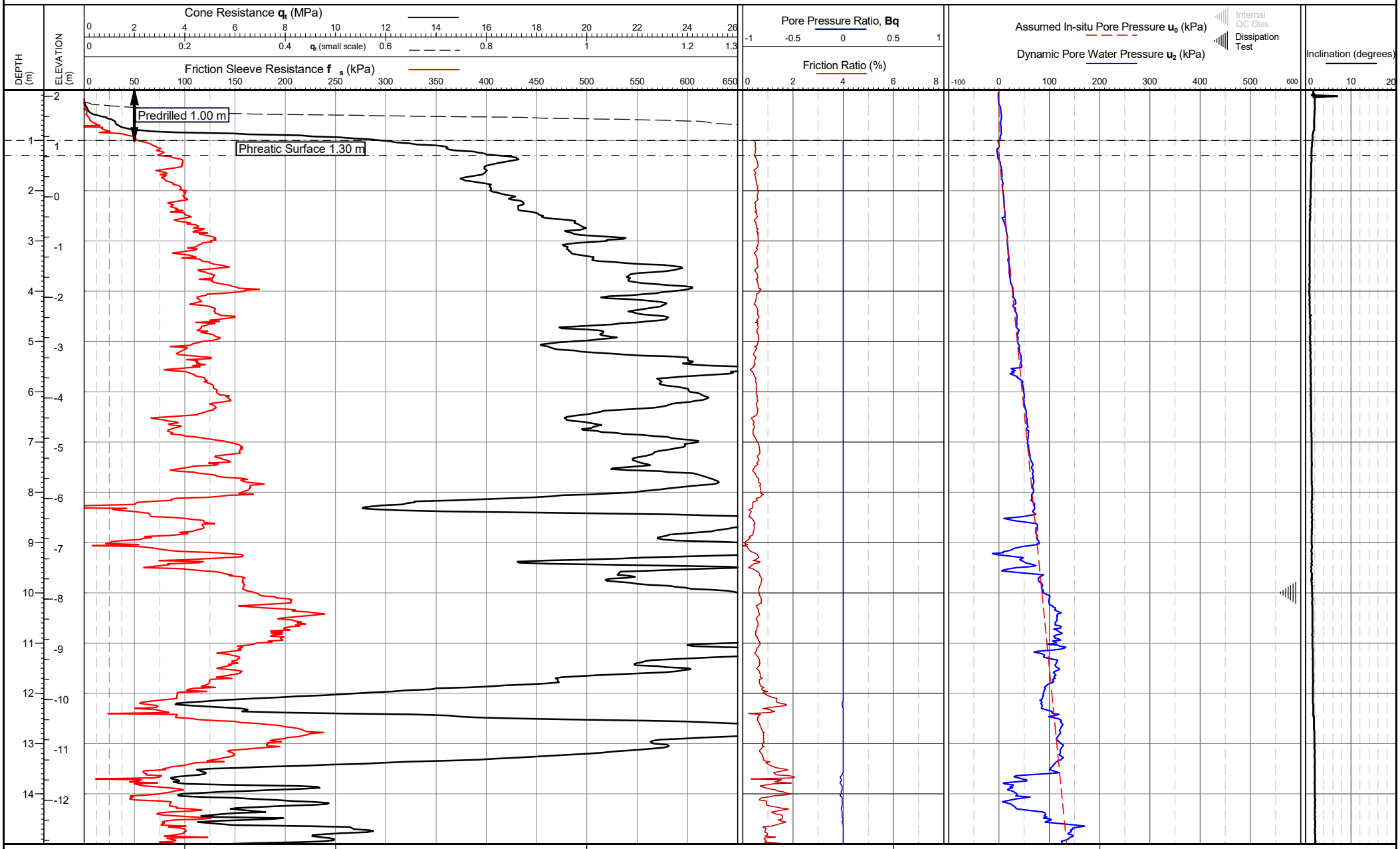


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 26/05/2021 14:55:39	Zero drift (Pre/post test) q_c (kPa): -11.4 f_s (kPa): 0.1 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -1.7	Location: North Yorkshire, UK Coordinates: 457762.771, 525932.348 Elevation: 3.84 Coordinate system:	Remarks: *Phreatic surface origin: Average measured piezometric depth at this location, approx. +- 0.4 mbgl Termination Remark: Target depth	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

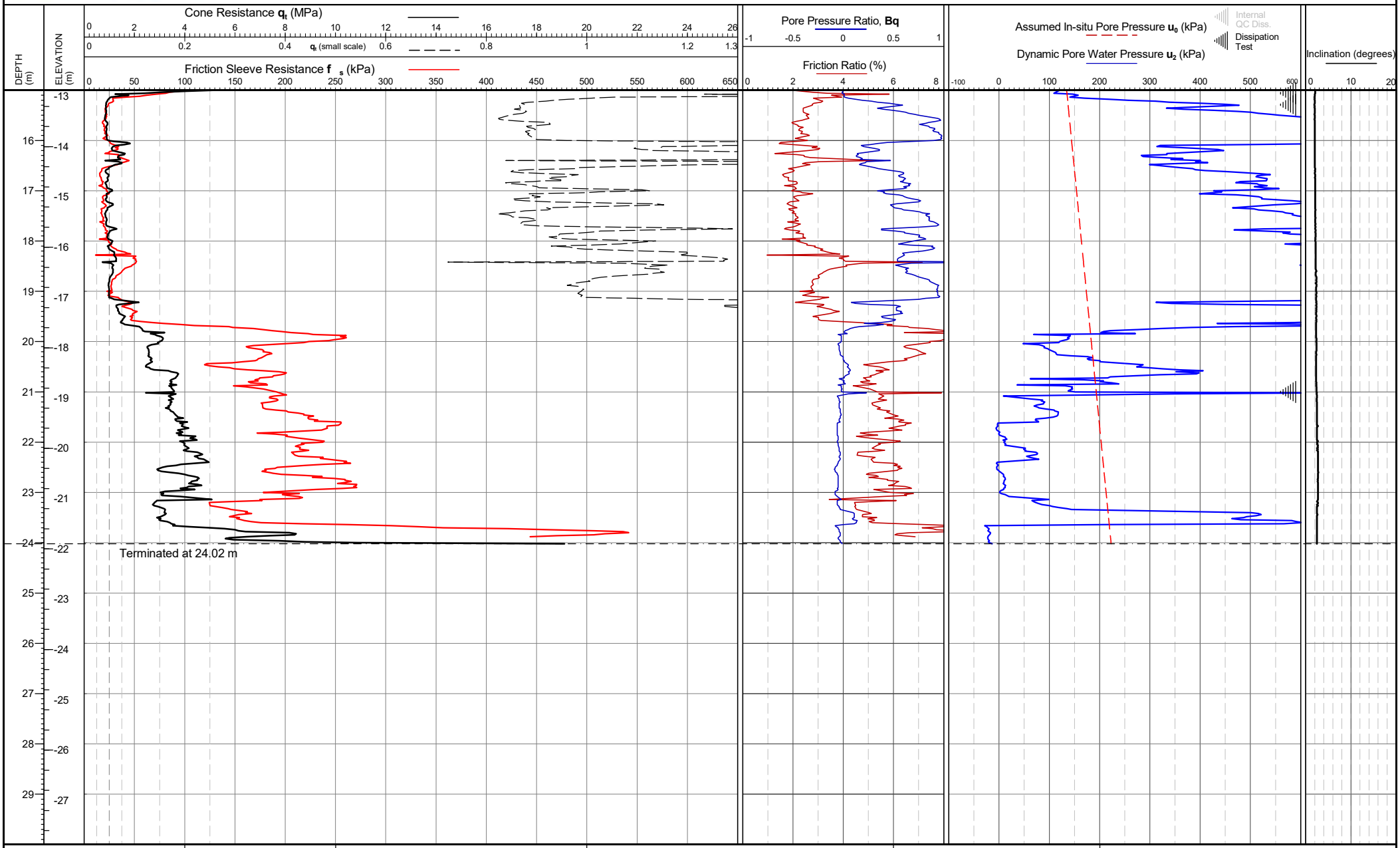


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 26/05/2021 11:43:09	Zero drift (Pre/post test) q_c (kPa): -11.4 f_s (kPa): 0.1 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -1.7	Location: North Yorkshire, UK Coordinates: 457834.825, 525934.533 Elevation: 2.123 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7	**TEST ID: LF\CPT04** Page 1 of 2

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

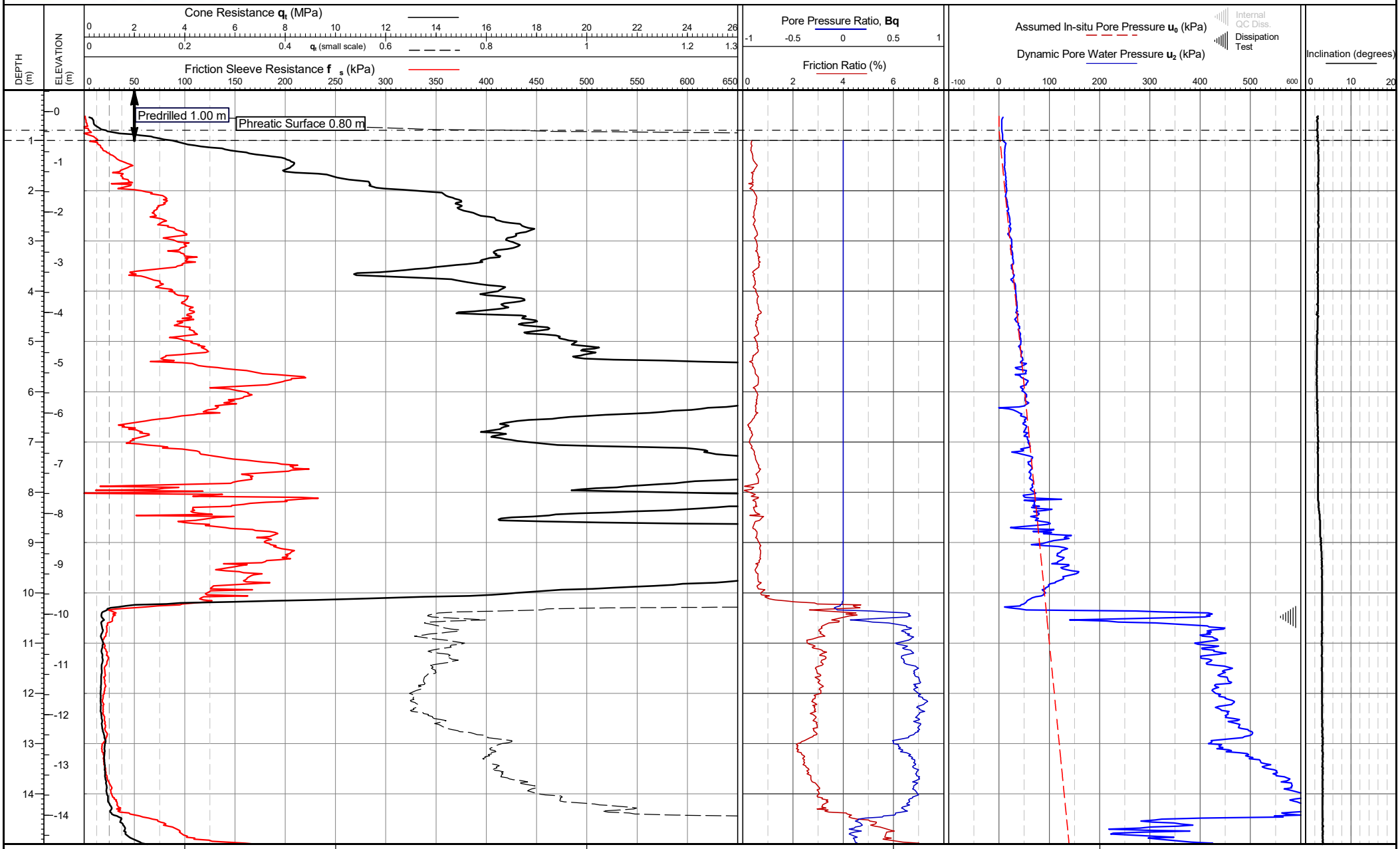


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 26/05/2021 11:43:09	Zero drift (Pre/post test) q_c (kPa): -11.4 f_s (kPa): 0.1 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -1.7	Location: North Yorkshire, UK Coordinates: 457834.825, 525934.533 Elevation: 2.123 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

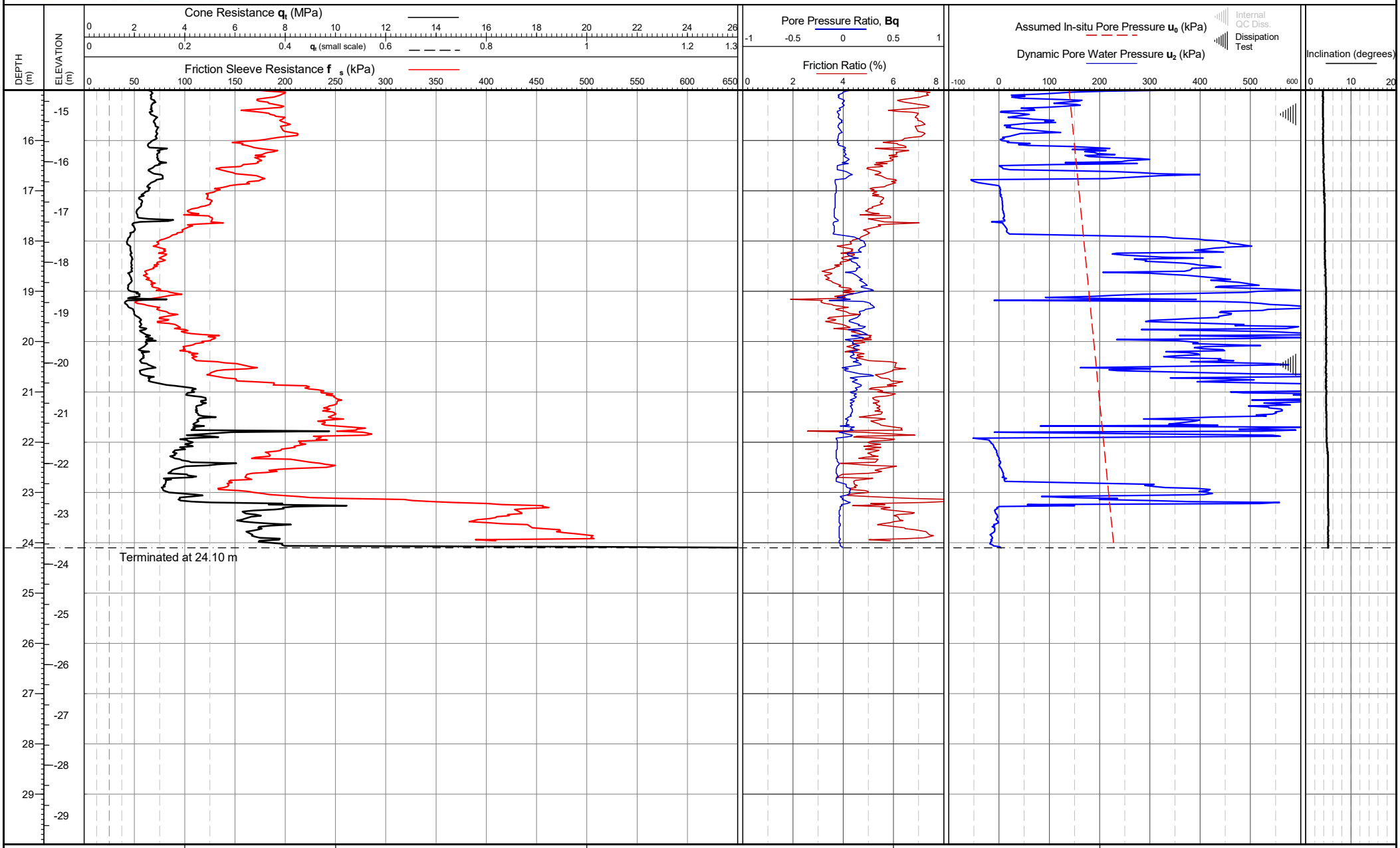
Client: AEG



Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 27/05/2021 09:53:54	Zero drift (Pre/post test) q_c (kPa): 0.0 f_s (kPa): -2.9 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -0.3	Location: North Yorkshire, UK Coordinates: 457921.134, 525982.859 Elevation: 0.424 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7	**TEST ID: LF\CPT05** Page 1 of 2

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG

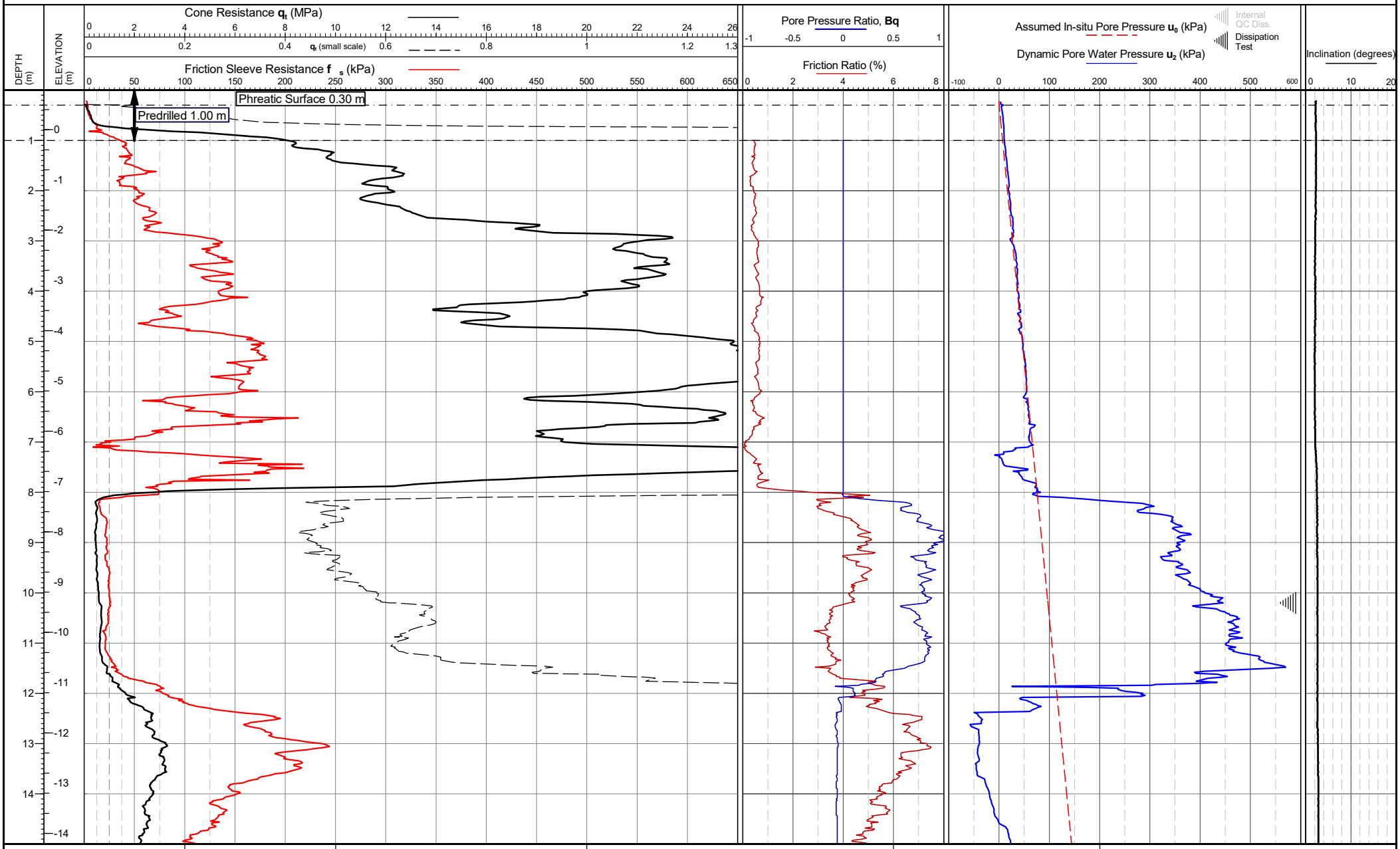


Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 27/05/2021 09:53:54	Zero drift (Pre/post test) q_c (kPa): 0.0 f_s (kPa): -2.9 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): -0.3	Location: North Yorkshire, UK Coordinates: 457921.134, 525982.859 Elevation: 0.424 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7	**TEST ID: LF\CPT05** Page 2 of 2

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 28/05/2021 10:17:10

Zero drift (Pre/post test)
q_c (kPa): -11.4
f_s (kPa): 1.5 ($f_{s\,drift}$ - $q_{c\,drift}$)
U_2 (kPa): 2.9

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

Remarks:
*Phreatic surface origin: Piezocone response in drained soils

Termination Remark: Lateral support

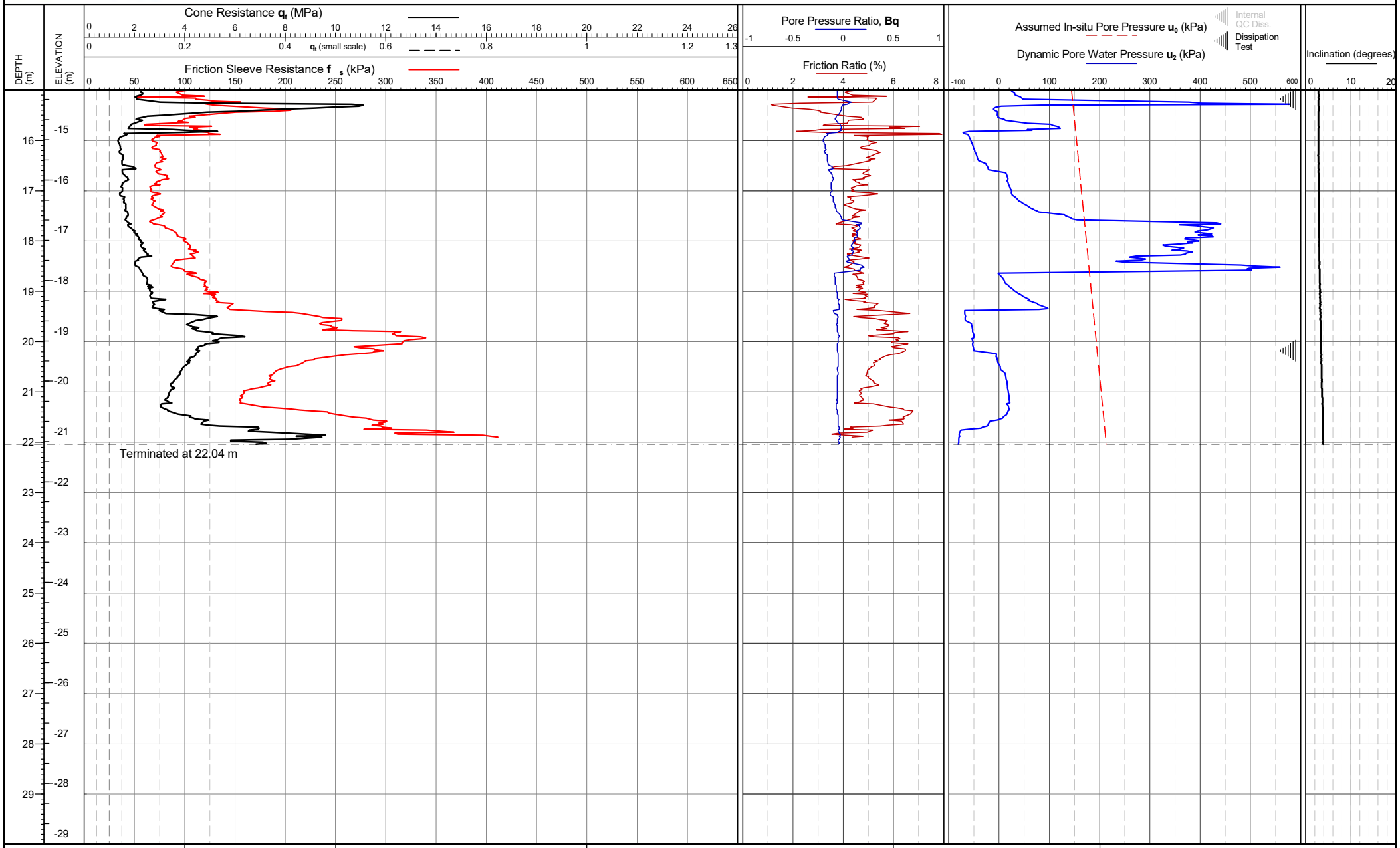
Date of plot: 28-07-21
Lankelma Project Ref: P-107755-7

Checked by: Chris Player

TEST ID: LF\CPT06

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2): Cone ID: S15-CFIP.1992 Operator: Robert Ashcroft Rig Used: UK8 Date of test: 28/05/2021 10:17:10	Zero drift (Pre/post test) q_c (kPa): -11.4 f_s (kPa): 1.5 ($f_{s\,drift}$ - $q_{c\,drift}$) U_2 (kPa): 2.9	Location: North Yorkshire, UK Coordinates: 458001.597, 526043.289 Elevation: 0.786 Coordinate system:	Remarks: *Phreatic surface origin: Piezocone response in drained soils Termination Remark: Lateral support	Date of plot: 28-07-21 Checked by: Chris Player	Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

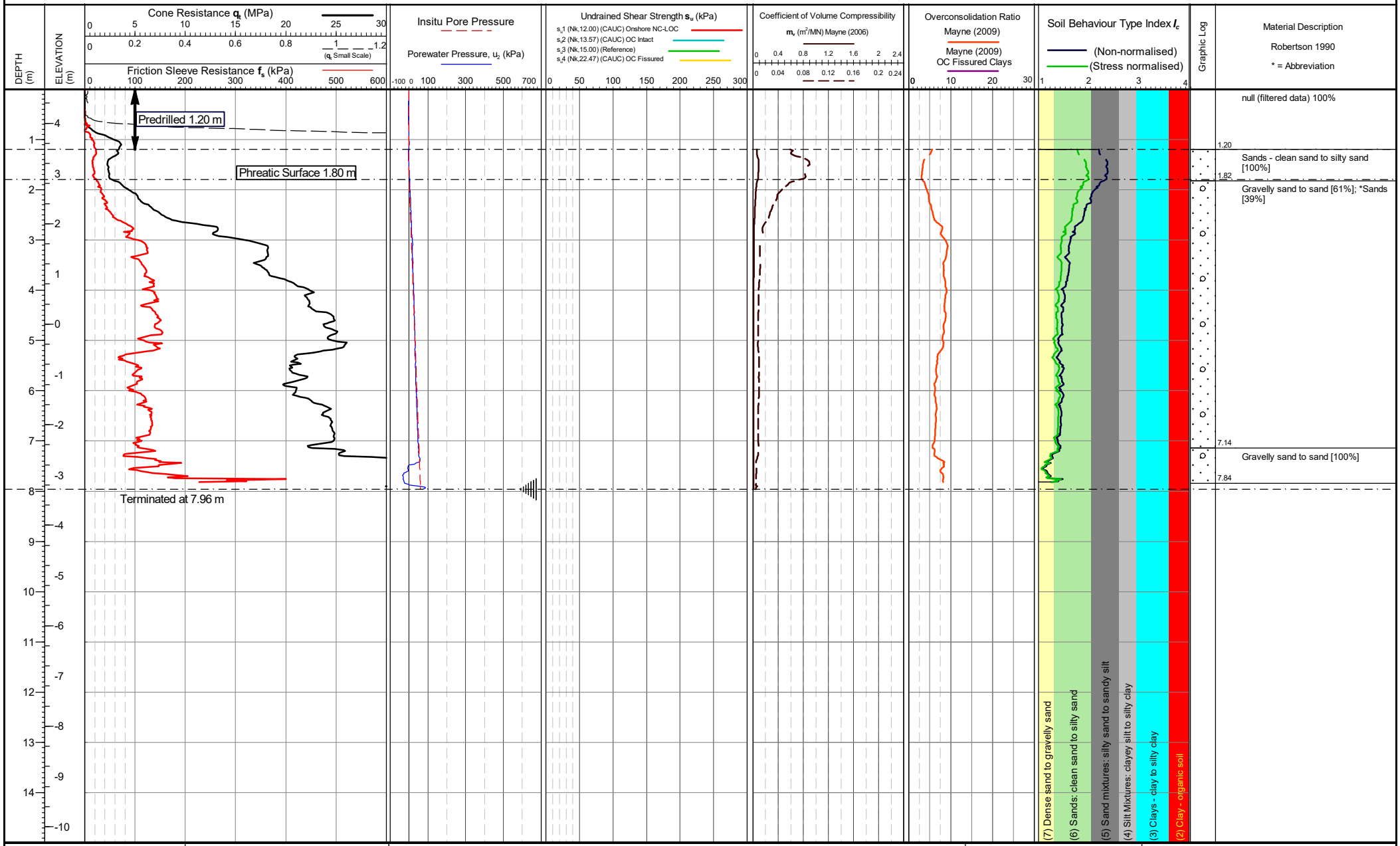
APPENDIX D INTERPRETATION RESULTS - SET 1

UNDRAINED SHEAR STRENGTH
COEFFICIENT OF VOLUME CHANGE
OVERCONSOLIDATION RATIO
SOIL BEHAVIOUR TYPE (SBT) DESCRIPTIONS

Plots are provided for all locations

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 25/05/2021 10:15:59

Location: North Yorkshire, UK
Coordinates: 457527.734, 525851.478
Elevation: 4.676
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

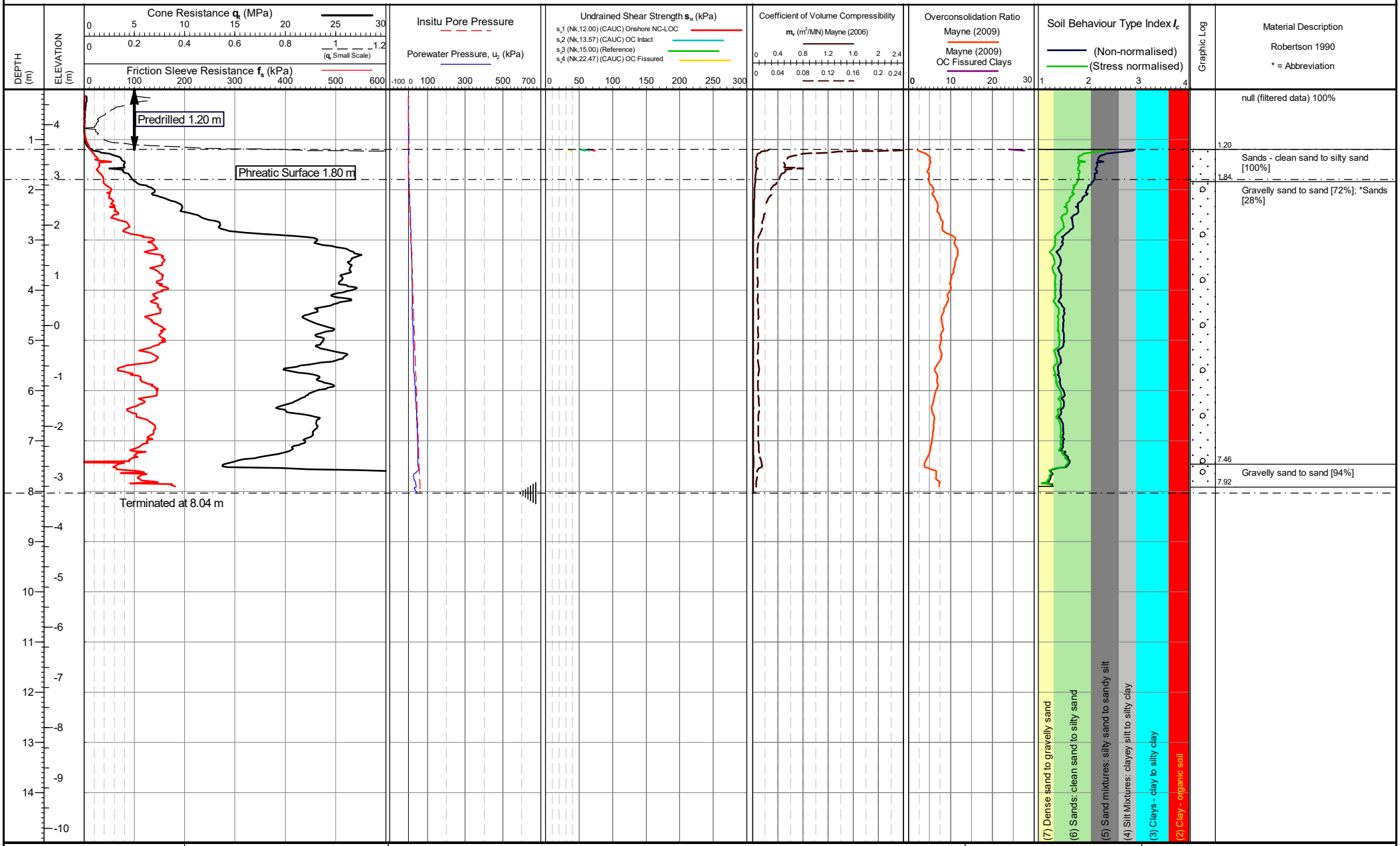
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 25/05/2021 11:35:03

Location: North Yorkshire, UK
Coordinates: 457528.447, 525852.477
Elevation: 4.705
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

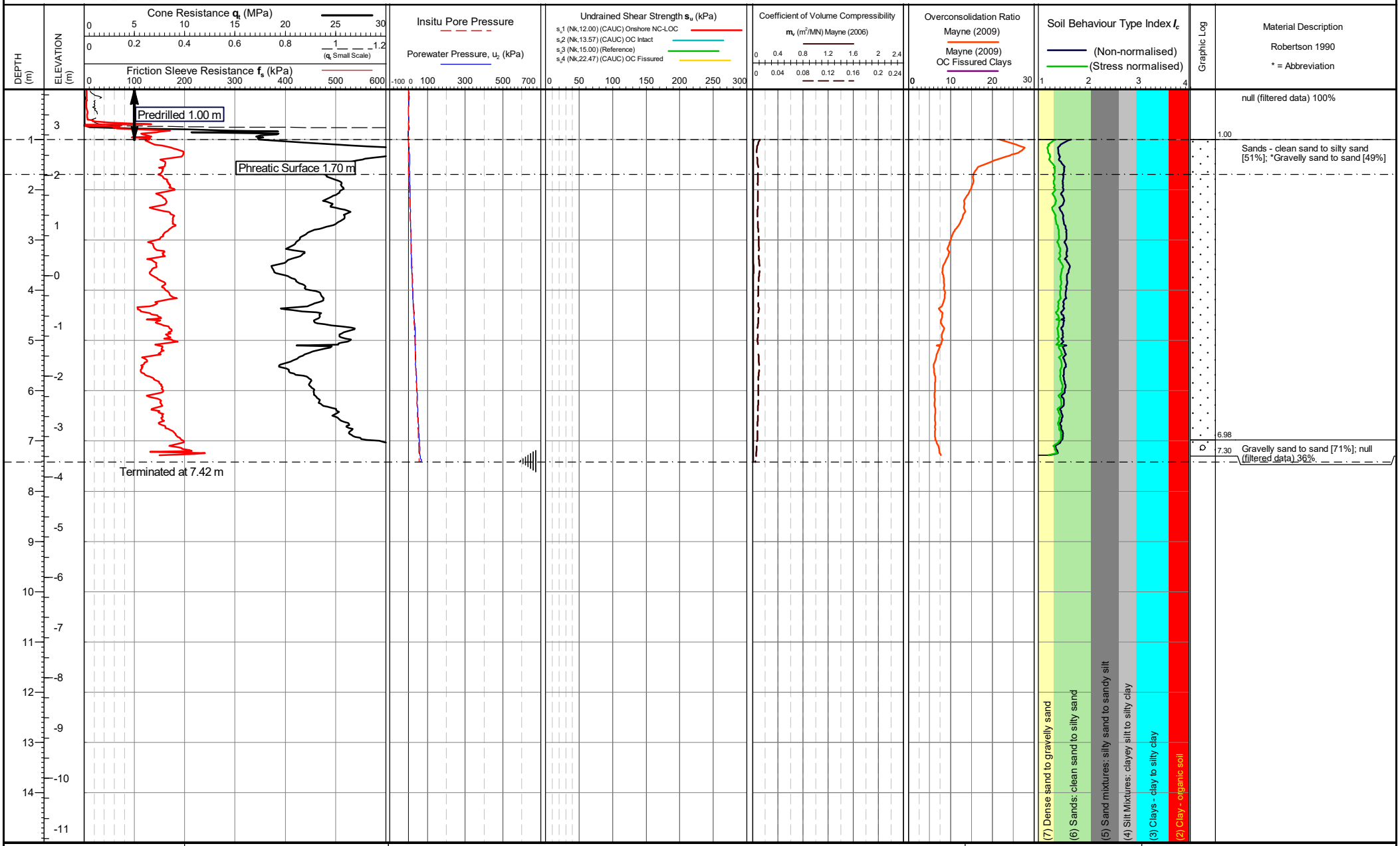
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01A

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 25/05/2021 13:52:49

Location: North Yorkshire, UK
Coordinates: 457548.396, 525875.571
Elevation: 3.712
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

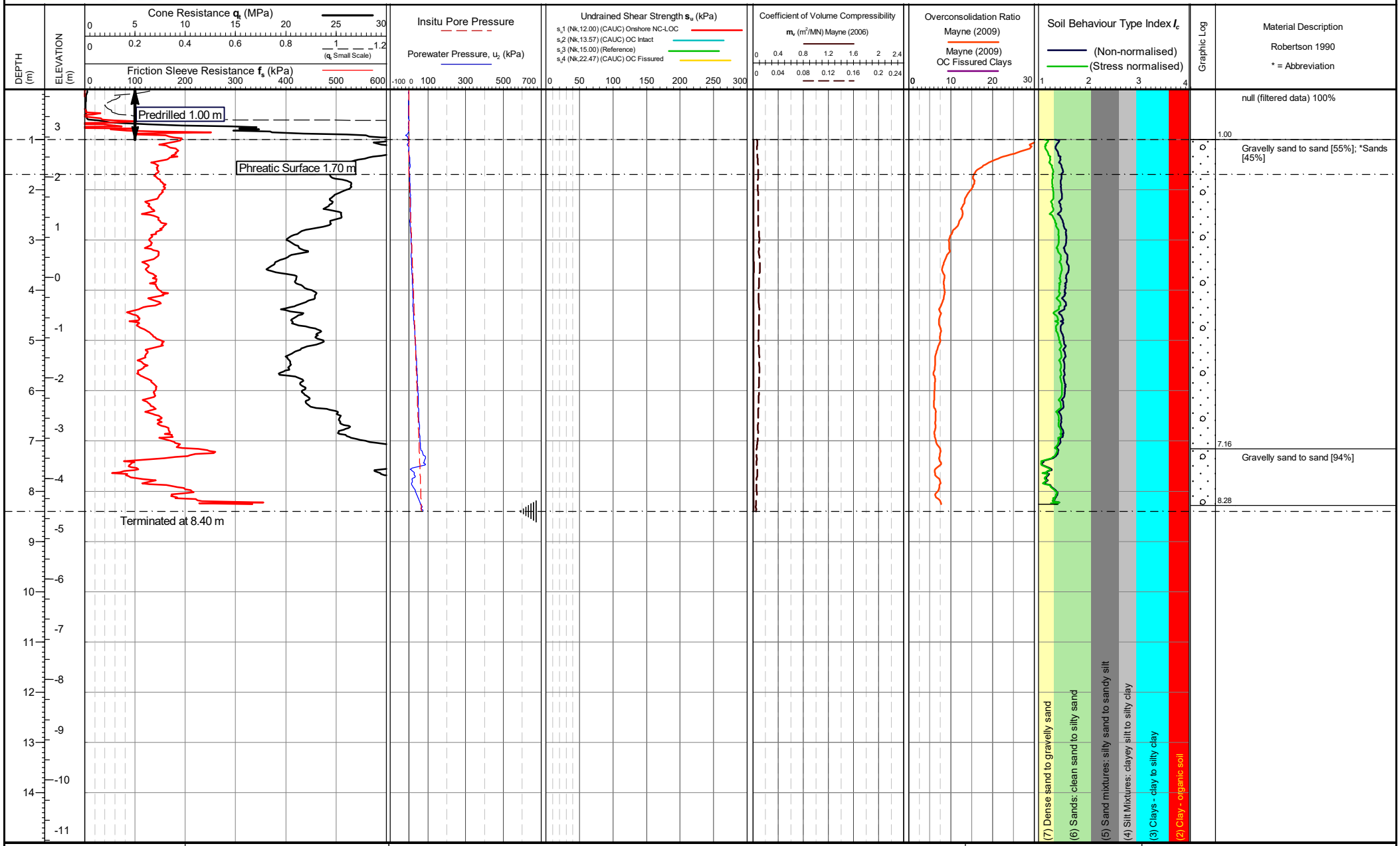
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 25/05/2021 15:13:23

Location: North Yorkshire, UK
Coordinates: 457549.703, 525875.634
Elevation: 3.747
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

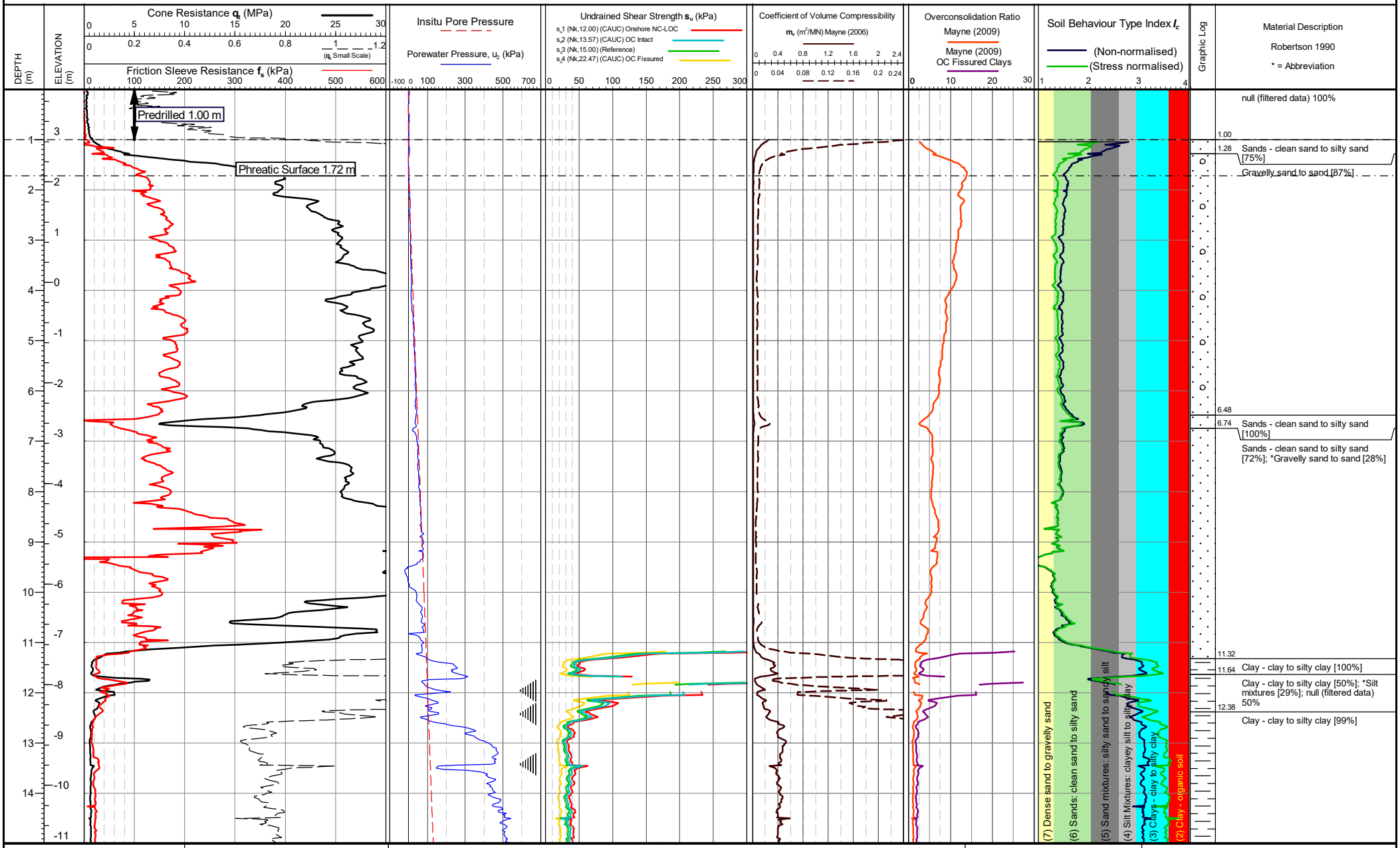
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02A

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

Remarks: *Phreatic surface origin: Average measured piezometric depth at this location, approx. +- 0.4 mbgl

Termination Remark:
Target depth

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

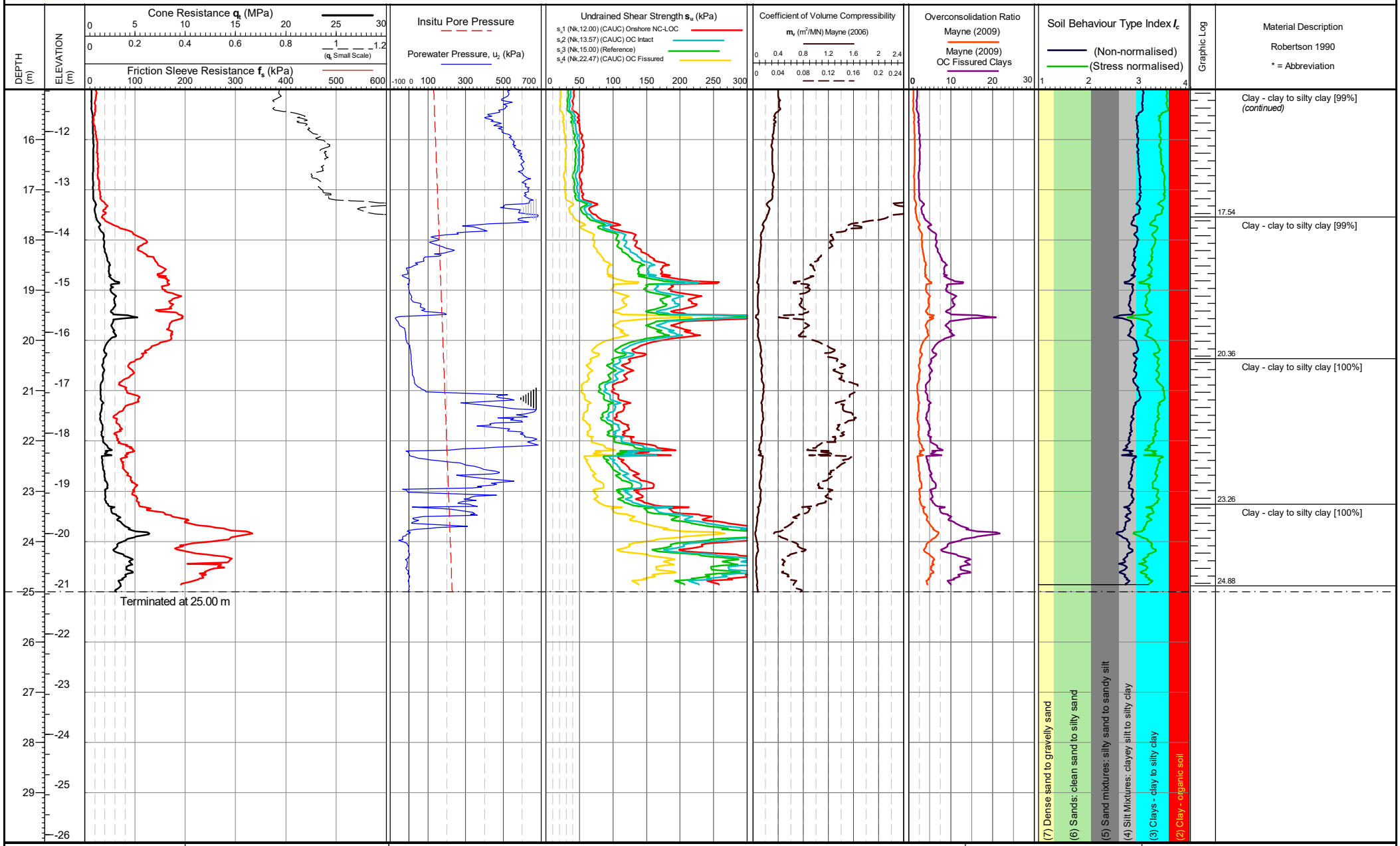
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

Remarks: *Phreatic surface origin: Average measured piezometric depth at this location, approx. +- 0.4 mbgl

Termination Remark:
Target depth

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

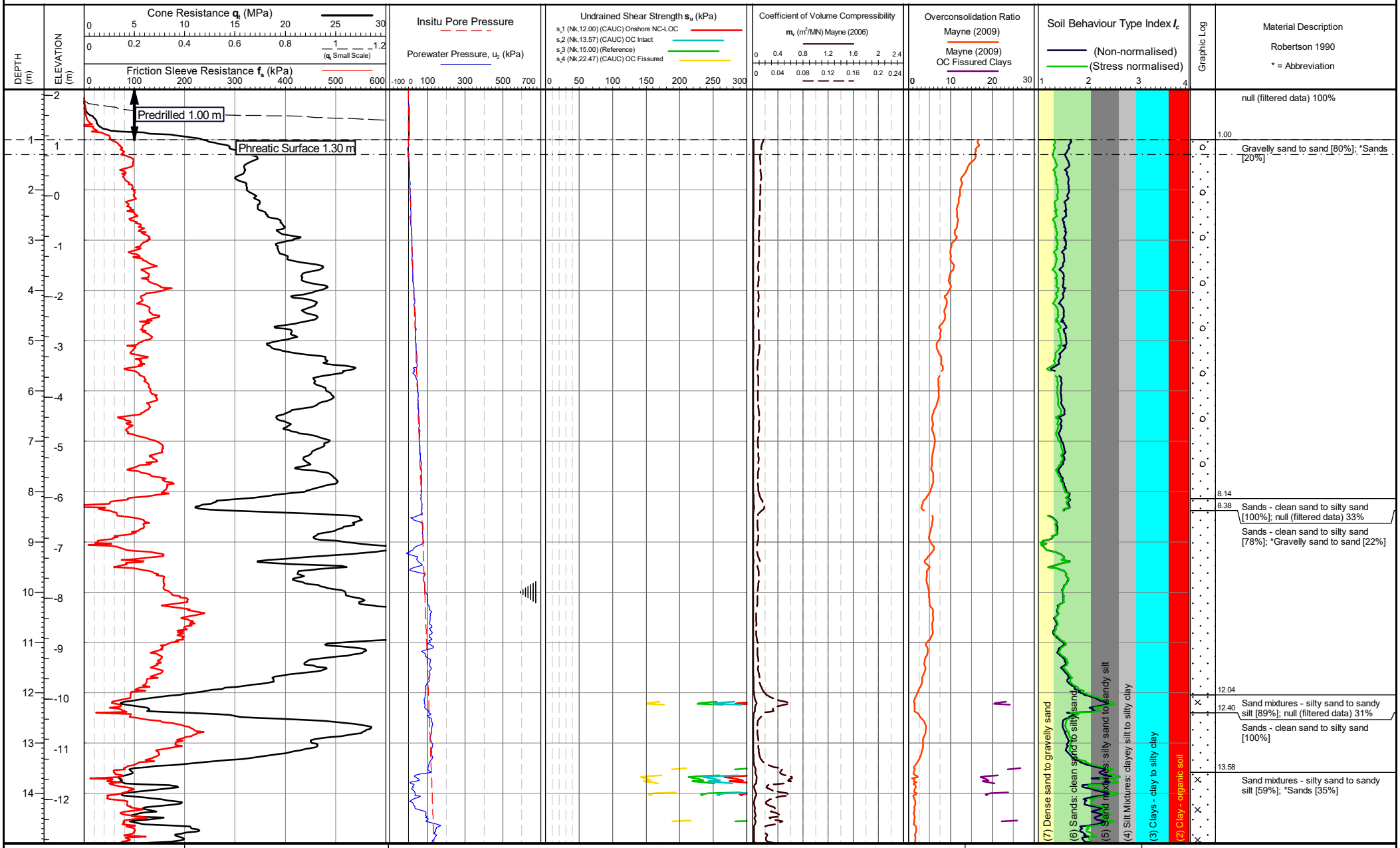
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

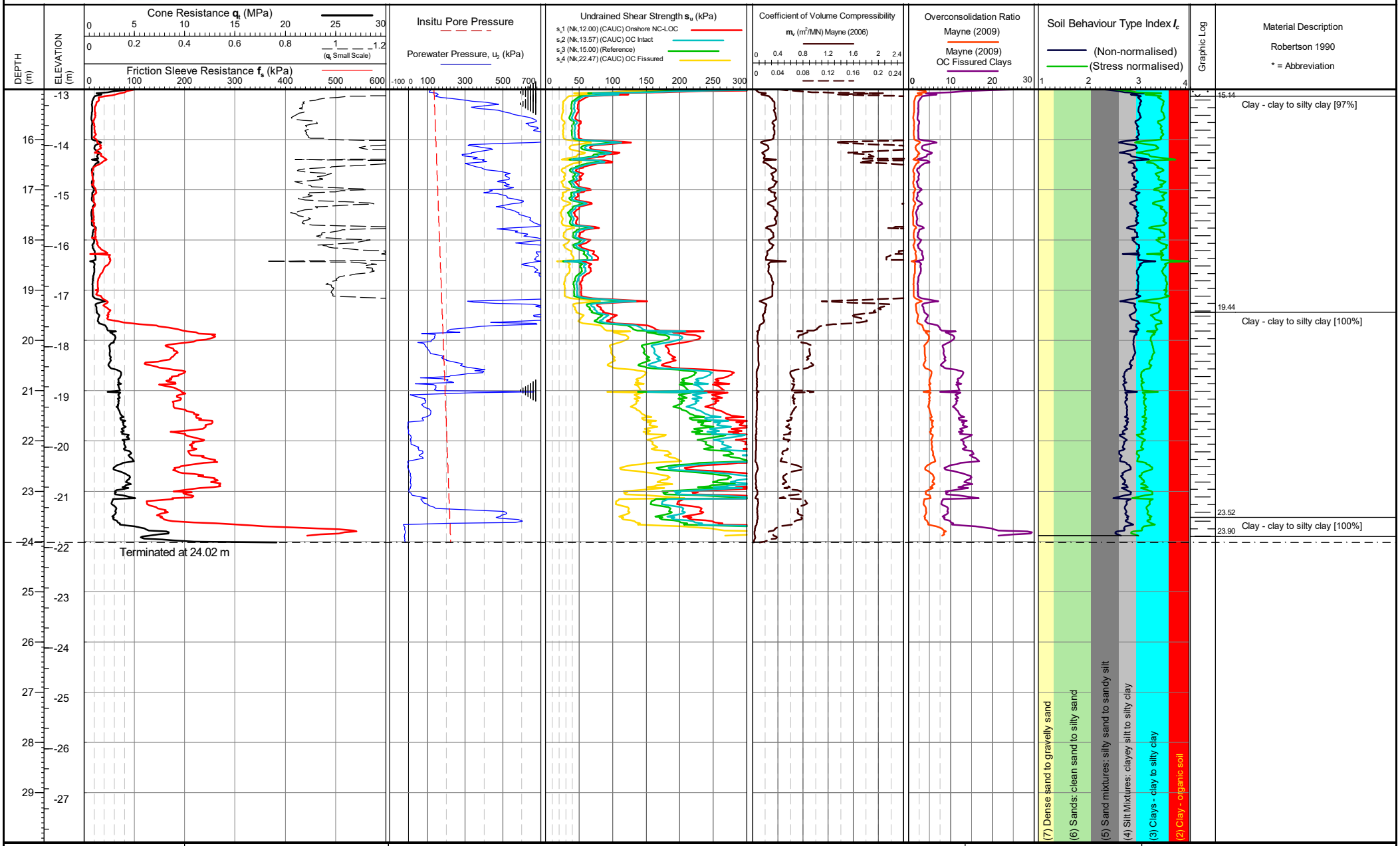
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

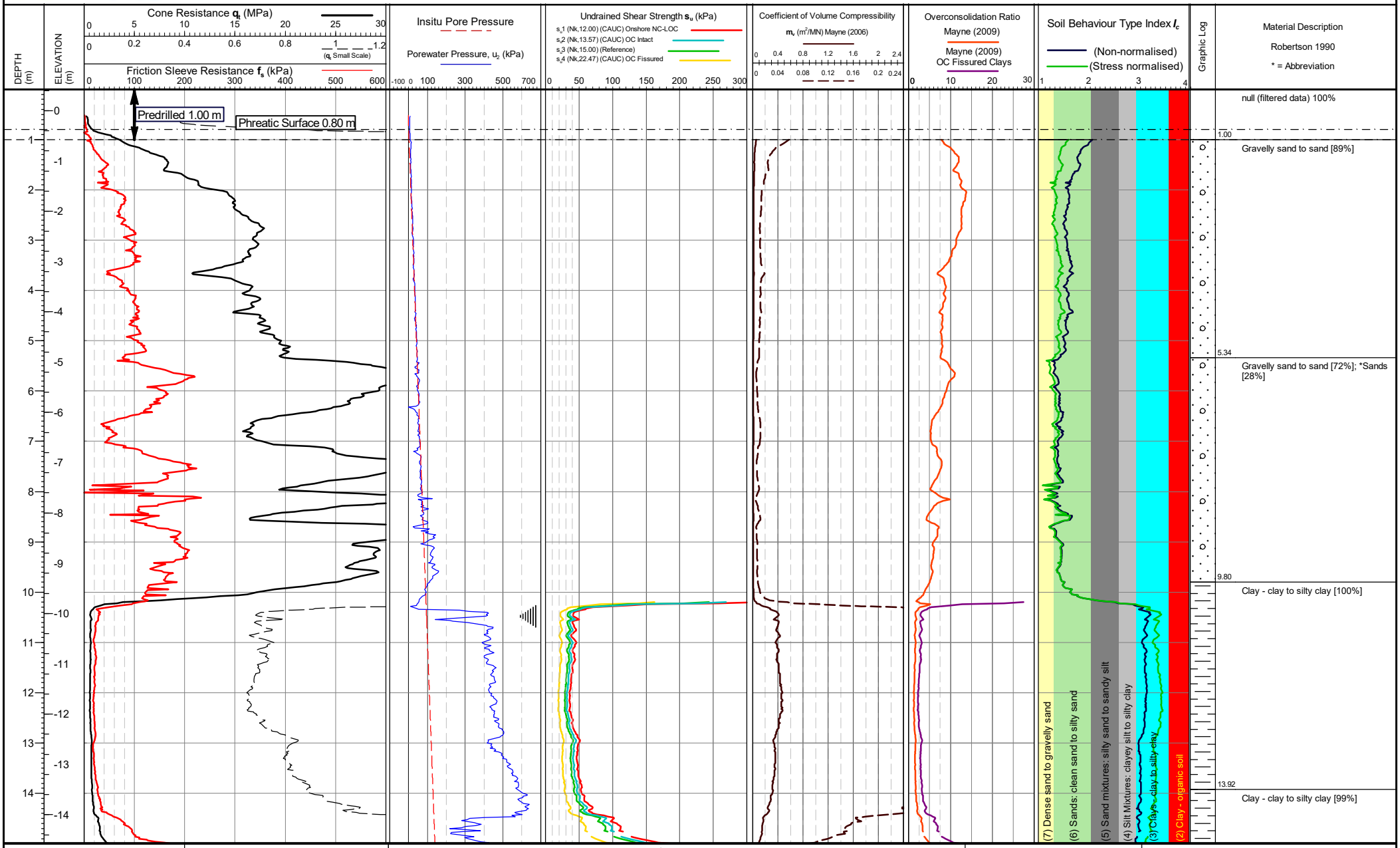
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

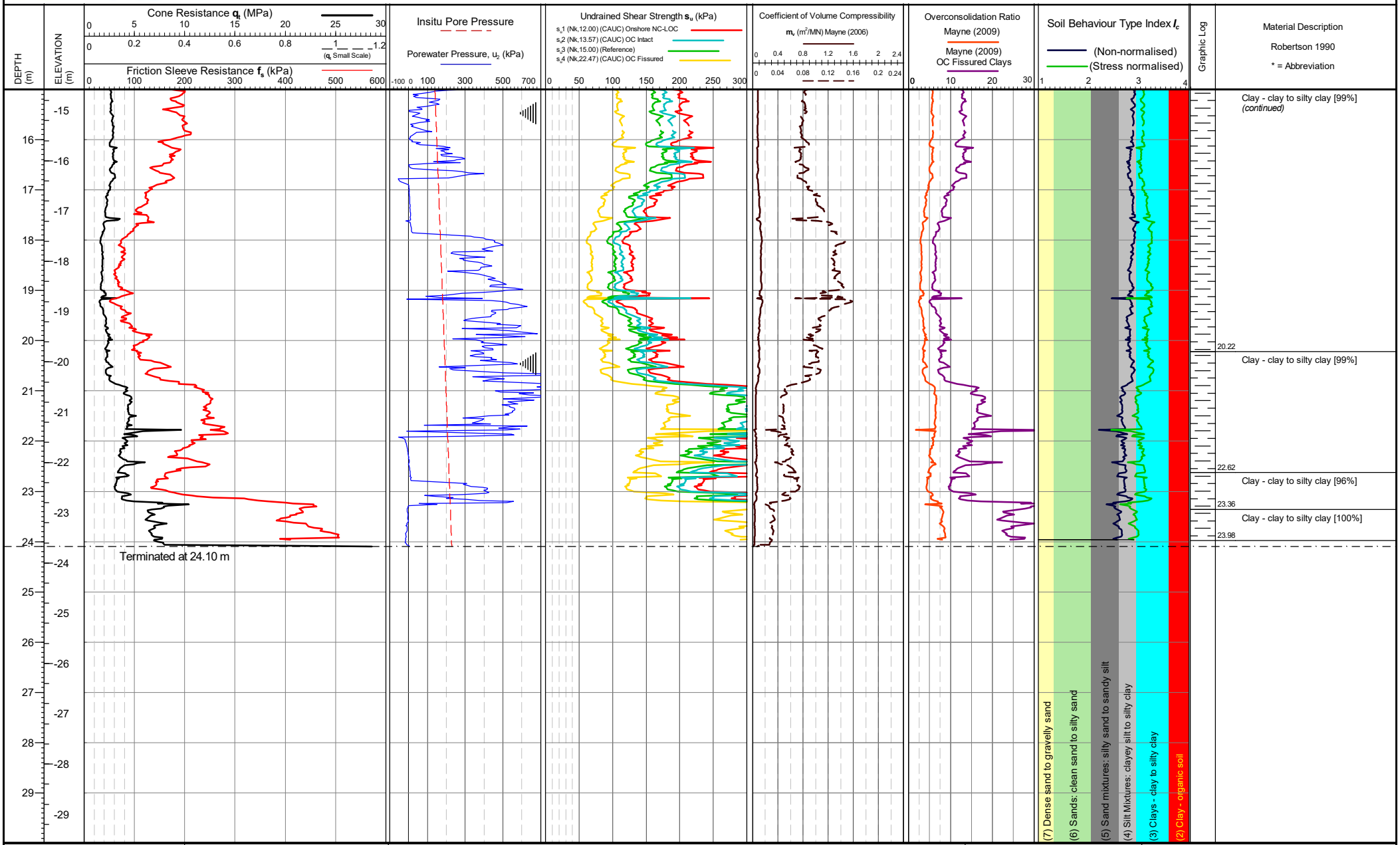
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

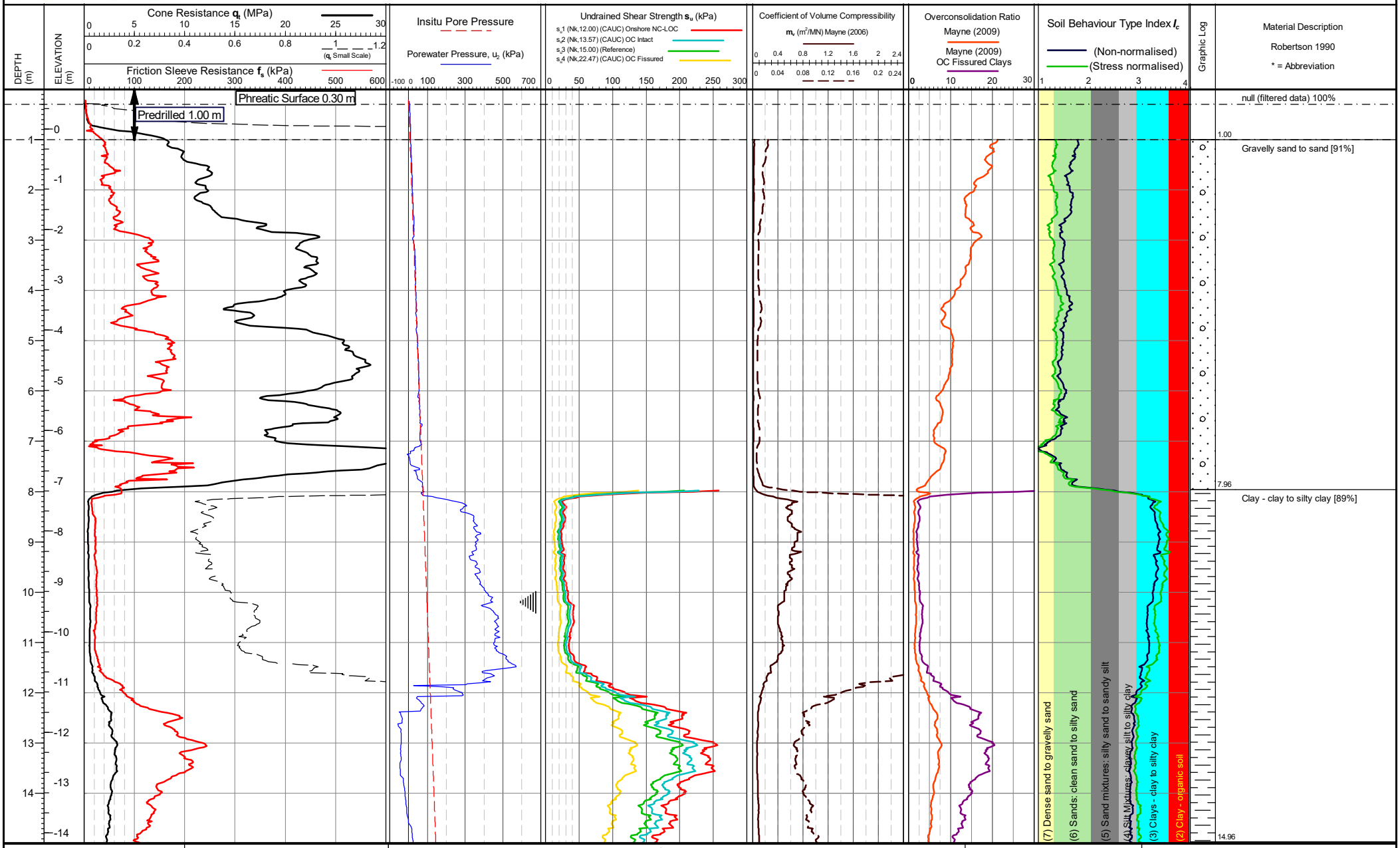
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

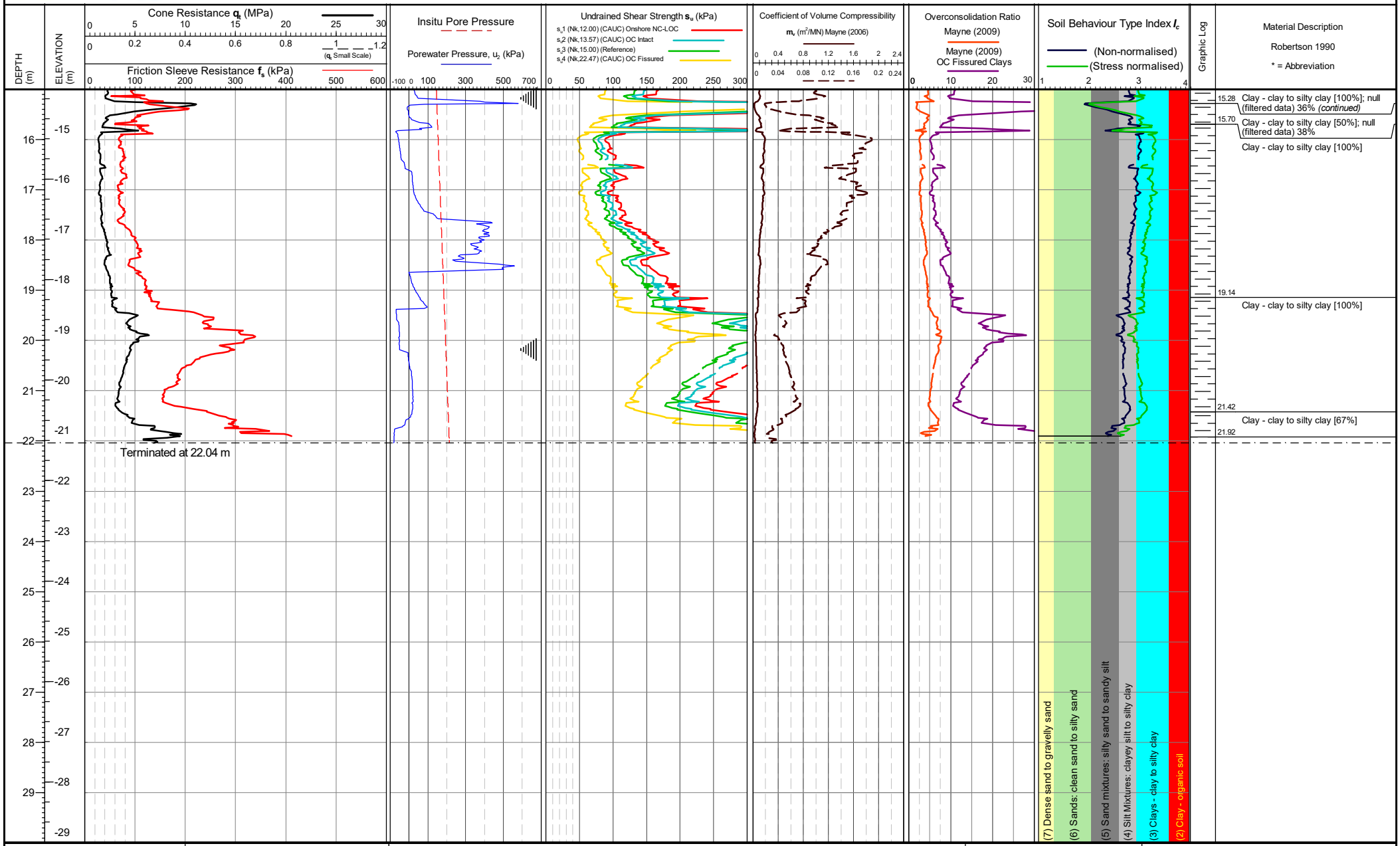
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Graphic Log

Material Description

Robertson 1990

* = Abbreviation

15.28 Clay - clay to silty clay [100%]; null (filtered data) 36% *(continued)*

15.70 Clay - clay to silty clay [50%]; null (filtered data) 38%

Clay - clay to silty clay [100%]

19.14 Clay - clay to silty clay [100%]

21.42 Clay - clay to silty clay [67%]

21.92

Cone area (mm2):
ConeID: S15-CFIP.1992
Operator: Robert Ashcroft
Rig Used: UK8
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

Remarks: *Phreatic surface origin: Piezocone response in drained soils

Termination Remark:
Lateral support

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21

Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

APPENDIX E INTERPRETATION RESULTS - SET 2

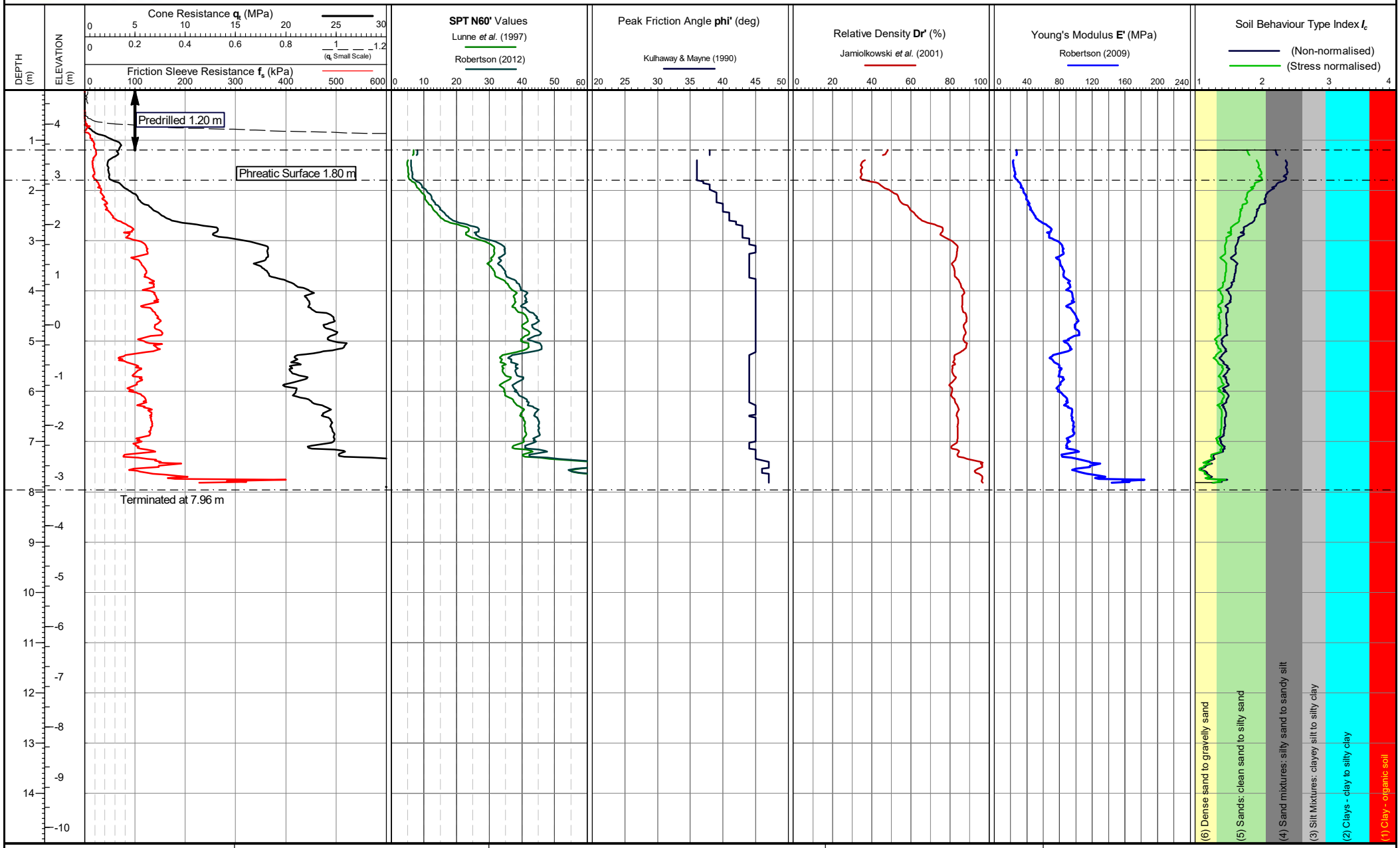
EQUIVALENT SPT N60
PEAK FRICTION ANGLE
RELATIVE DENSITY
YOUNG'S MODULUS

Plots are provided for all locations

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 10:15:59

Location: North Yorkshire, UK
Coordinates: 457527.734, 525851.478
Elevation: 4.676
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

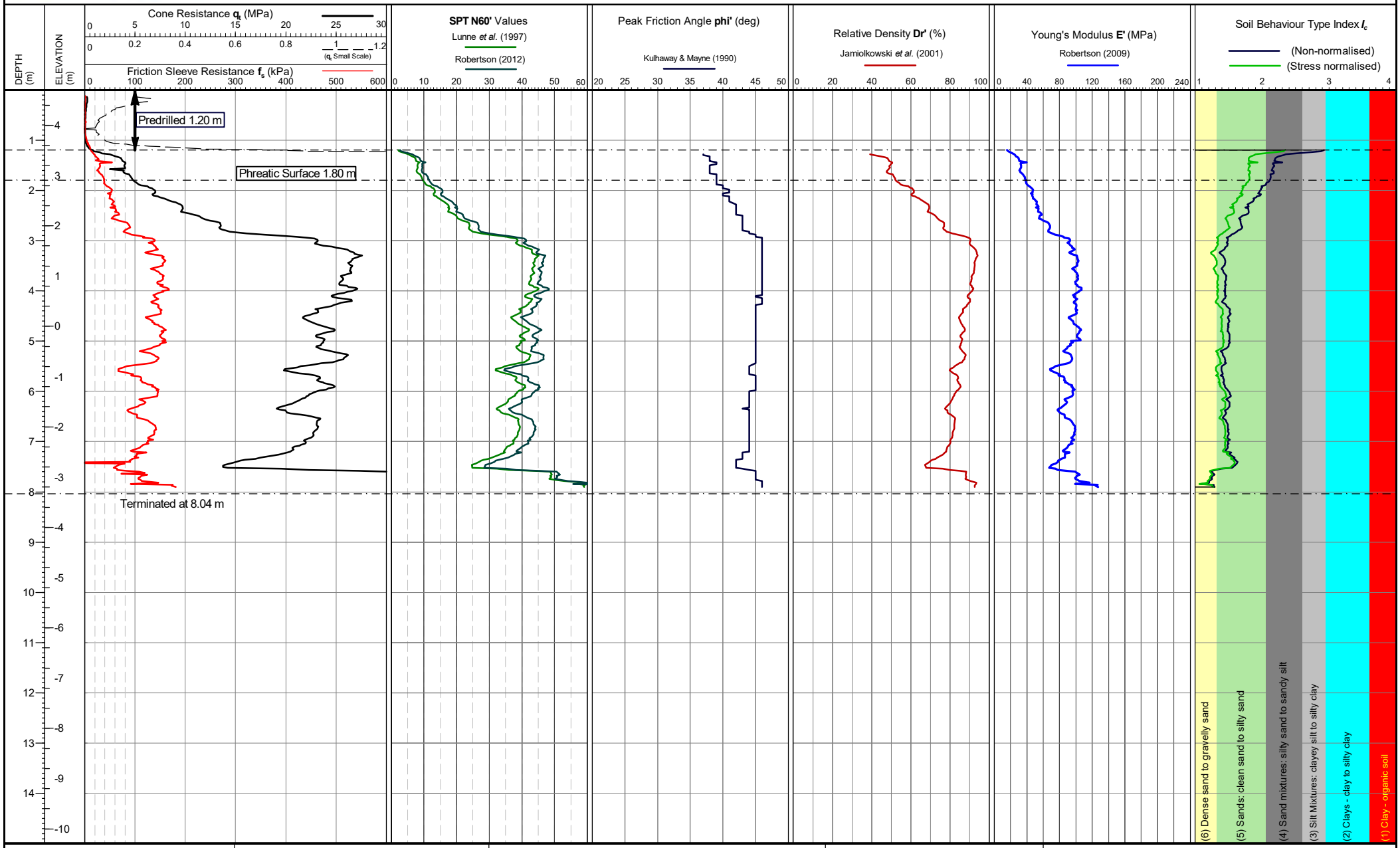
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 11:35:03

Location: North Yorkshire, UK
Coordinates: 457528.447, 525852.477
Elevation: 4.705
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

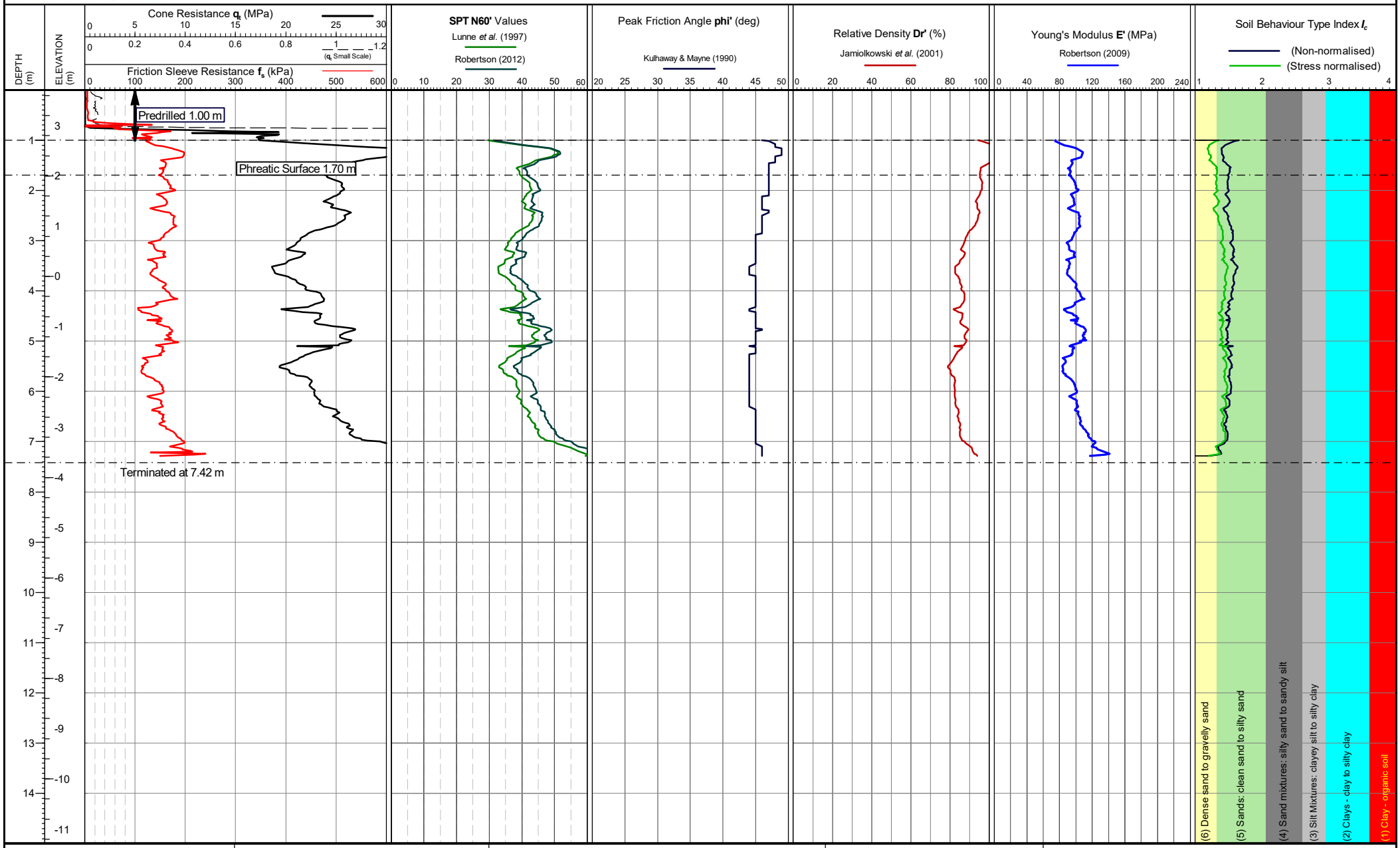
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01A

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 13:52:49

Location: North Yorkshire, UK
Coordinates: 457548.396, 525875.571
Elevation: 3.712
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

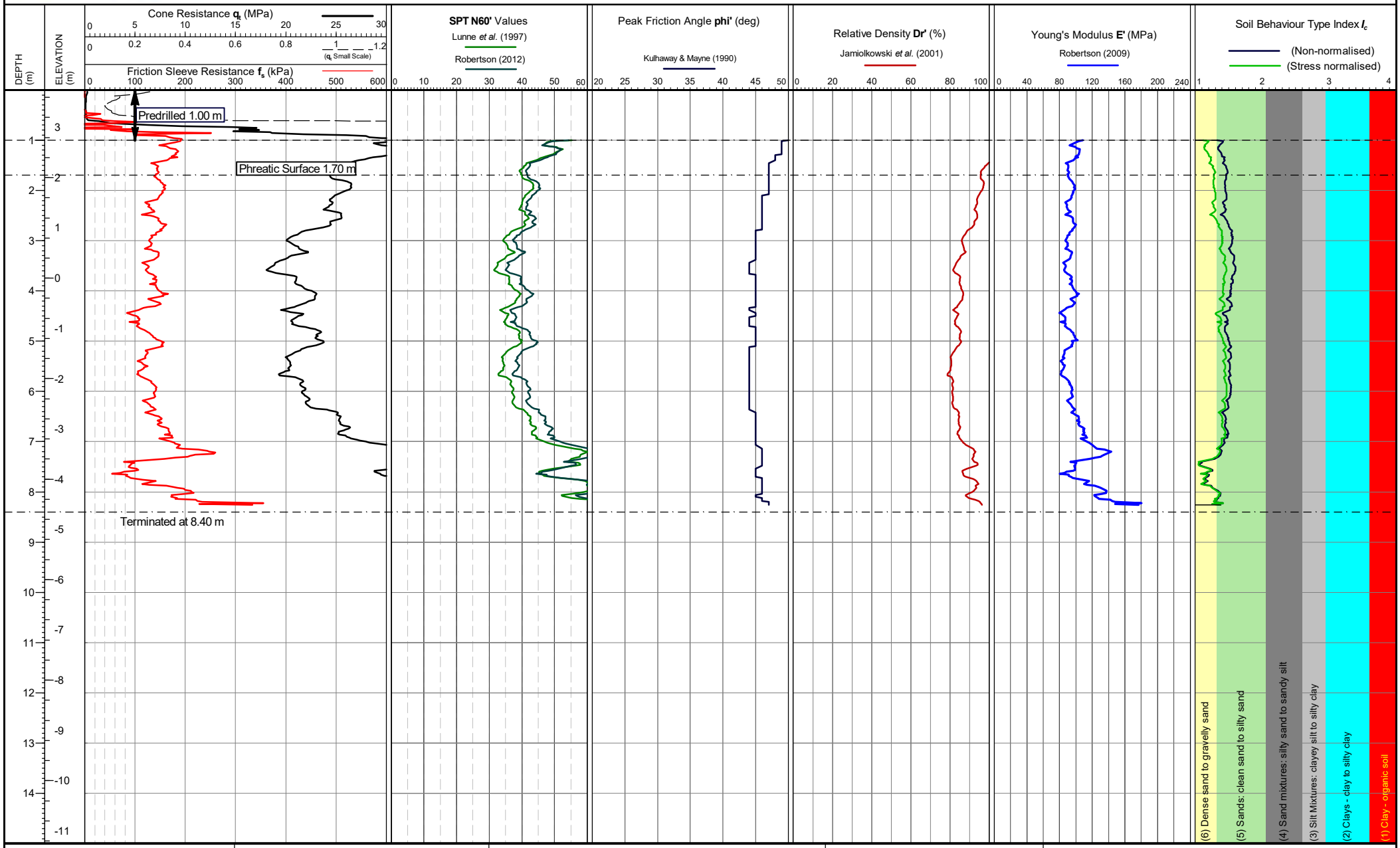
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 15:13:23

Location: North Yorkshire, UK
Coordinates: 457549.703, 525875.634
Elevation: 3.747
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

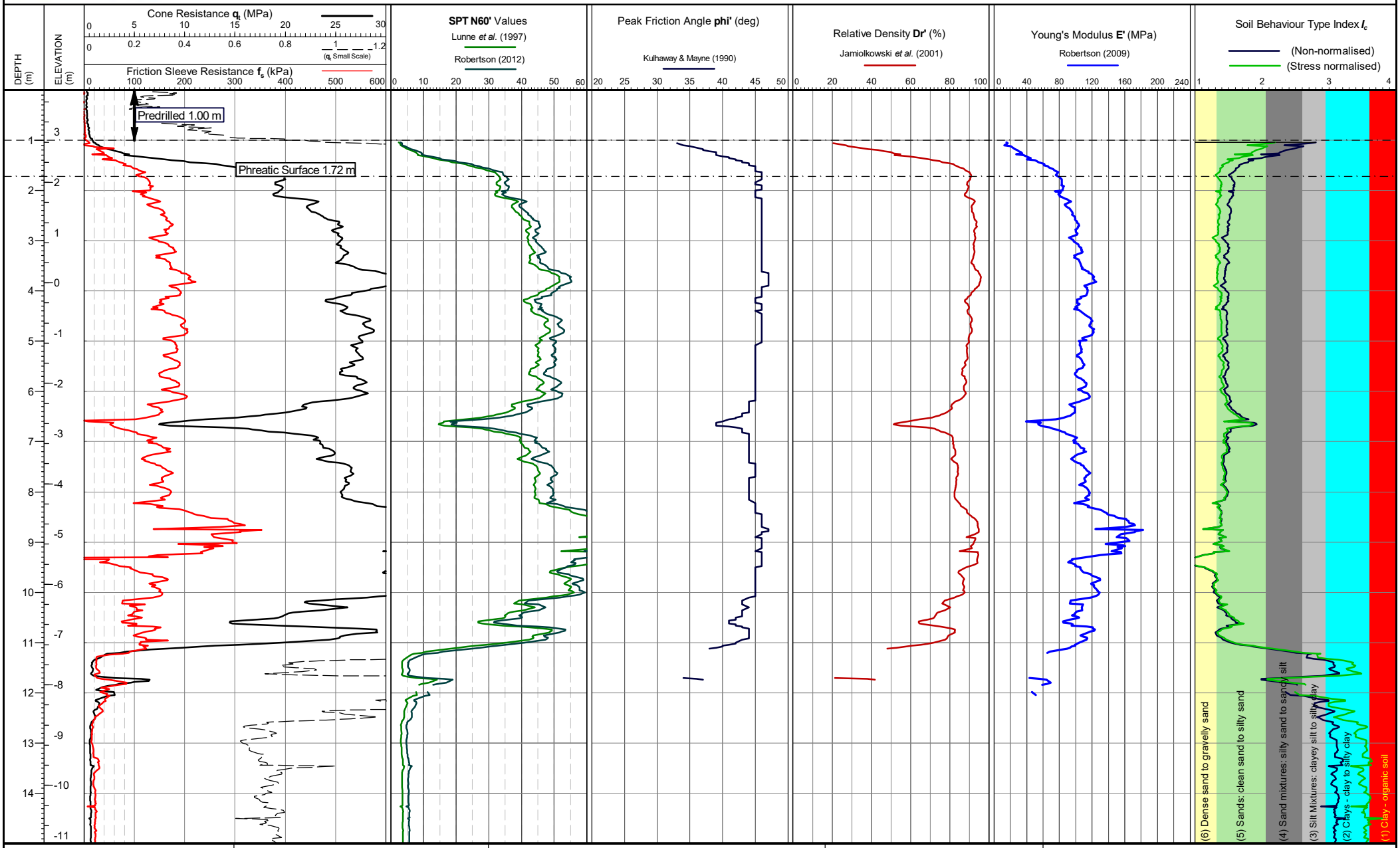
Date of plot: 28-07-21
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02A

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

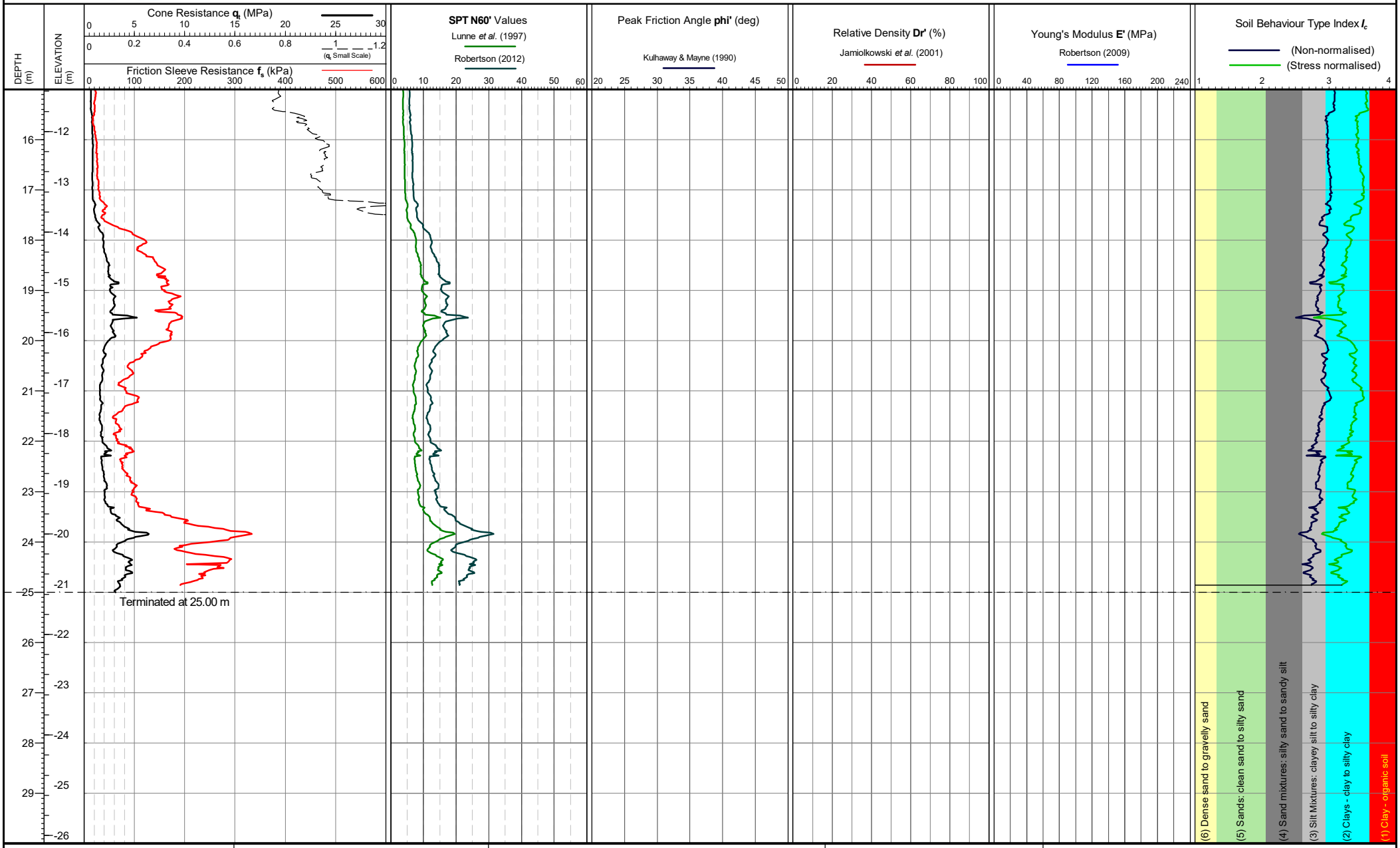
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

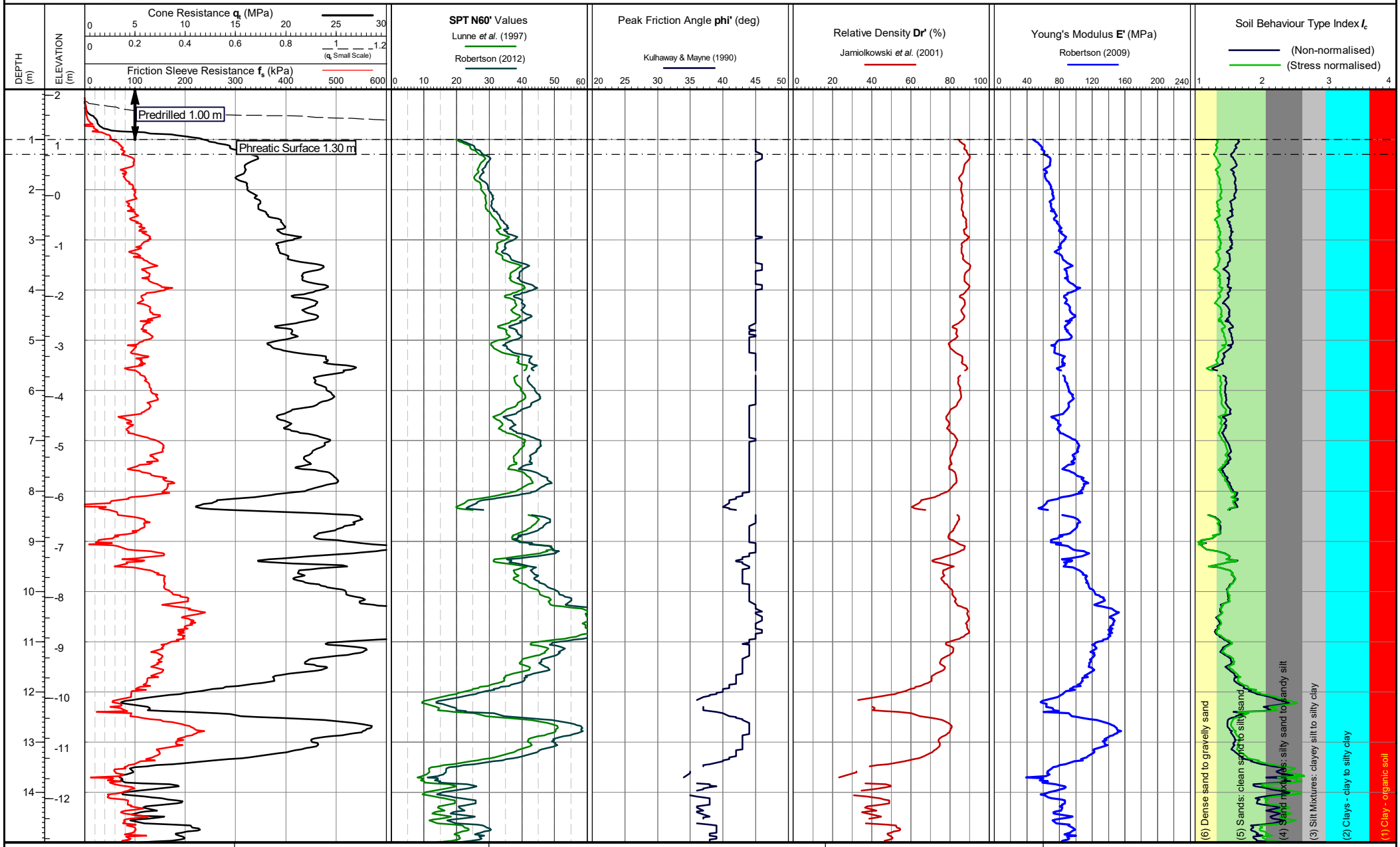
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

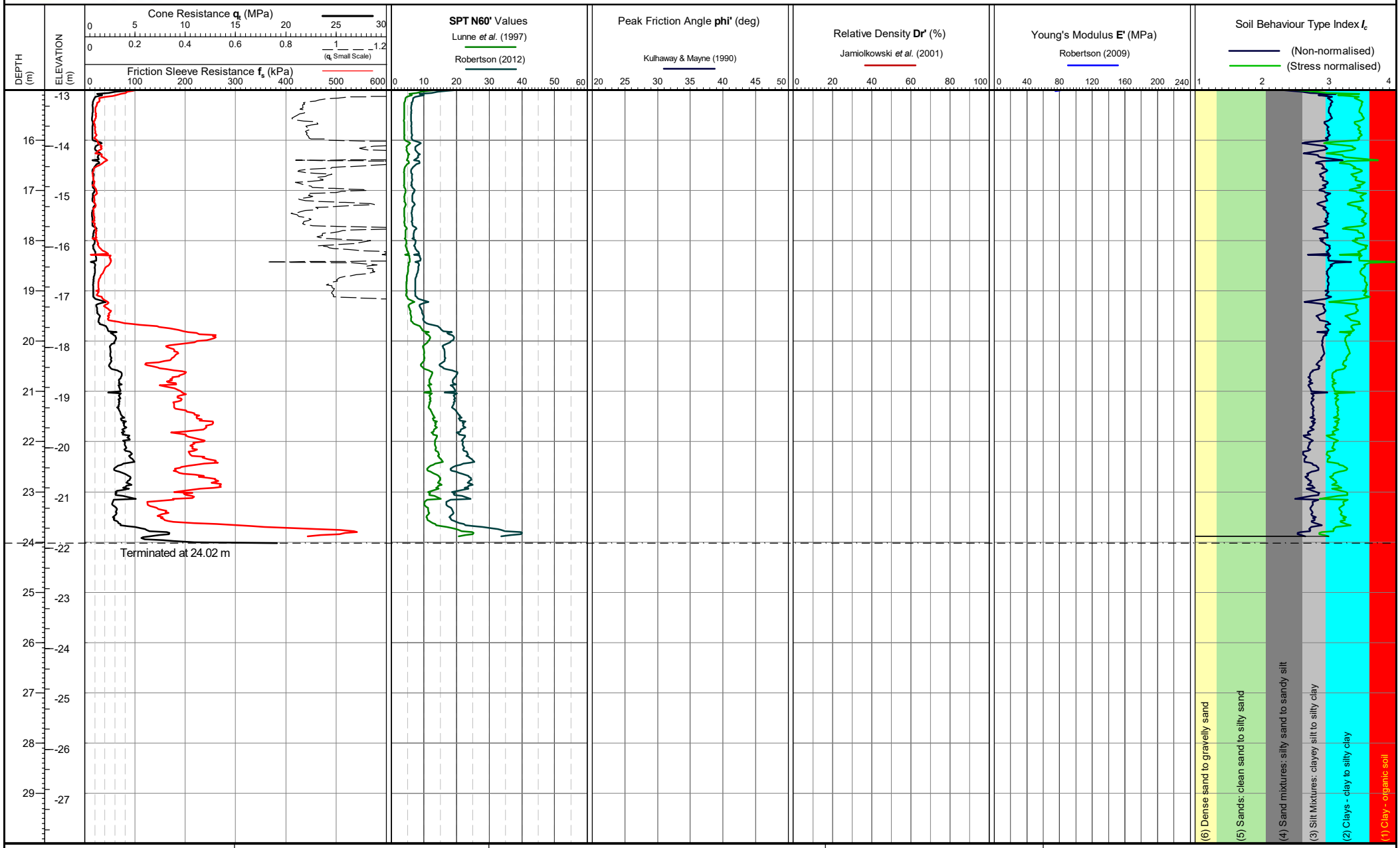
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

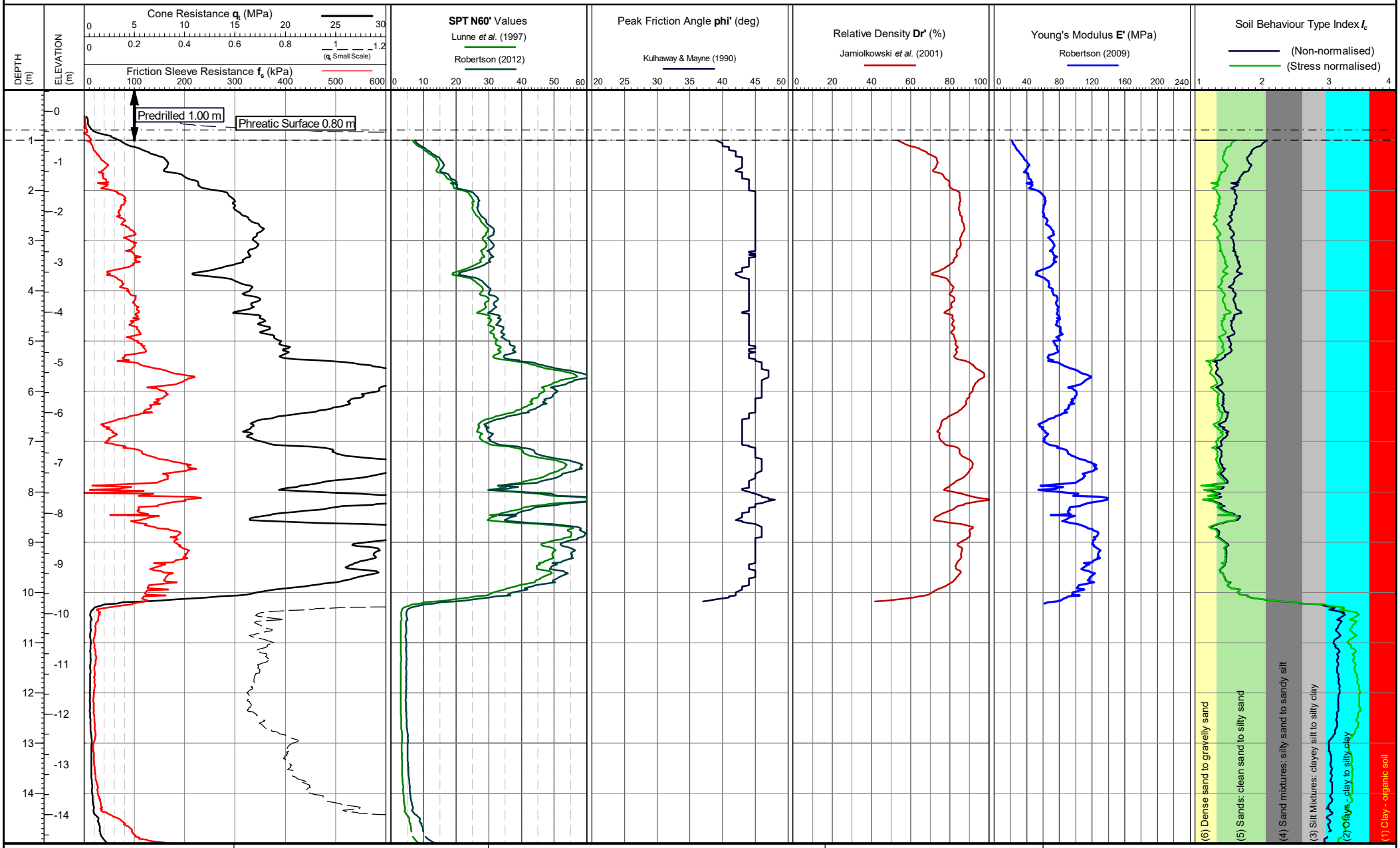
Date of plot: 28-07-21
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

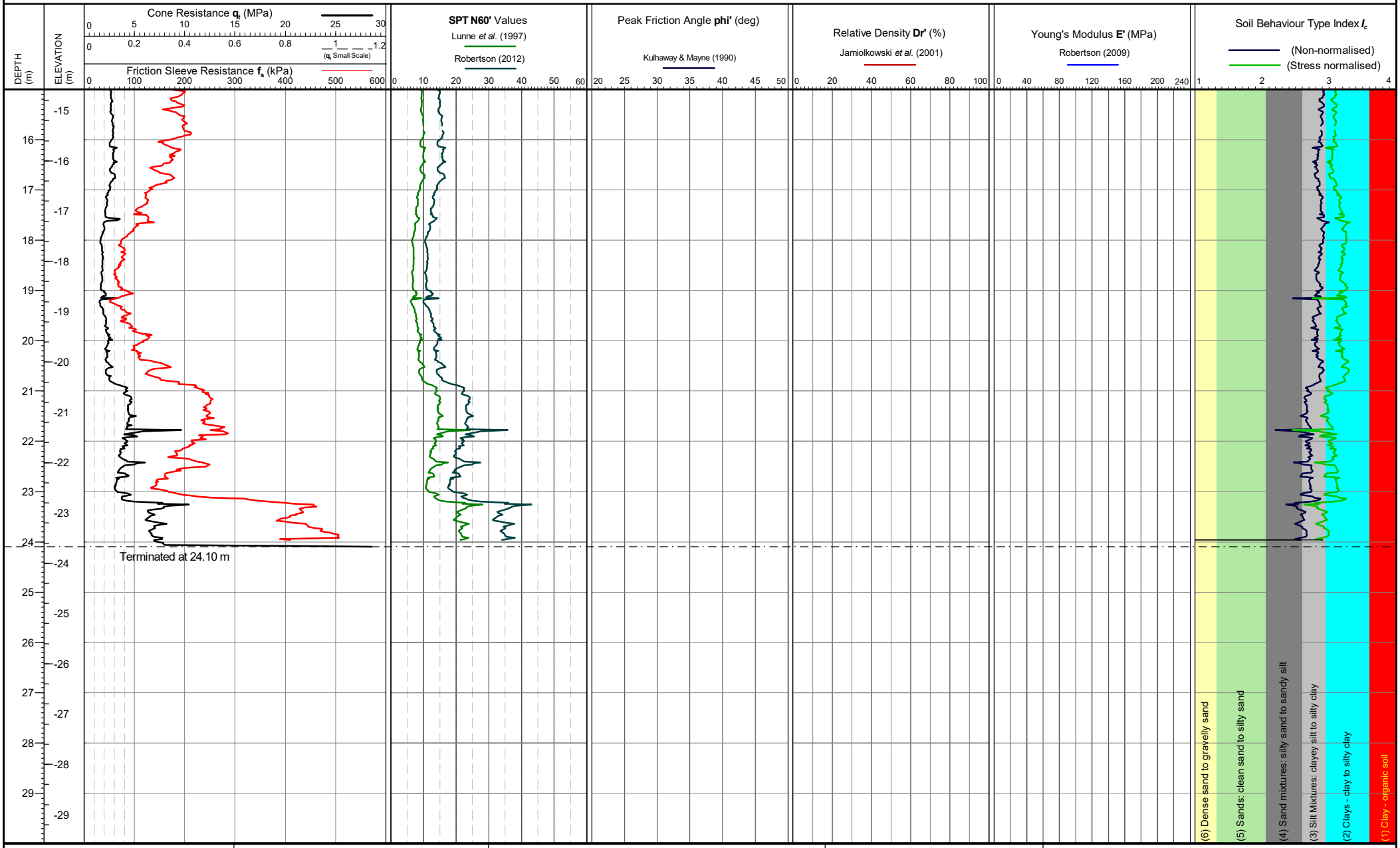
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

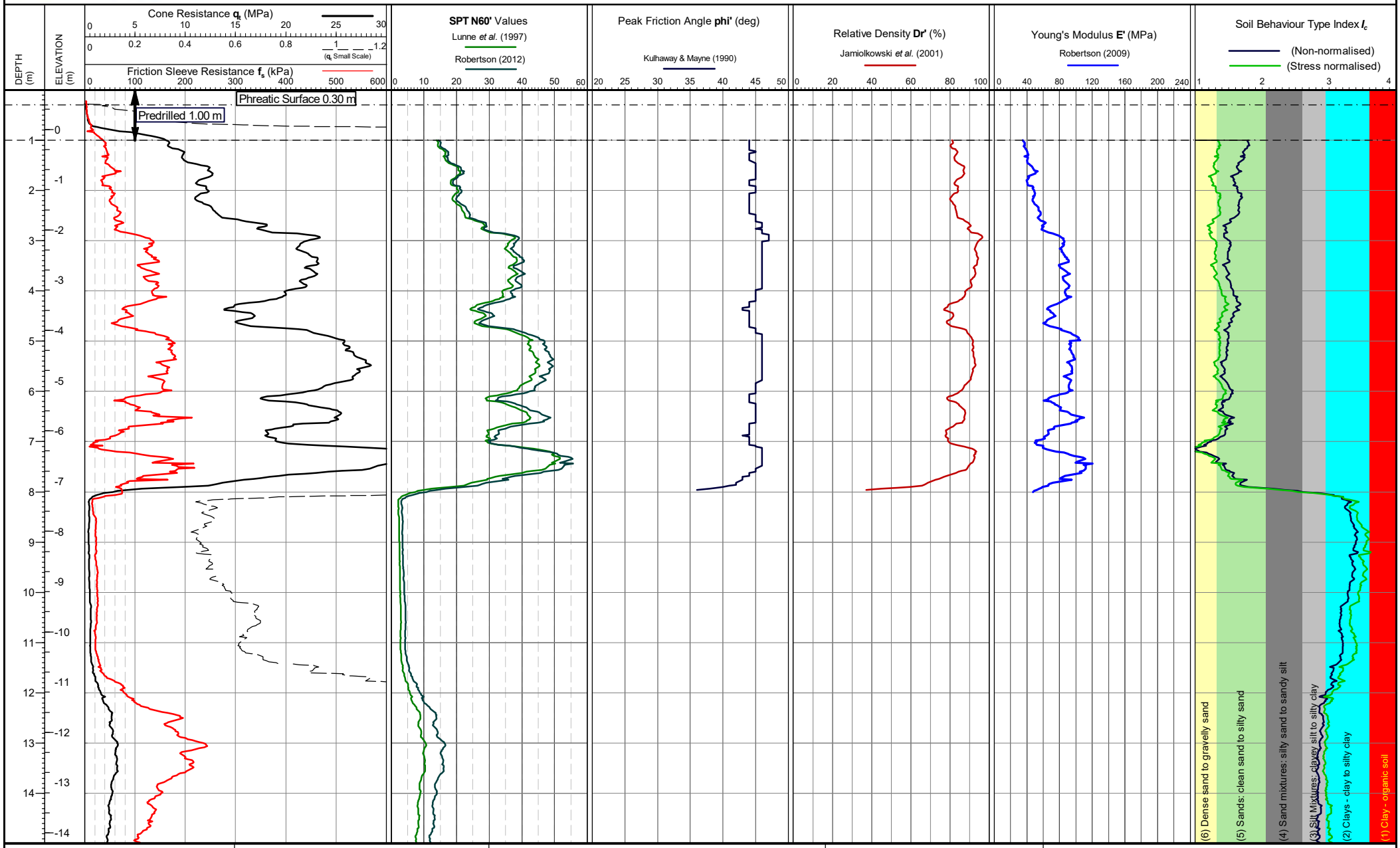
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

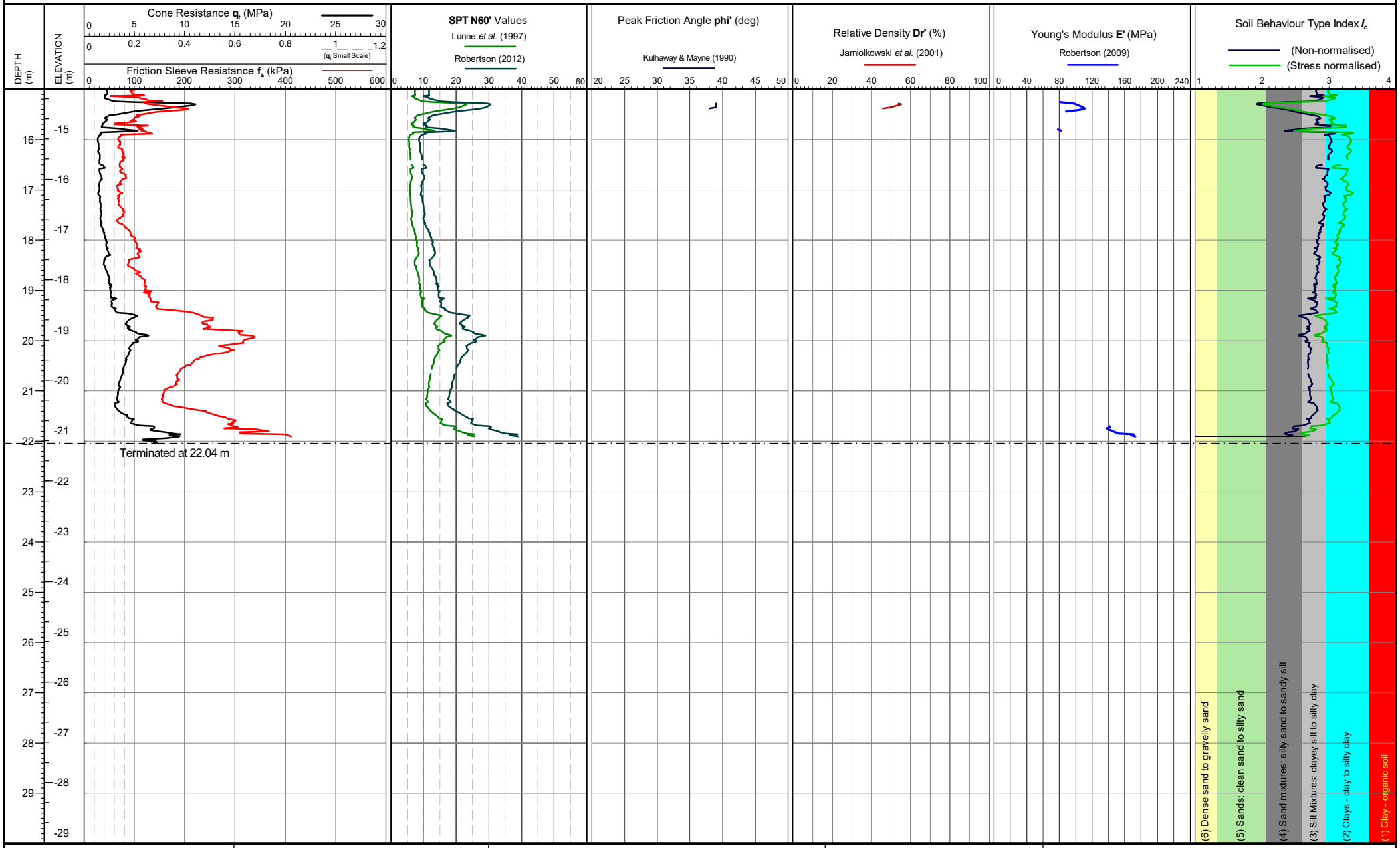
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-07-21
Checked by: Chris Player

Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

APPENDIX F INTERPRETED DISSIPATION TEST RESULTS

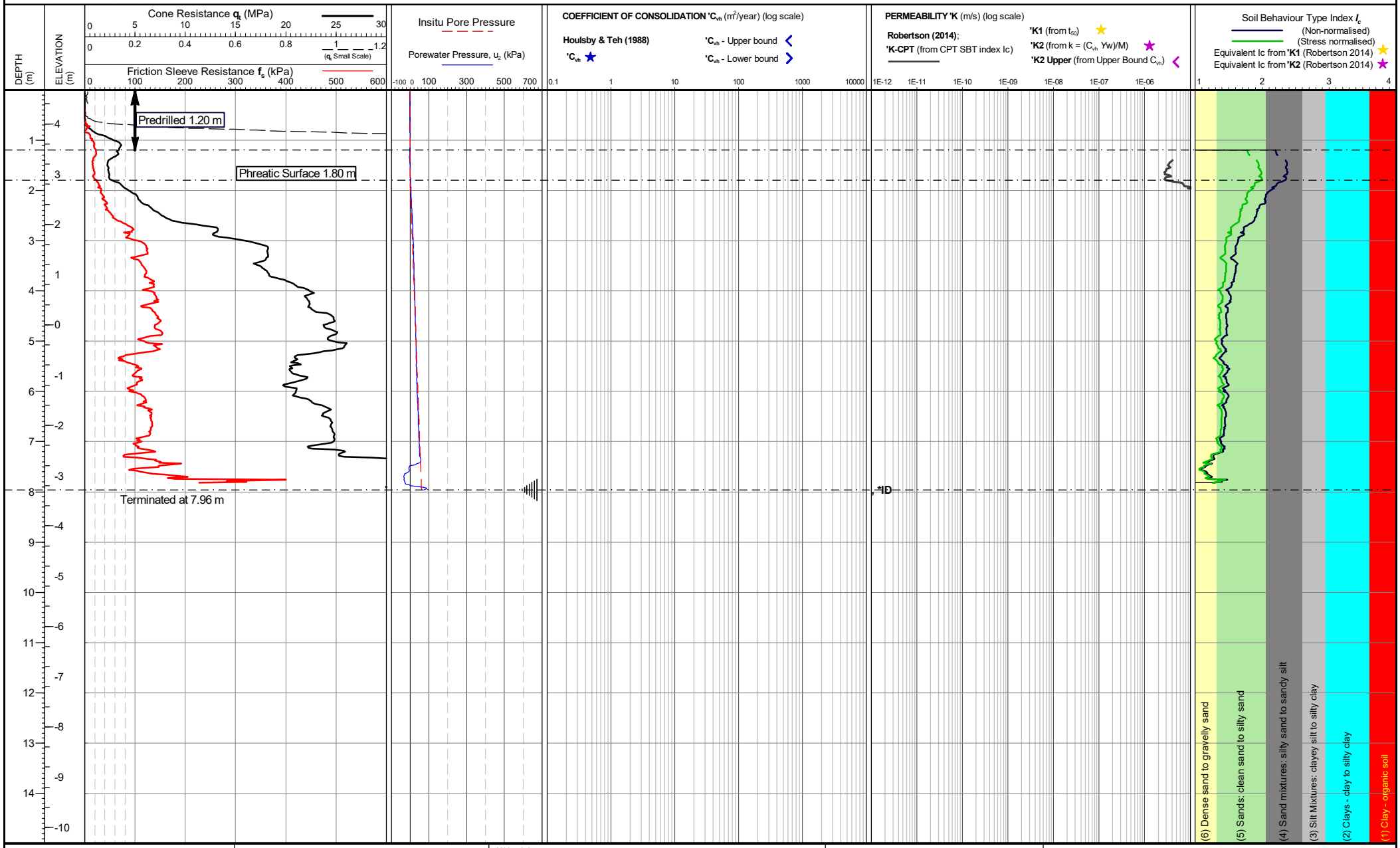
PERMEABILITY
COEFFICIENT OF CONSOLIDATION
EQUIVALENT SBT INDEX (Ic) FROM PERMEABILITY

Plots are provided for all locations. Interpreted values are only provided for specified dissipation tests or QC dissipation data deemed to be suitable for interpretation.

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 10:15:59

Location: North Yorkshire, UK
Coordinates: 457527.734, 525851.478
Elevation: 4.676
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

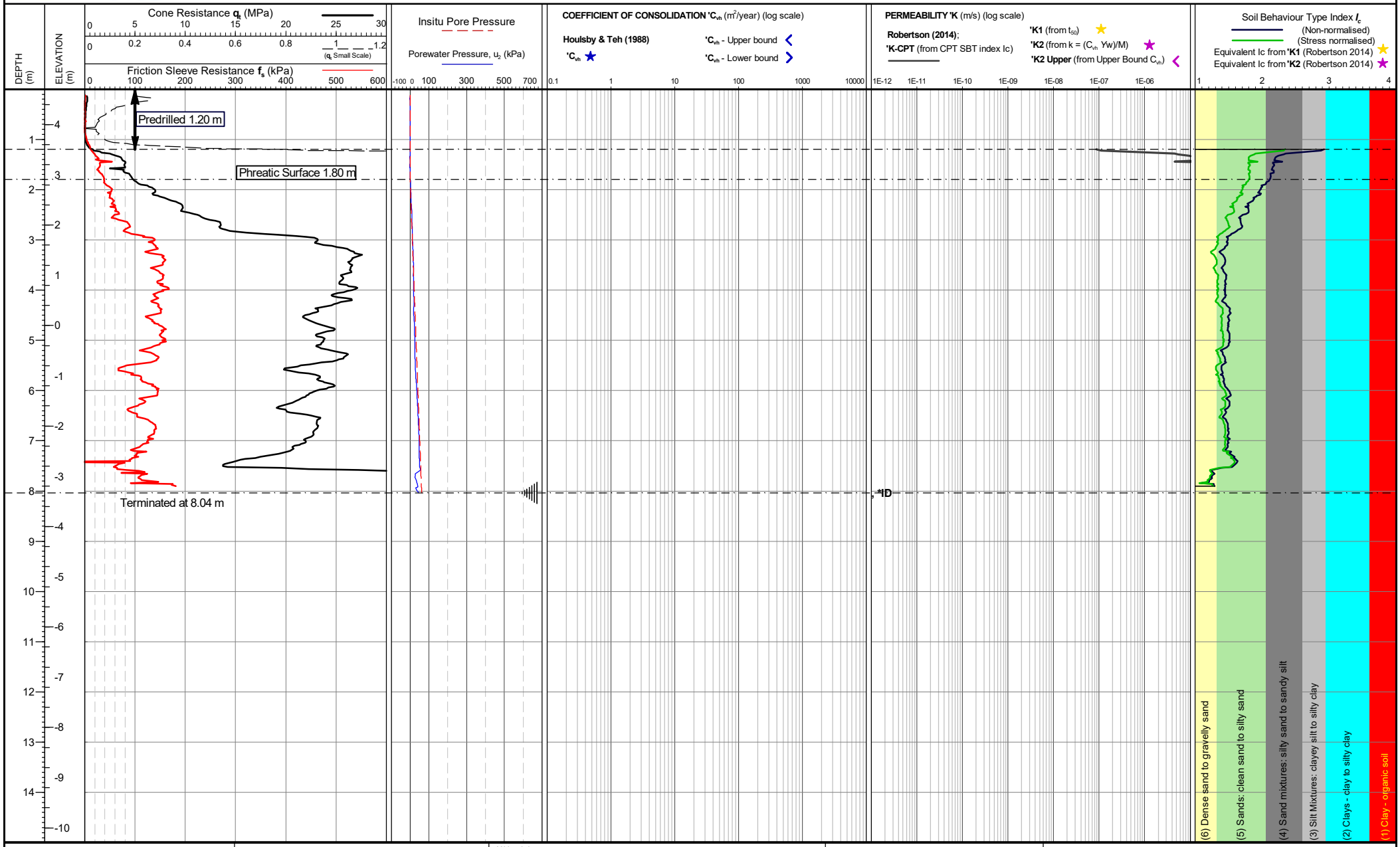
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 11:35:03

Location: North Yorkshire, UK
Coordinates: 457528.447, 525852.477
Elevation: 4.705
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

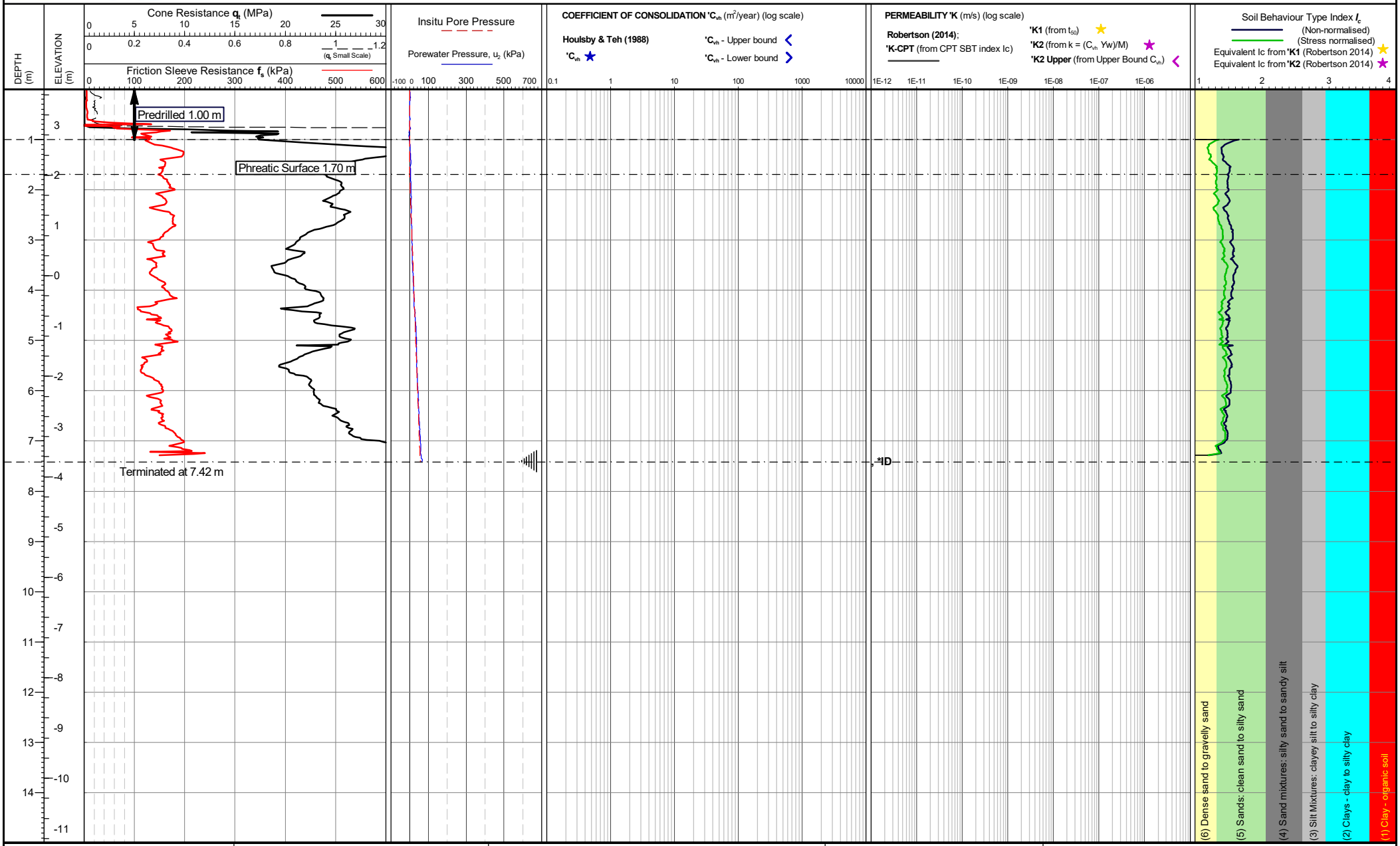
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT01A

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 13:52:49

Location: North Yorkshire, UK
Coordinates: 457548.396, 525875.571
Elevation: 3.712
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

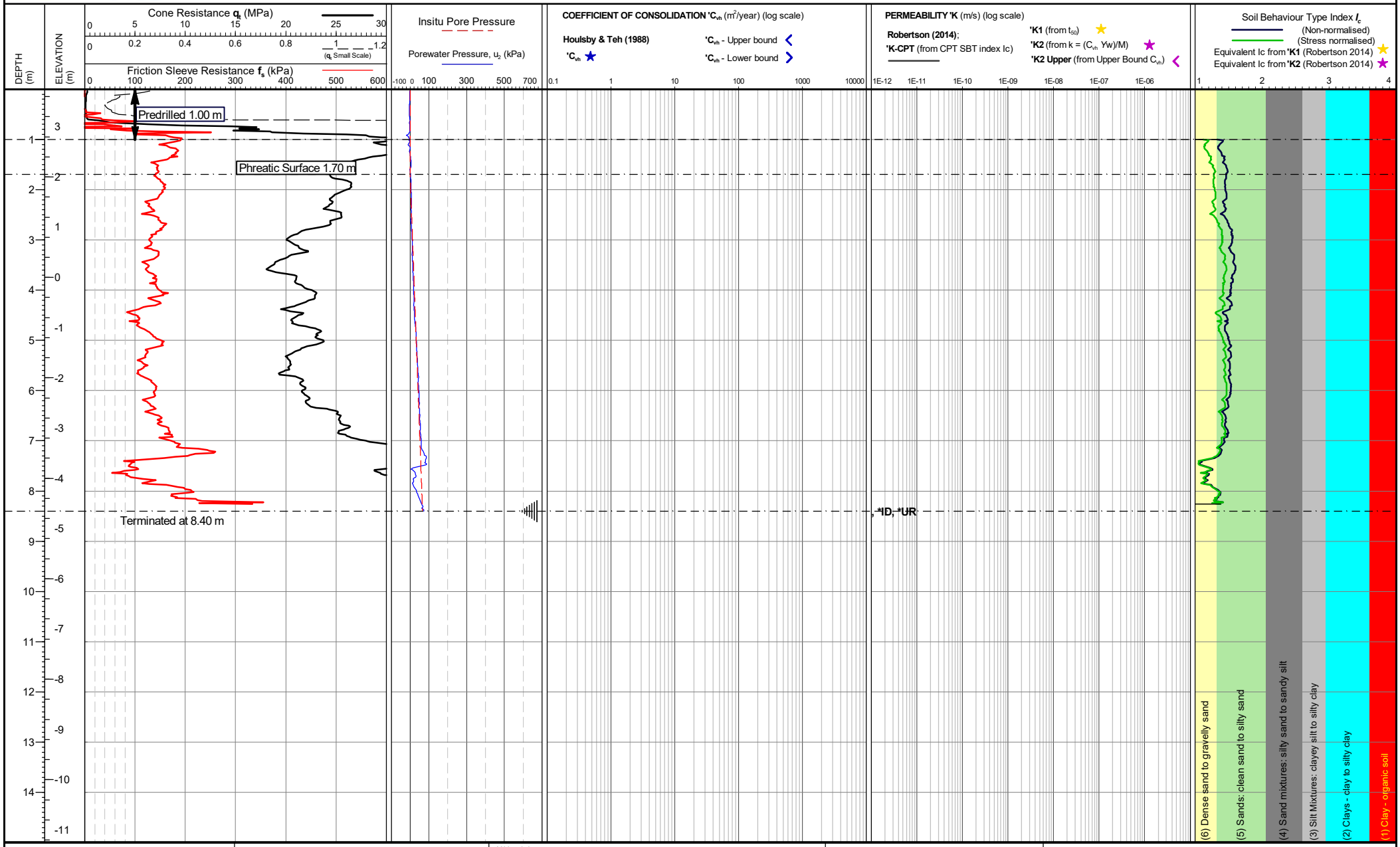
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 25/05/2021 15:13:23

Location: North Yorkshire, UK
Coordinates: 457549.703, 525875.634
Elevation: 3.747
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

Date of plot: 28-07-21
Checked by: Chris Player

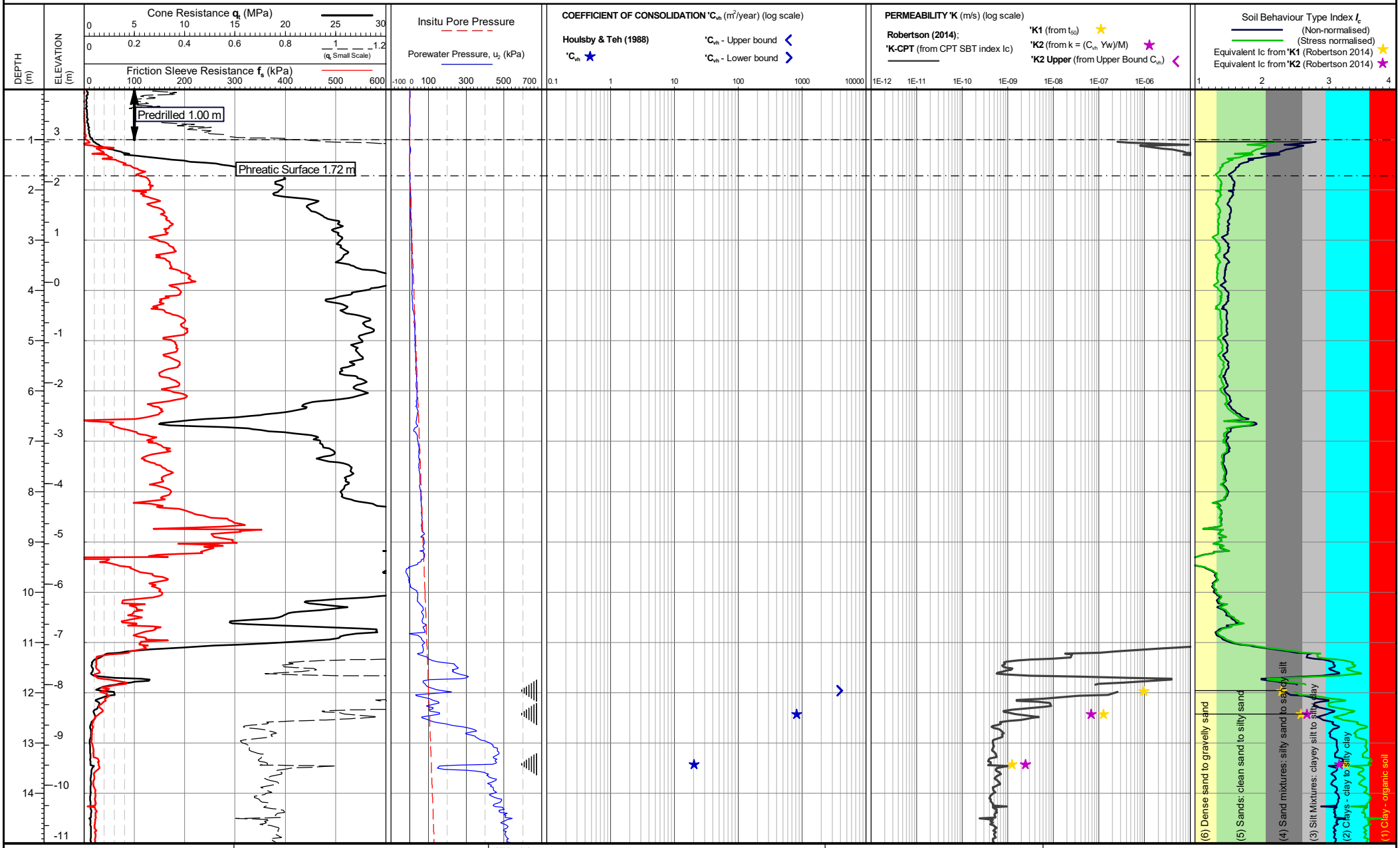
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT02A

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

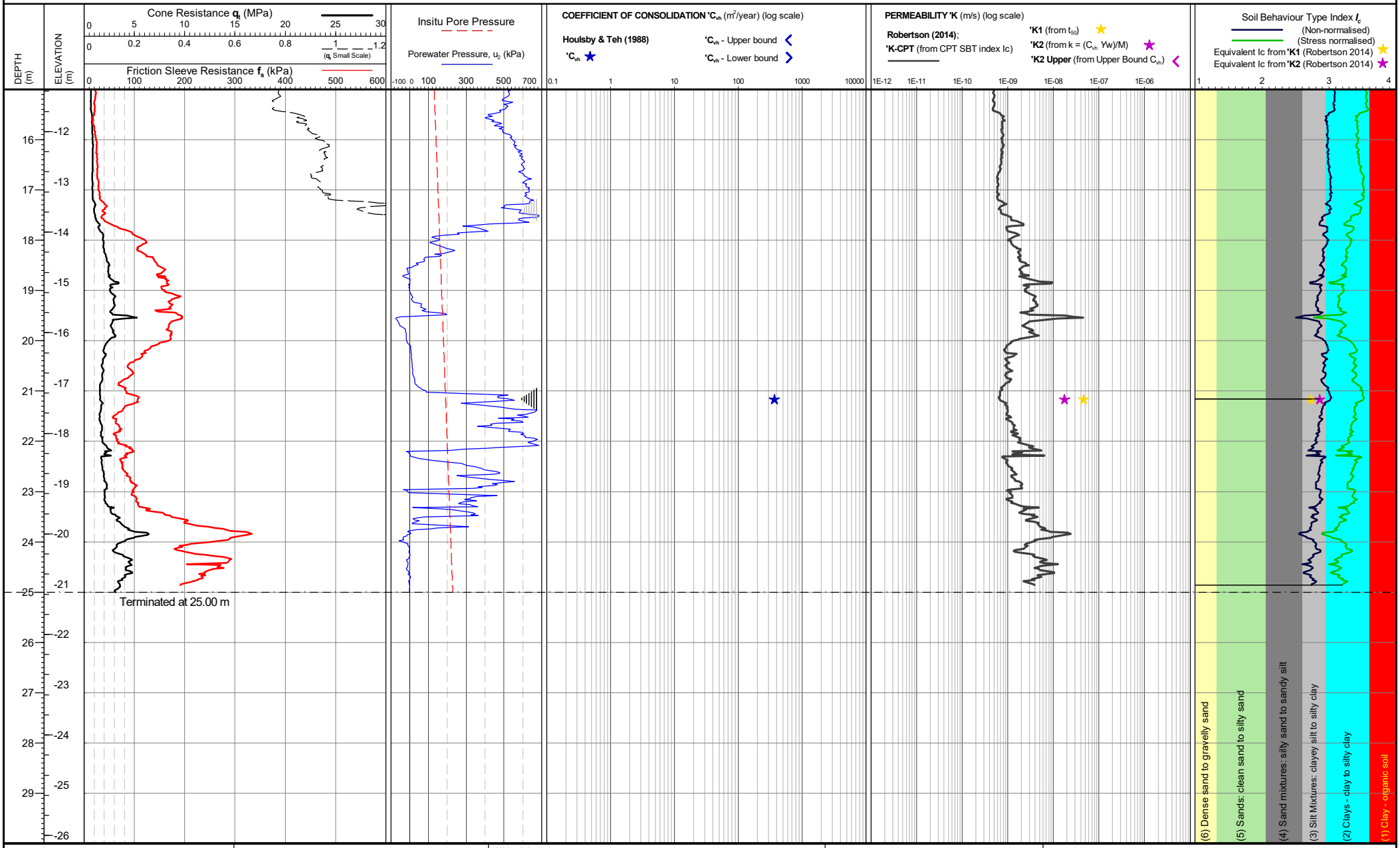
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 14:55:39

Location: North Yorkshire, UK
Coordinates: 457762.771, 525932.348
Elevation: 3.84
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

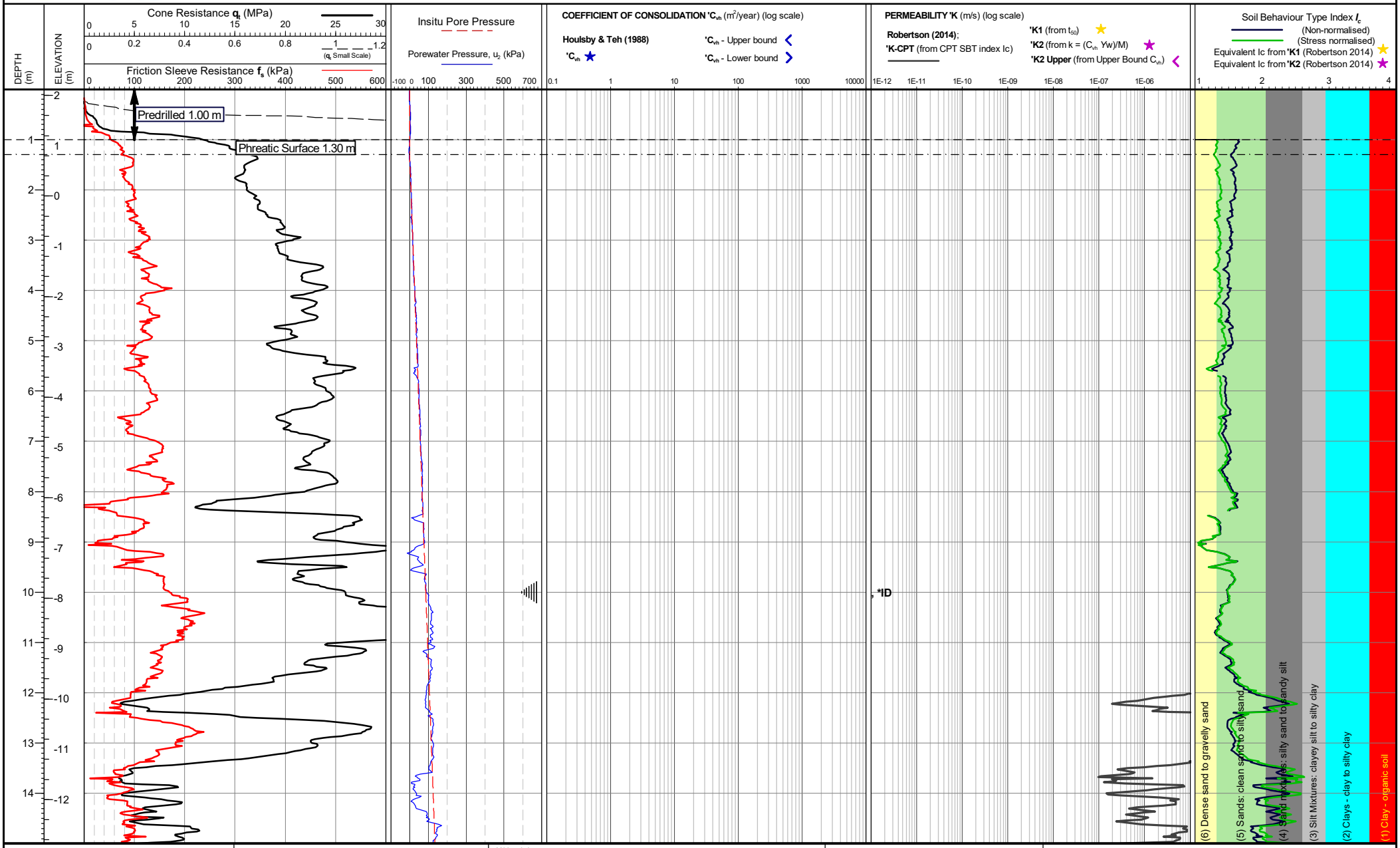
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT03

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

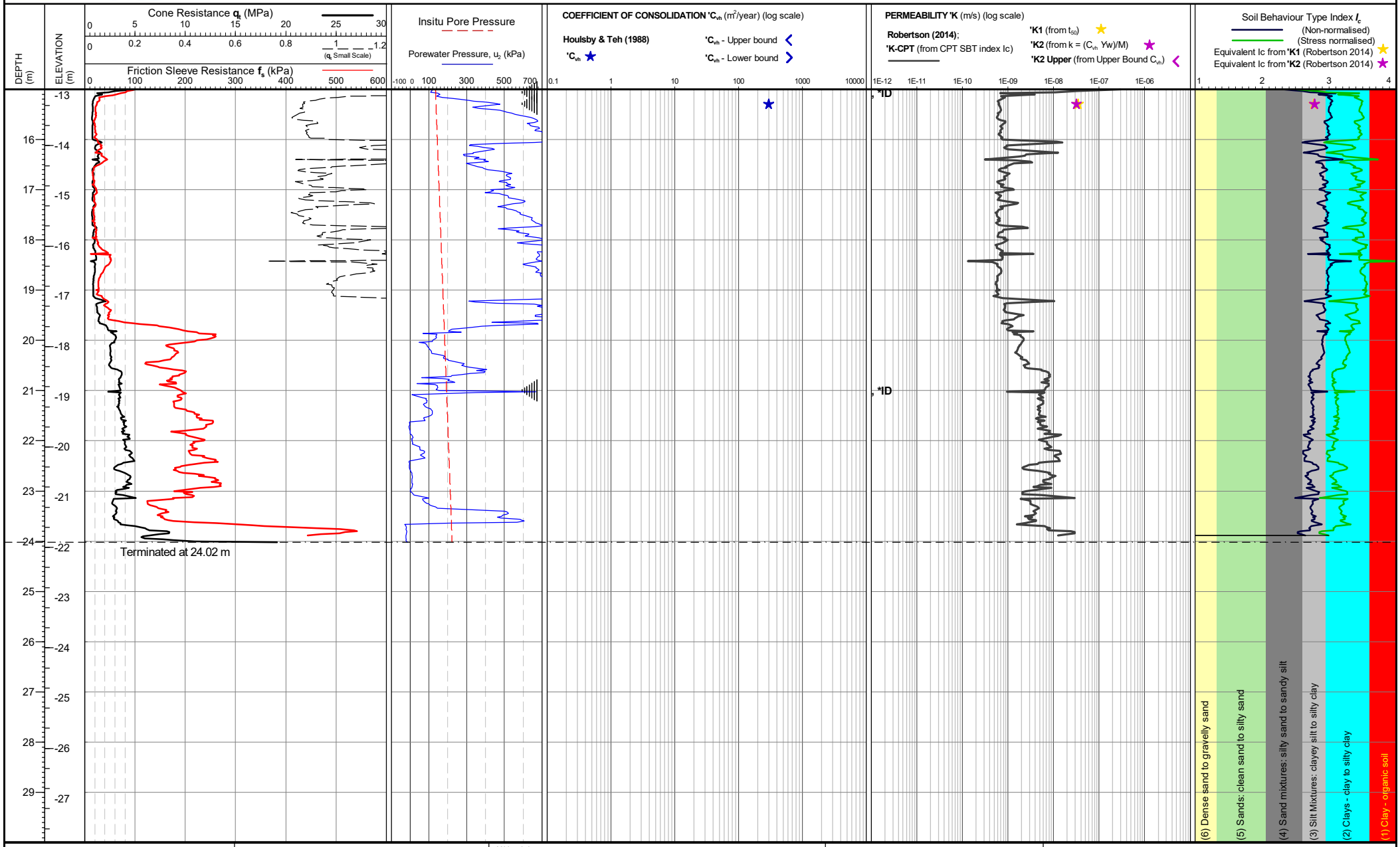
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 26/05/2021 11:43:09

Location: North Yorkshire, UK
Coordinates: 457834.825, 525934.533
Elevation: 2.123
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

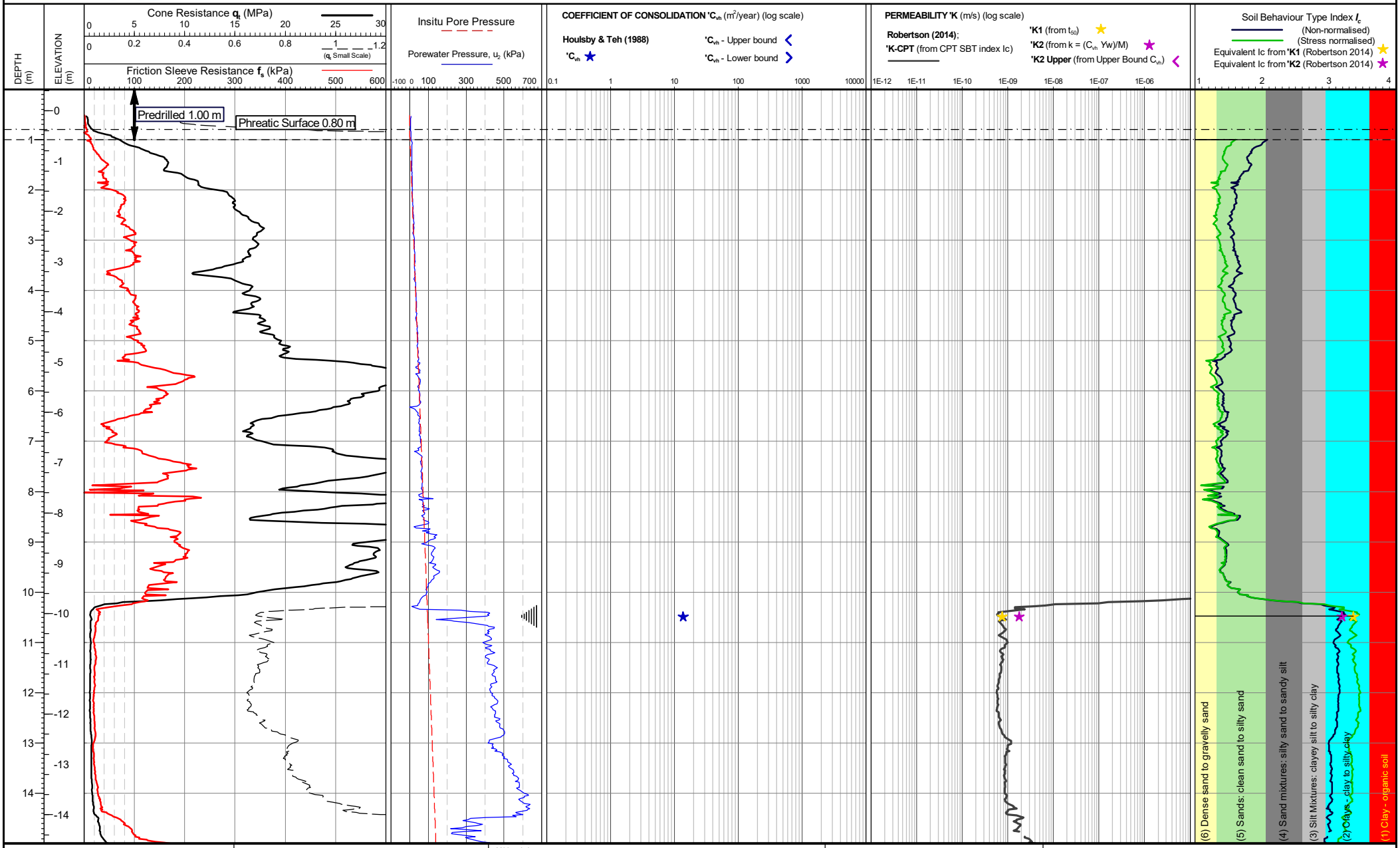
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT04

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

Date of plot: 28-07-21
Checked by: Chris Player

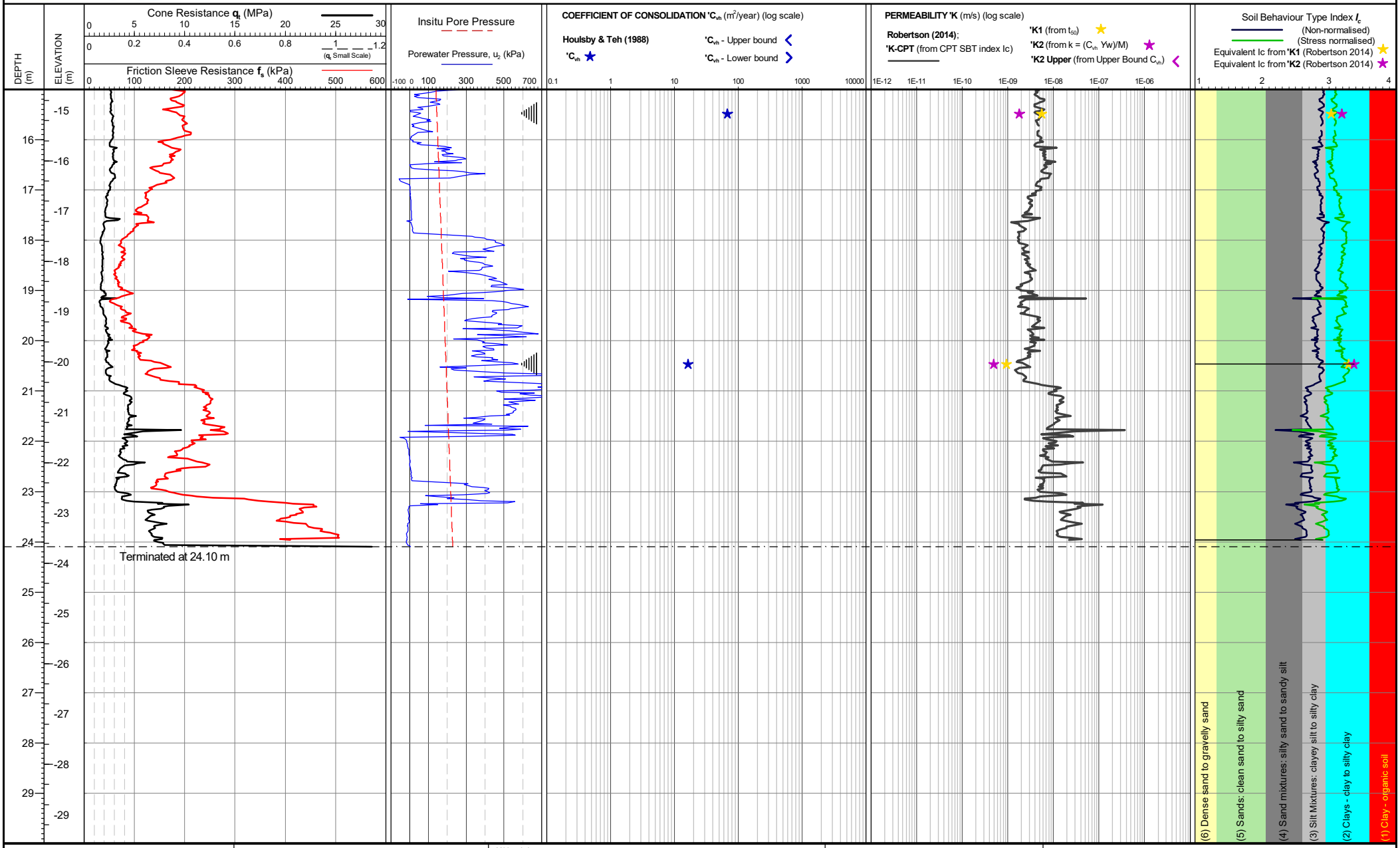
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 27/05/2021 09:53:54

Location: North Yorkshire, UK
Coordinates: 457921.134, 525982.859
Elevation: 0.424
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

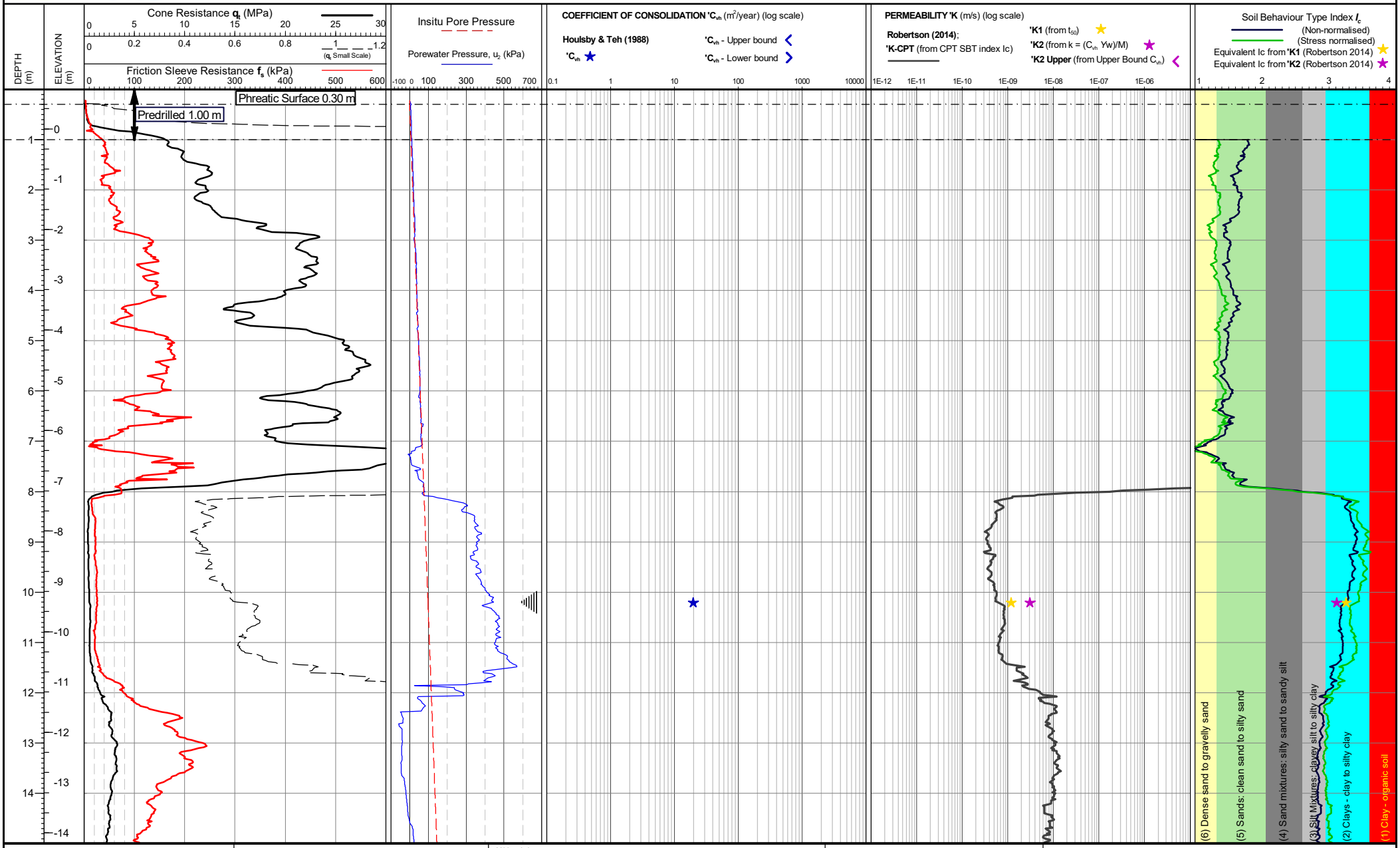
Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT05

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

Date of plot: 28-07-21
Checked by: Chris Player

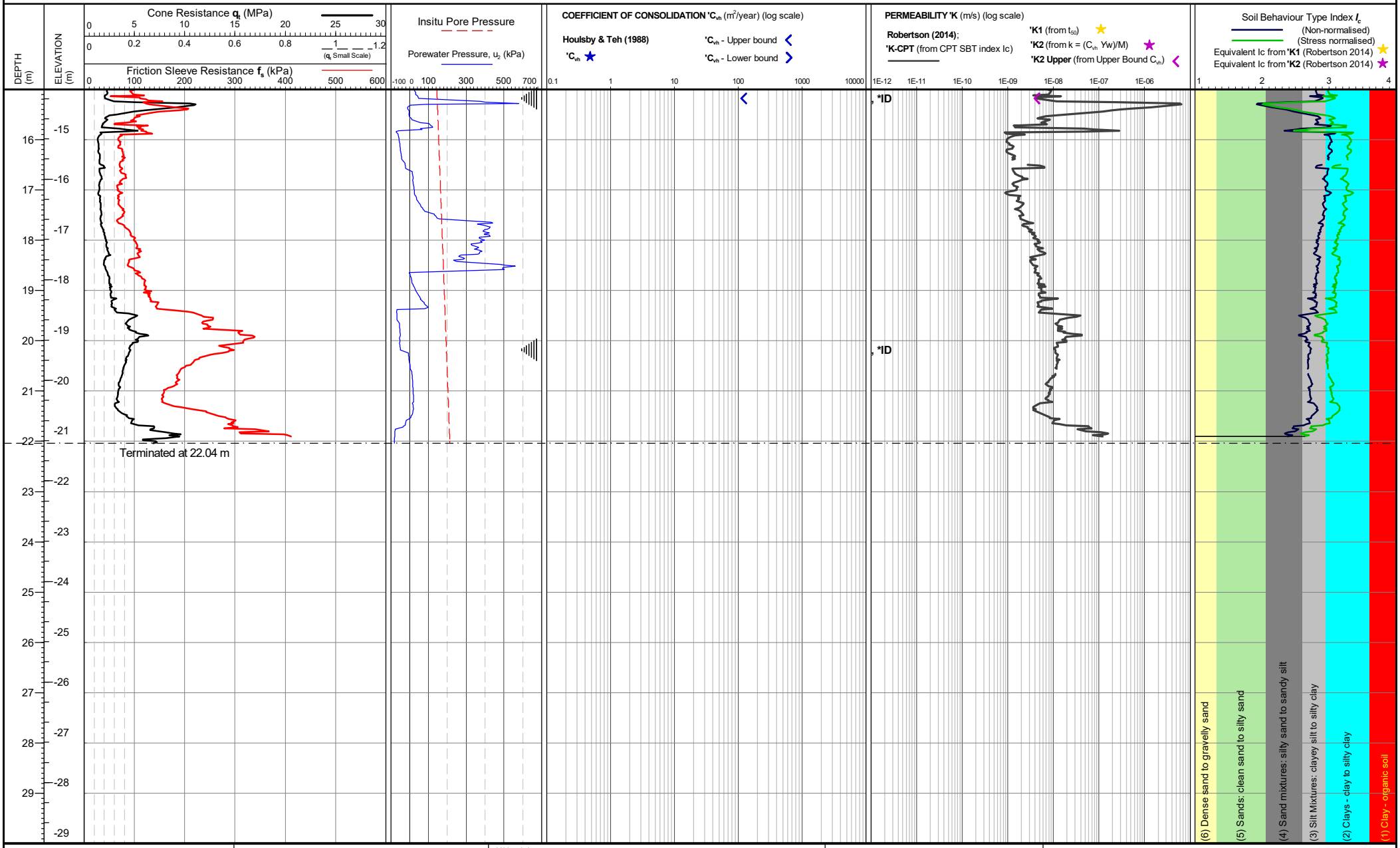
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

LANKELMA

Project: PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT

Client: AEG



Cone area (mm2):
Cone ID: S15-CFIP.1992
Operator: Robert Ashcroft
Date of test: 28/05/2021 10:17:10

Location: North Yorkshire, UK
Coordinates: 458001.597, 526043.289
Elevation: 0.786
Coordinate system:

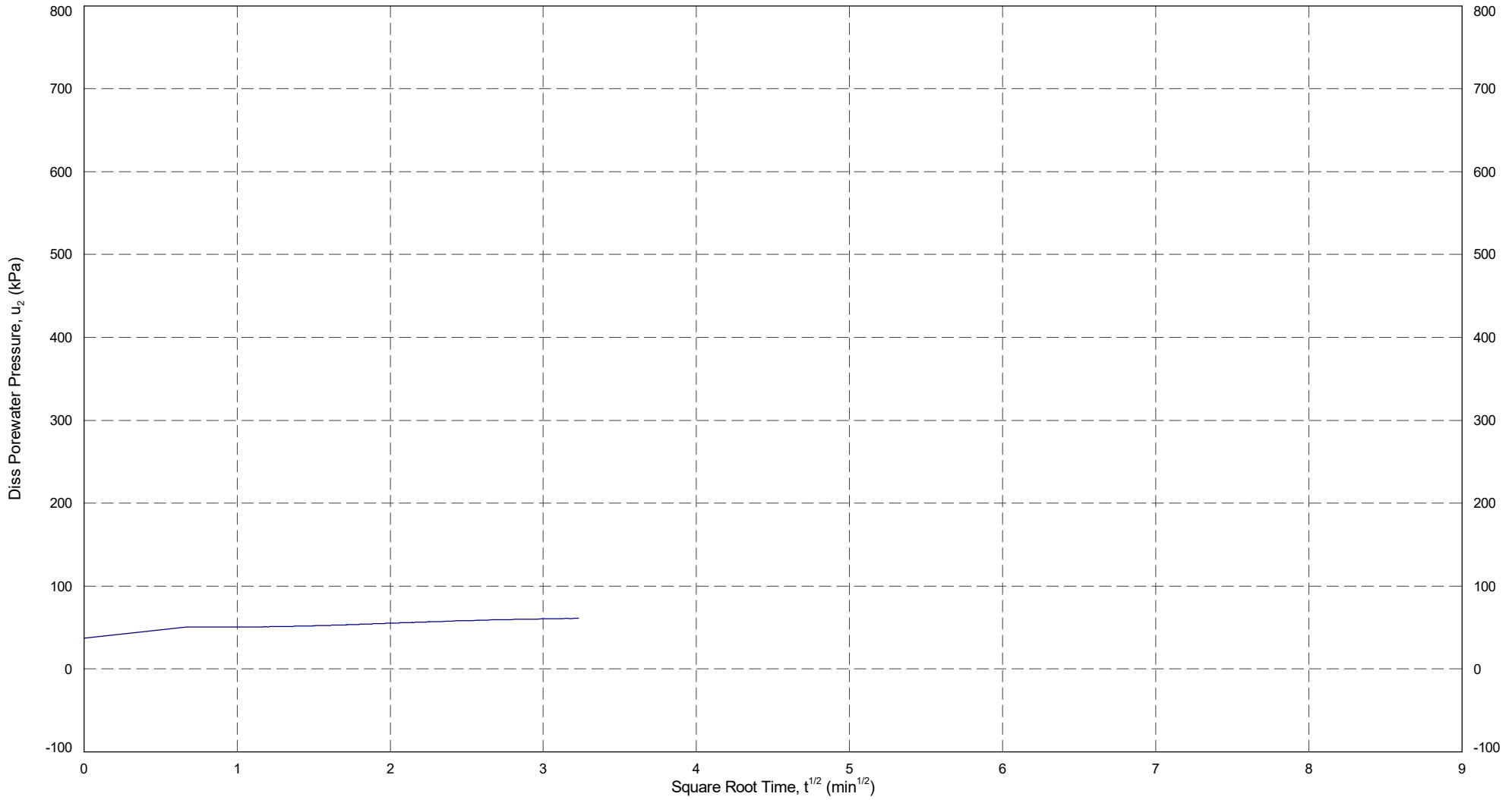
*Abbreviations:
NEP: No excess pore pressures generated
ID: Insufficient test duration
UR: Uncharacteristic response
DR: Drained or partially drained response
A: Estimated/measured in-situ pore pressure corresponds to artesian conditions.
PUS: Potentially unsaturated soil.
MD: Monotonic decay.
IEP: Insufficient excess pressure generated.
LBI: Lower bound interpretation.
DT: Disrupted test.
NI: No interpretation.

Date of plot: 28-07-21
Checked by: Chris Player
Lankelma Project Ref: P-107755-7

TEST ID: LF\CPT06

APPENDIX G RAW DISSIPATION TEST RESULTS

Dissipation curves are presented grouped by CPT location. All data including QC dissipation data (penetration pauses for QC purposes) are presented.



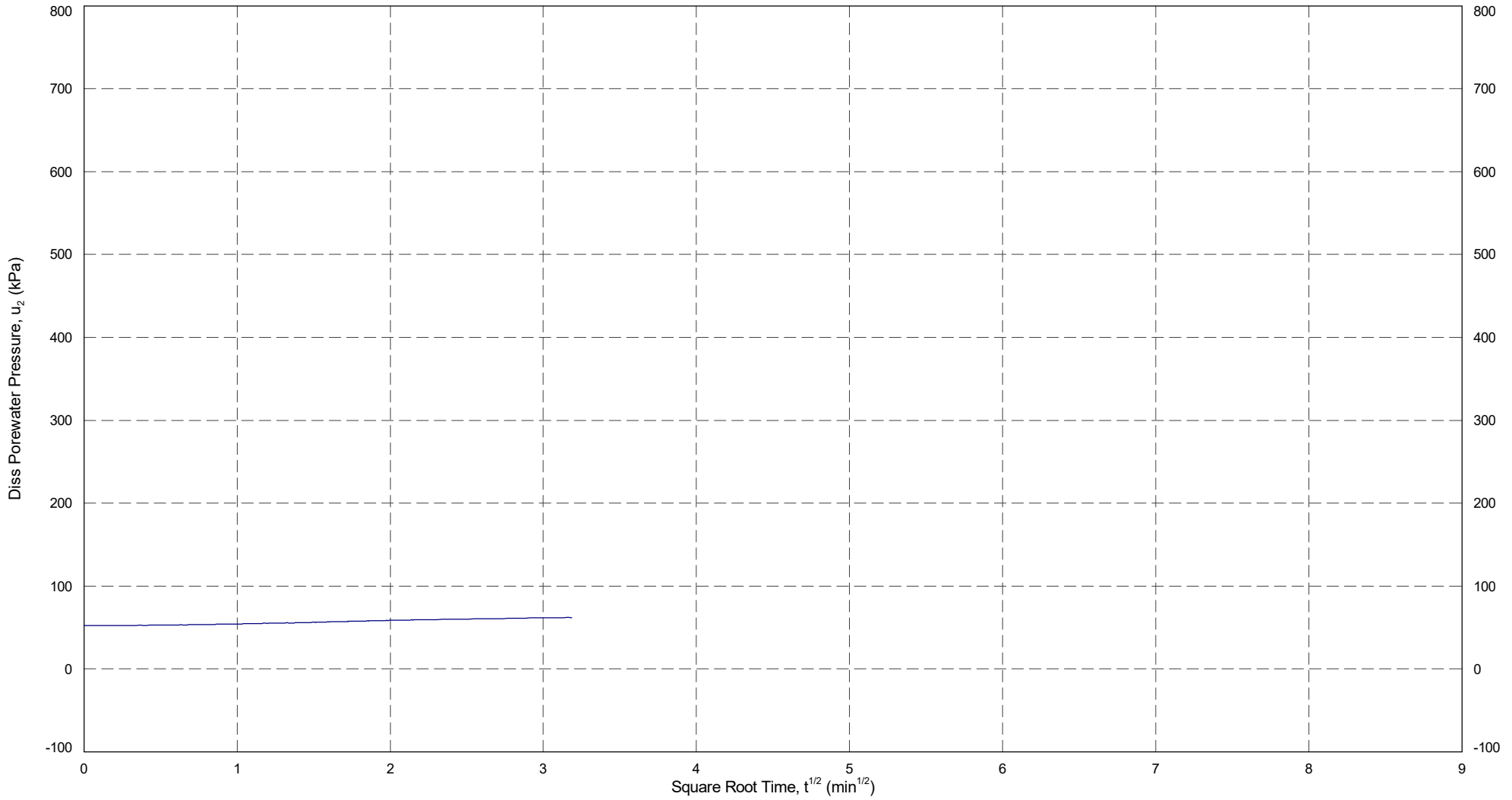
7.96 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT01

DRAWN	Christopher Player	DATE	28/07/2021
CHECKED	Jospeh Hobbs	DATE	28/07/2021
SCALE			A4
PROJECT No	P-107755-7	FIGURE No	



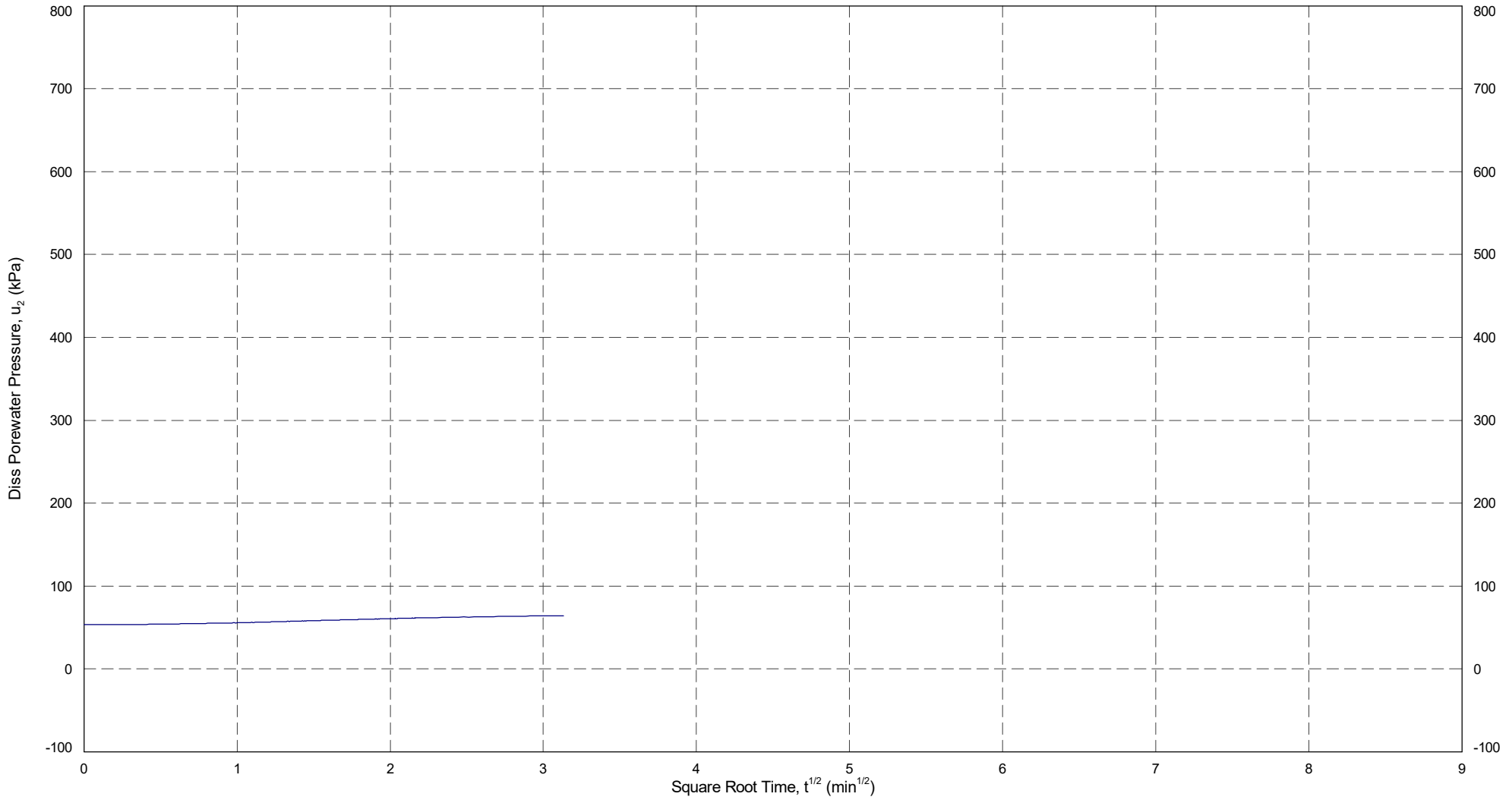
8.04 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT01A

DRAWN	Christopher Player	DATE	28/07/2021
CHECKED	Jospeh Hobbs	DATE	28/07/2021
SCALE			A4
PROJECT No	P-107755-7	FIGURE No	



7.40 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT02

DRAWN	Christopher Player	DATE	28/07/2021
CHECKED	Jospeh Hobbs	DATE	28/07/2021
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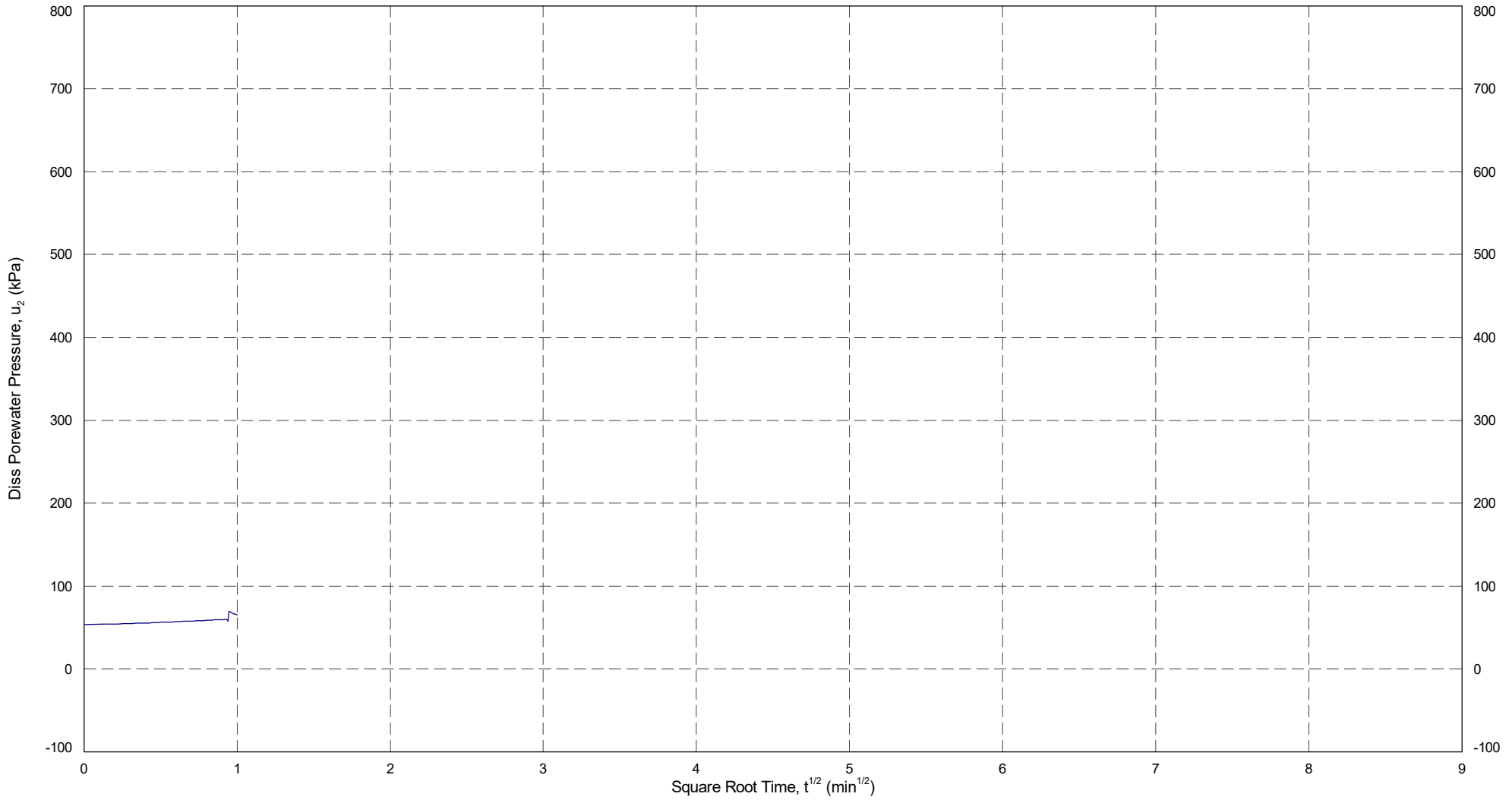
PROJECT No	P-107755-7	FIGURE No	



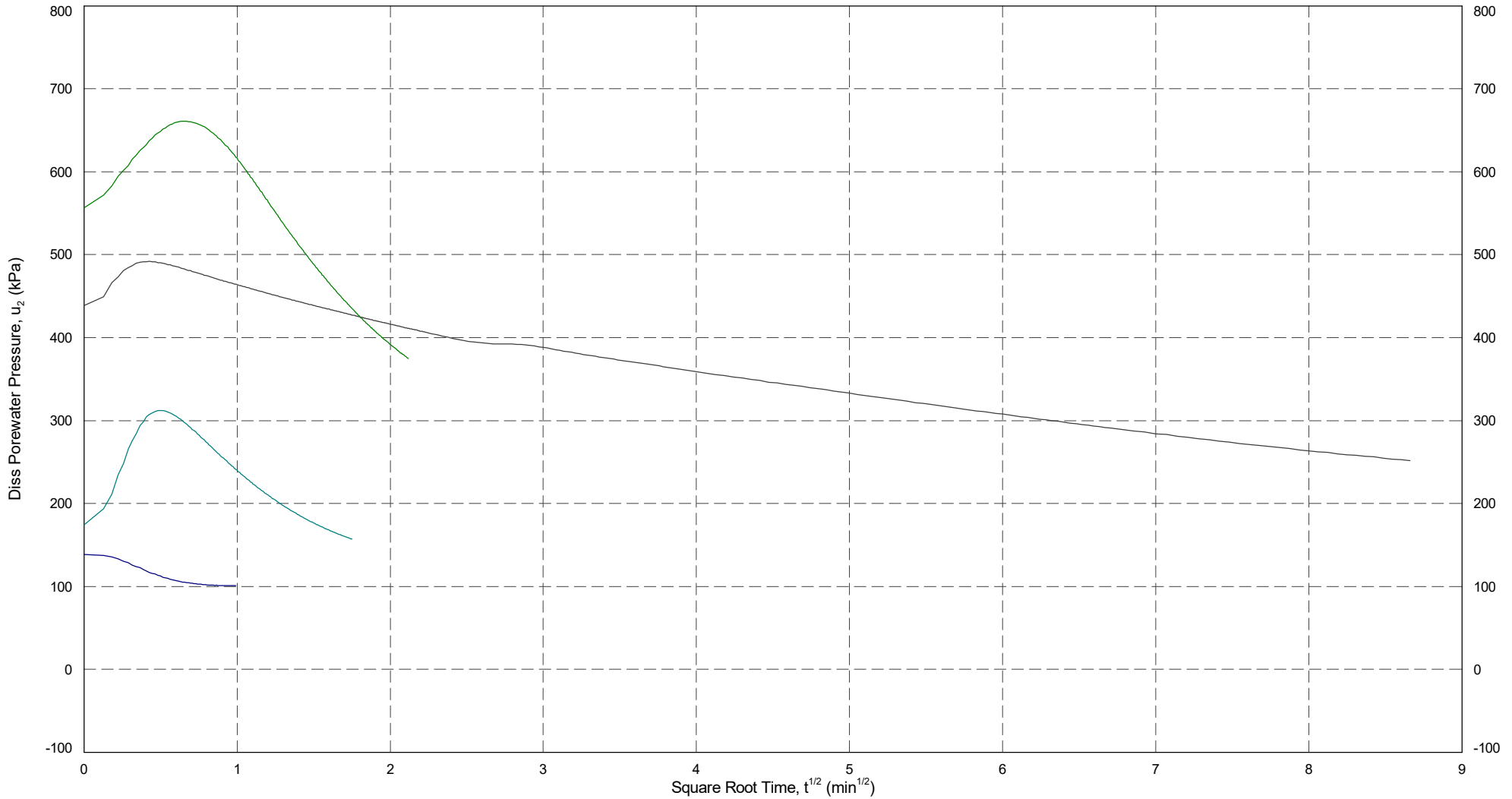
8.40 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT02A

DRAWN	Christopher Player	DATE	28/07/2021
CHECKED	Jospeh Hobbs	DATE	28/07/2021
SCALE			A4
PROJECT No	P-107755-7	FIGURE No	



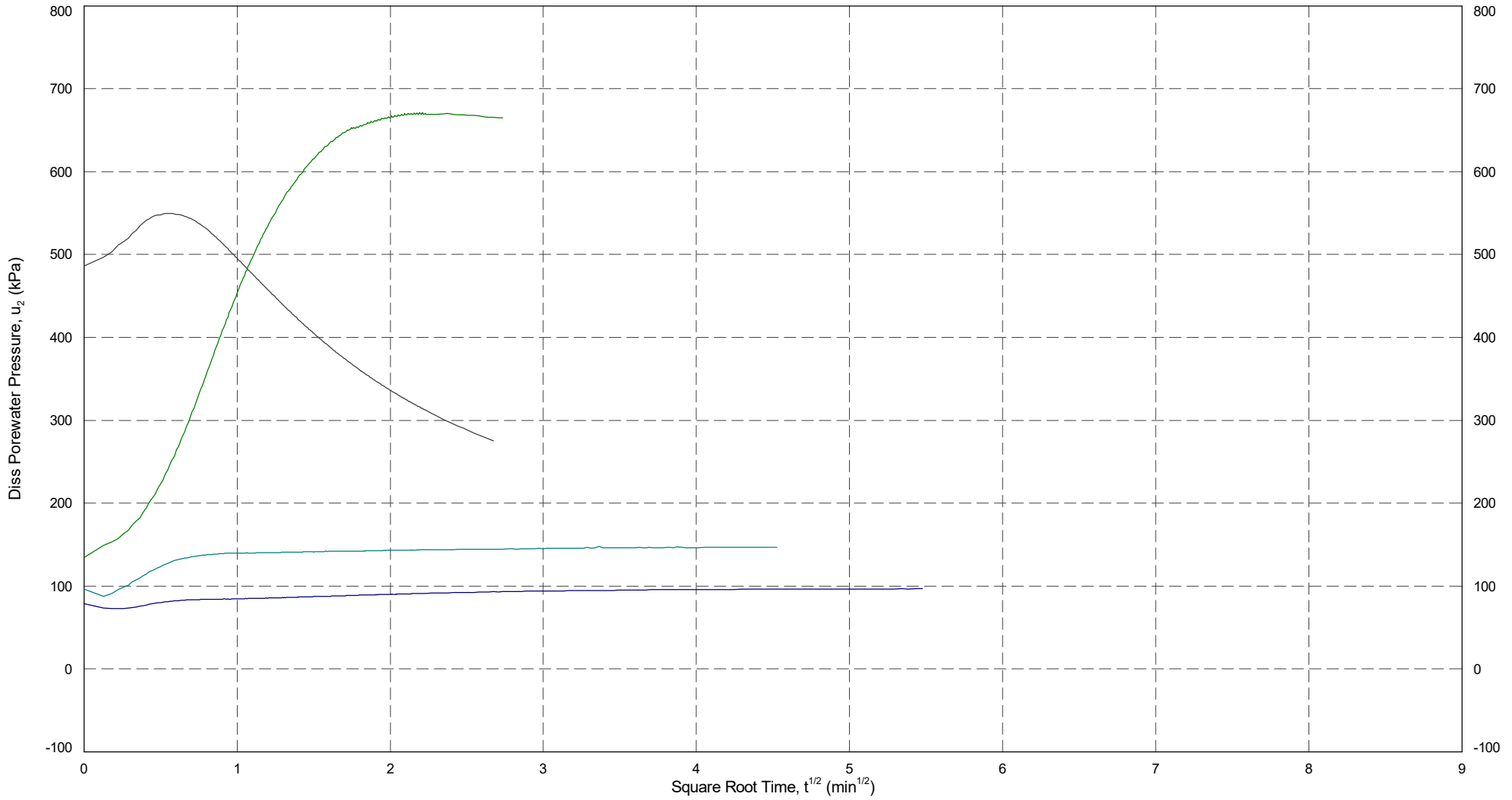
11.96 m
12.42 m
13.42 m
21.16 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT03

DRAWN	Christopher Player	DATE	28/07/2021
CHECKED	Jospeh Hobbs	DATE	28/07/2021
SCALE			A4
PROJECT No	P-107755-7	FIGURE No	



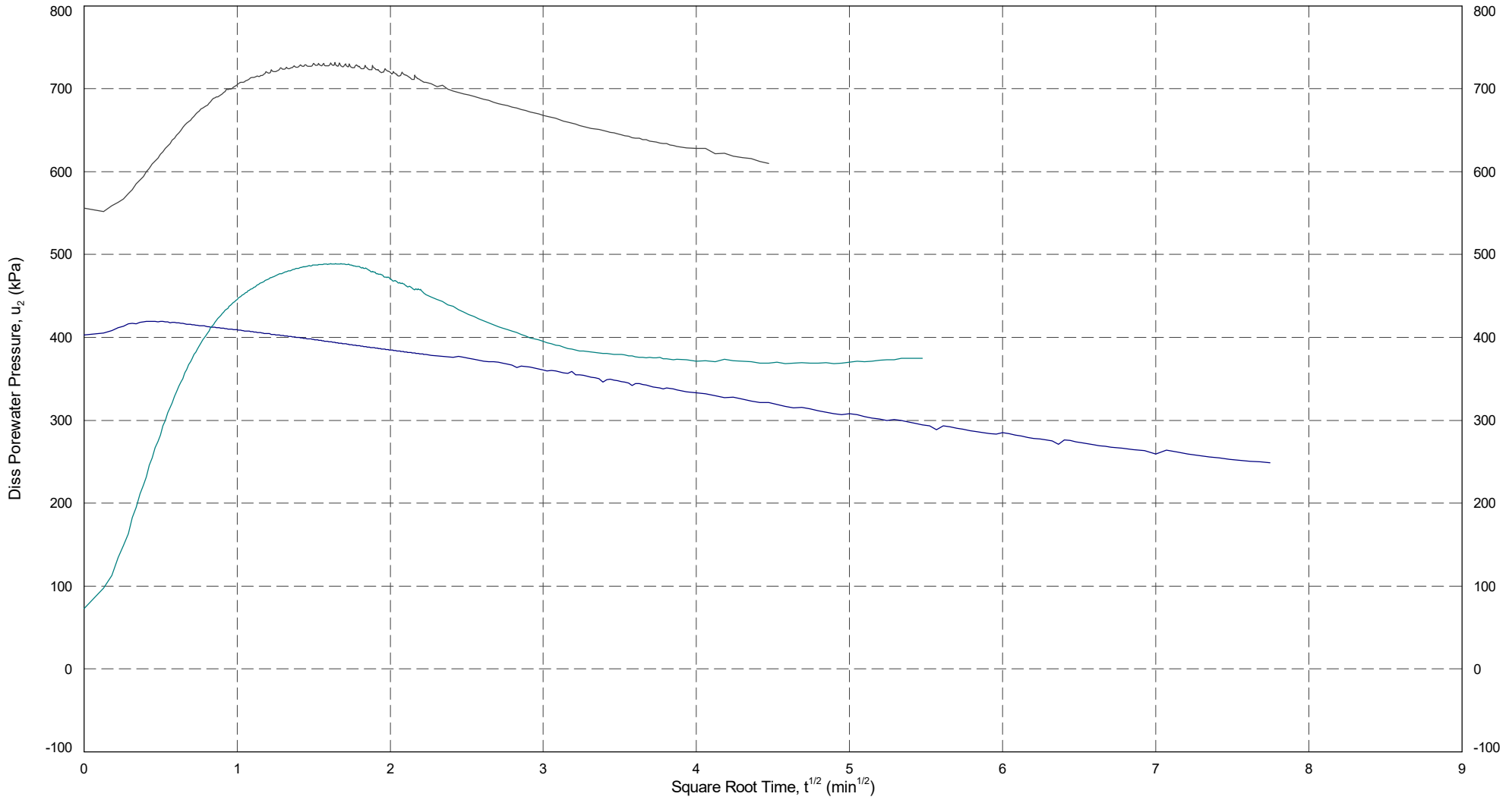
10.00 m
15.06 m
15.29 m
21.00 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT04

DRAWN Christopher Player	DATE 28/07/2021
CHECKED Jospeh Hobbs	DATE 28/07/2021
SCALE	A4
PROJECT No P-107755-7	FIGURE No



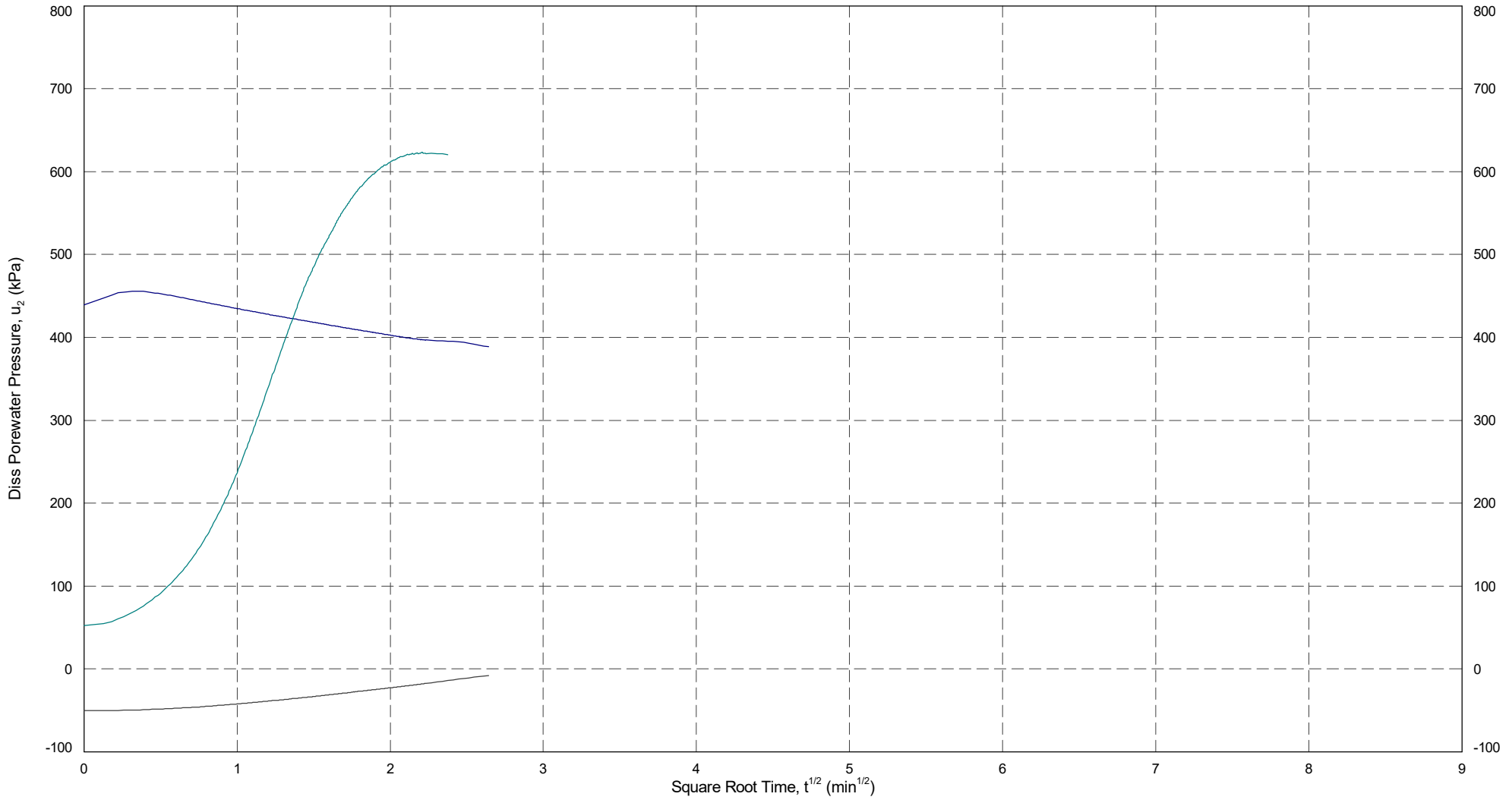
10.48 m
15.48 m
20.46 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT05

DRAWN Christopher Player	DATE 28/07/2021
CHECKED Jospeh Hobbs	DATE 28/07/2021
SCALE	A4
PROJECT No P-107755-7	FIGURE No



10.20 m
15.18 m
20.18 m

LANKELMA

TITLE

AEG
North Yorkshire, UK
PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT
Dissipation Test - LF\CPT06

DRAWN Christopher Player	DATE 28/07/2021
CHECKED Jospeh Hobbs	DATE 28/07/2021
SCALE	A4
PROJECT No P-107755-7	FIGURE No

APPENDIX III

High Pressure Dilatometer Testing

(Tested Externally)

PRELIMINARY GROUND INVESTIGATION-NZT TEESWORK

Results of pressuremeter tests carried out by Cambridge Insitu Ltd

Client reference	**4339**
Contractor	**Allied Exploration & Geotechnics Ltd**
Cambridge Insitu reference:	**CIR1505/21**
Report date:	**July 2021**
Version:	**1.0**

VOLUME 1 of 2

Text report with a summary of the results

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TASKS	RESPONSIBLE PERSON	AFFILIATION
Calibration (HPD 'Wally')	Kyle Clarkson/ Ewan Stockwell	Cambridge Insitu Ltd
Field work	Stuart Pearce / Ewan Stockwell	Cambridge Insitu Ltd
Preliminary analysis	Yasmin Byrne / Ewan Stockwell	Cambridge Insitu Ltd
Final analysis	Yasmin Byrne/ Robert Whittle	Cambridge Insitu Ltd
Final reporting	Yasmin Byrne/ Robert Whittle	Cambridge Insitu Ltd

PREFACE - EQUATIONS FOR MODULUS

Shear modulus G, where τ is shear stress and γ is shear strain: $G = \tau/\gamma$ [P.1]

G in terms of cavity strain ε_c and cavity pressure p_c: $2G = \delta P_c / \delta \varepsilon_c$ [P.2]
This is valid for a linear elastic response and a small strain alteration

Linear elastic Young's modulus E in terms of G, where *v* is Poisson's ratio: $E = 2(1+v)G$ [P.3]

Non-linear secant shear modulus G_s: $G_s = \alpha\gamma^{\beta-1}$ [P.4]
where α is the shear stress constant and β is the exponent of linearity obtained from fitting the reloading response in shear stress/shear strain space with a power function. γ is plane shear strain.

Non-linear secant Young's modulus E'_s using invariant shear strain γ_α: $E'_s = 2\alpha[1+v][\sqrt{3}\gamma_\alpha]^{\beta-1}$ [P.5]
Multiplying by √3 converts γ_α to γ assuming no volumetric strains are involved.

Non-linear tangential shear modulus G_t: $G_t = \alpha\beta\gamma^{\beta-1}$ [P.6]

Plane shear strain at failure, undrained case, c_u is undrained shear strength: $\gamma_f = [c_u/\alpha]^{1/\beta}$ [P.7]

Secant shear modulus at failure, in terms of stress: $G_s = \alpha[c_u/\alpha]^{(\beta-1)/\beta}$ [P.8]

For secant shear modulus at mobilised stress levels less than failure, introduce *n* where $0 < n \leq 1$ $G_n = \alpha[nc_u/\alpha]^{(\beta-1)/\beta}$ [P.9]

For the special case of G_{50} at half of the ultimate shear strength: $G_{50} = \alpha[c_u/2\alpha]^{(\beta-1)/\beta}$ [P.10]

Note: substitute τ_f for c_u in the case of drained tests in P.7 to P.10

Contents

PREFACE - EQUATIONS FOR MODULUS 3
Contents 4
Preliminary Ground Investigation- NZT Pressuremeter Testing 7
1 Introduction 7
1.1 Instrumentation 7
1.2 Analysis 8
1.3 Report Layout 9
1.4 Notation 10
1.5 Units 10
2 Details of work carried out 11
Table 2.1 Sequence of work 11
Table 2.2 Probe details and calibrations 11
Table 2.3 Borehole information 12
3 Summary of results 13
Table 3.1 Initial stress state 13
Table 3.2 Parameters for strength assuming a drained path 14
Table 3.3 Linear parameters relating to stiffness 15
Table 3.4 Non-linear parameters relating to stiffness 17
4 Field Curves 19
Figure 4.1 Field Curves - All tests on common axes 19
APPENDIX A A DESCRIPTION OF THE EQUIPMENT 20
1 The High Pressure Dilatometer (HPD) 20
2 The Membrane 22
3 The Pressurising System 23
4 Electronic Interface Unit (EIU) 23
5 Data Logging / Analysis Software 24
APPENDIX B CALIBRATING CAMBRIDGE PRESSUREMETERS 25
1 Scale Factors 25
2 The Displacement Measuring System 25
3 Pressure Measuring Transducers 26
4 Reference (‘zero’) outputs 27
5 Membrane stiffness 27
6 Instrument compliance 29
7 Instrument straightness 30
8 Membrane thinning 31

9 Repeatability (or how much effort should be devoted to calibrations) 32
APPENDIX C THE TEST PROCEDURE 33
1 Placing the HPD 33
2 Description of the Test 33
3 Logging Rate 35
4 Terminating a test 35
APPENDIX D ANALYSIS OVERVIEW 37
1 MATERIAL PROPERTIES FROM PRESSUREMETER TESTS IN SOIL. 37
1.1 Notation 37
1.2 Overview 37
1.3 Defining strain 37
1.4 Average displacements versus the output of the separate axes 38
1.5 The Analysis program WINSITU 39
2 ANALYSES FOR INSITU LATERAL STRESS 40
2.1 Notation 40
2.2 Overview 40
2.3 Marsland & Randolph (1977) Analysis 41
3 SHEAR MODULUS 43
3.1 Notation 43
3.2 Background 43
3.3 Describing the unload/reload cycle 46
3.4 Non-linear stiffness/strain response 47
3.5 Plotting stiffness against strength proportion. 50
3.6 Cross hole anisotropy 50
4 ANALYSES FOR STRENGTH, DRAINED LOADINGS 52
4.1 Notation 52
4.2 Overview 53
4.3 Hughes et al (1977) 53
4.4 Withers, Howie, Hughes and Robertson (1989) 55
4.5 Carter et al (1986, adapted 2010) 56
APPENDIX E EXAMPLE CALCULATION OF A LINE OF DATA (HDP) 63
1 Calibrations and raw data 63
2 Zeroing and scaling 63
3 Compression Correction 64
4 Membrane Correction 64
5 Displacement and average total pressure 65

6 Calculation of pressure outside membrane 65
APPENDIX F REFERENCES..... 67

Volume 2 - Data for all tests and Calibrations

Preliminary Ground Investigation- NZT Pressuremeter Testing

1 Introduction

Cambridge Insitu Ltd (CI) was contracted by Allied Exploration & Geotechnics Ltd (AEG) to supply specialist pressuremeter testing services for the NZT preliminary ground investigation at Teeswork, Redcar. The proposed scheme is the development of a Combined Cycle Gas Turbine (CCGT) gas-fired generating power station and associated infrastructure. Elements of the onshore structures will be supported on piled foundations socketed into bedrock and will be subject to high axial and lateral loads. Some structures may also be subject to dynamic loading. The Client for the works are British Petroleum and their representative for engineering purposes is AECOM, who were responsible for the pressuremeter specification.

The purpose of conducting pressuremeter testing was obtaining representative values for the engineering properties of the ground, in particular insitu horizontal stress, stiffness and strength. These parameters are required for the determination of both axial and lateral pile resistance.

Pressuremeter testing was carried out at four locations. At each location two levels were tested giving 8 tests in all. The tests levels are between 22.8mBGL and 27.8mBGL. The field work took place between the 3rd June and 9th July 2021 on an intermittent basis as locations became available.

All tests are in mudstone and were carried out using a 95mm Cambridge High Pressure Dilatometer (HPD) placed in pre-bored pockets. These were formed by rotary methods and AEG provided the drilling support.

MS/BH07 Test 1 and MS/BH09 Test 1 are affected by membrane slips resulting in premature termination, but this was not serious enough to prevent a reasonably complete set of results being obtained. For all tests the maximum pressure reached was sufficient to cause the material to fail in shear. This is important because it means that analytical methods developed for soils can, with some adjustment, be applied to data from tests in rock.

Descriptions of the material and other tests can be found in the report issued by AEG (their reference 4339). This report is concerned solely with the presentation of the pressuremeter results. Any preliminary results are now superseded by the data in this report.

1.1 Instrumentation

The 95mm diameter Cambridge High Pressure Dilatometer was developed to carry out a pressuremeter test in soft to weak rock. In use the instrument is lowered into a nominal 101mm pocket, usually made by a rotary coring rig using a T6H/T101 barrel.

Once in position, oil or gas pressure is applied down an umbilical and inflates a membrane covering the central third of the probe, so loading the borehole wall. The expansion of the membrane is monitored by sensitive displacement followers or ‘arms’ and the pressure applied is measured by transducers in the probe. The output of the probe is digital data; when converted to engineering units this gives a pressure/displacement curve of the horizontally orientated loading test.

It is a complex instrument by normal site standards, uses strain gauged transducers throughout and incorporates a microprocessor controlled data acquisition system.

Although intended for soft to weak rocks, the displacement range and resolution of the equipment is such that it can make suitable tests in much weaker material, such as stiff clay.

The pressure capability is 200 bars in normal use, 300 bars under special circumstances. The displacement capability is the equivalent of 50% shear strain. Maximum pressure and maximum displacement do not occur in the same test.

A single HPD was used on this contract, known as 'Wally'. This version of the HPD outputs a line of data every 10 seconds.

1.2 Analysis

The pressuremeter loading curve can be solved directly using mathematical expressions for the expansion of a cylindrical cavity. The solution conventionally is quoted in terms of strength and stiffness parameters for the material, typically shear modulus, shear strength or friction angle as appropriate, and the insitu lateral stress. The success of this method is dependent on the validity of the assumptions that have to be made about the nature of the ground and the geometry of the cavity expansion configuration.

1.2.1 Assumptions

- Assumptions about the material response assume that at the test level the material is homogeneous with isotropic properties behaving as a continuum. If the material is a soil it is assumed that it is fully saturated.
- An assumption about the instrument is that the length to diameter ratio of the expanding section is large enough for end effects to be negligible allowing the test to be modelled as a plane strain expansion.
- The pressuremeter test gives data for the total radial stress and radial displacements of the cavity wall. The displacements are a direct function of the hoop strain. In order to solve the boundary problem represented by a cavity expansion it is necessary also to know the radial strain and circumferential stress. If it assumed the test is undrained (as it might be for low permeability materials) then the loading takes place at constant volume. This means that radial and shear strains are derived easily from circumferential strain. If the expansion is drained then a more complex solution is required; shear and volumetric strains are derived using assumptions about the dilatant behaviour of the material.
- In addition it is assumed that the cavity expands as a circle and hence the results have been obtained by analysing the curve derived from the average of all six displacement followers as this gives the best representation of a circular expansion. Unless the probe is an exact fit to the cavity the output from individual arms is almost meaningless, because the centre of the probe is the reference for all measured displacements and is free to translate in relation to the cavity.

1.2.2 Shear stiffness

The primary purpose of the tests is the provision of estimates of ground stiffness. These can be obtained from the slope of the virgin loading (G_i) or the slope of the chord bisecting small cycles of unloading and reloading (G_{ur}). Plausible and consistent data for shear modulus have been obtained from the unload/reload cycles and several such cycles were incorporated into each test. This approach to interpreting unload/reload cycles assumes the material response is linear elastic.

G_i is generally less than G_{ur} due to stress relief caused by the process of forming the test cavity and subsequently unloading it by removing the boring tool.

At the time of measurement all modulus parameters are shear modulus $\boldsymbol{G}$. They can be converted to Young's modulus $\boldsymbol{E}$ - if the material is isotropic then the relationship $\boldsymbol{E = 2G(1 + v)}$ can be used where $\boldsymbol{v}$ is Poisson's ratio.

The Poisson's ratio we have applied is 0.3 but this is an assumption and has not been measured. It is straightforward to re-calculate the parameters for different values of v if better information becomes available.

We have also applied the procedure suggested by Bolton & Whittle (1999) to derive the stiffness/strain degradation properties of the material tested.

1.2.3 Pore water pressure and vertical stress

Based on the observed response, we have judged that the material tested likely is porous enough to receive a contribution from pore water pressure. Essentially this is a decision about whether the material is behaving predominantly as a soil (where effective stress must be used) or a rock (where total stress is likely to be more appropriate).

The ambient pore water pressure has been determined based on ground water monitoring information provided by AEG. For MS/BH07 and MS/BH11 this is based on borehole specific groundwater monitoring. For MS/BH06 and MS/BH09 this is based on the groundwater monitoring across the site. It has been assumed that groundwater is hydrostatic. Refer to Table 3.1 for test specific values.

The total vertical stress is calculated from an assumed unit weight, 22kN/m^3 for rock.

1.2.4 Strength and cavity reference pressure

For all tests a drained loading path has been assumed, based on the increase in stiffness with stress level at the cavity wall for successive cycles. This indicates a rising average stress and therefore analysis by methods that identify the angles of internal friction ϕ and dilation ψ.

Two procedures can be applied. Hughes et al (1977) is applicable to expansion data and Withers et al (1989) is applied to contraction data. Strictly, both analyses are only relevant for cohesion-less material. The Withers et al analysis is especially sensitive to both the assumed porewater pressure and residual friction angle and is a coarser measurement than the loading.

To apply these analyses, it is necessary to know the residual friction angle when the material is deforming under constant volume conditions. We have assumed that as the material is unloaded the mobilised friction angle will tend to this state. The input values lie in the range 38°-40°.

We have given estimates for the cavity reference pressure P_o. We have assumed that the values for P_o are representative of the total insitu lateral stress σ_{ho} . For an initial estimate we have attempted the iteration from the yield stress using the procedure of Marsland & Randolph (1977).

The result of the analysis process is a set of parameters that ought to be capable of producing the measured field data. The final act of the analysis procedure is to optimize the derived parameters and determine the drained cohesion using the solution of Carter et al (1986) as a curve fitting procedure. The solution has been modified to include for a non-linear elastic response. There are two unknowns, drained cohesion c' and P_o, that must be adjusted for best fit. The stiffness and strength data are inserted without alteration. To further validate the results, we have also applied the 1989 Manassero method (as modified by Whittle & Byrne, 2020) to the contraction data. This method does not consider cohesion and thus often results in higher friction angles when compared to Carter et al.

1.3 Report Layout

Although it is necessary to make judgments when analysing data, this remains a factual report. The parameters derived represent what seems a reasonable choice having applied a particular analysis. Other choices are possible, and the intention is that this report provides a full description of the tests and analytical methods employed so that the choices made here can be checked or modified.

This report is in two volumes. Volume 2 contains the test data, both raw and analysed, predominantly in graphical form. Volume 1 summarises the significant results and provides explanatory text.

The appendices of Volume 1 give further details of the instrument and procedures. Supporting data has been provided in Excel format.

1.4 Notation

The data collection system employed on site utilises a limited keyboard that restricts the options for describing a test. In particular it stores tests in the form B** T** where ** must be a number. The 'B', which may be modified, is intended to refer to the borehole and the 'T' refers to the individual test, so a typical test reference is B09T1 – the first test in borehole MS/BH09.

This limitation does not apply to the analysed data which uses different software.

Calibration tests to evaluate membrane stiffness and system compliance are reported in a similar manner, but using a test number that cannot be confused with an actual test.

1.5 Units

Pressure is quoted throughout in kPa. Displacements are quoted in millimetres which in turn are eventually converted to percent cavity strain.

Depths are given as mBGL (metres below ground level) from our measurements. Elevation is given in mAOD (metres above ordnance datum) using information provided by AEG.

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2 Details of work carried out

Table 2.1 below details the pressuremeter testing carried in the boreholes. Table 2.2 provides background information about the tests and probe used. Table 2.3 contains borehole details. Notes on the work carried out and tables of information are provided below.

Table 2.1 Sequence of work

Test	Internal ref.	Depth (mBGL)	Date	Max Pressure (kPa)	Material	Remarks
MS/BH06 Test 1	B06T01	25.75	03/06/2021	7435	Mudstone	-
MS/BH06 Test 2	B06T02	27.80	04/06/2021	10774	Mudstone	-
MS/BH07 Test 1	B07T01	25.20	06/07/2021	3747	Mudstone	Membrane extrusion at 3.7MPa. Issues recorded drilling pocket.
MS/BH07 Test 2	B07T02	27.40	07/07/2021	7979	Mudstone	-
MS/BH09 Test 1	B09T01	22.40	08/07/2021	7924	Mudstone	Membrane extrusion at 7.9MPa. Issues recorded drilling pocket.
MS/BH09 Test 2	B09T02	25.15	09/07/2021	11664	Mudstone	-
MS/BH11 Test 1	B11T01	22.80	10/06/2021	6048	Mudstone	-
MS/BH11 Test 2	B11T02	25.80	11/06/2021	8092	Mudstone	-

Notes:

1. **Depth** is given as metres below ground level the centre of the measuring section. The HPD membrane is 0.6 long, hence the affected zone is ± 0.3m of the quoted test centre.
2. **Material –** is based on information available to the Cambridge Insitu operator during fieldwork.
3. **Max Pressure** is the maximum pressure reached by the end of loading and may be used as a rough indication of how the material strength is changing with depth.

Table 2.2 Probe details and calibrations

Test	Operator	Probe	Transducer calibration	Membrane stiffness	System compliance
MS/BH06 Test 1	SDP	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH06 Test 2	SDP	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH07 Test 1	EJS	Wally (HPD)	17/05/2021	E0107T21	E0107T21
MS/BH07 Test 2	EJS	Wally (HPD)	17/05/2021	E0707T21	E0707T21
MS/BH09 Test 1	EJS	Wally (HPD)	17/05/2021	E0707T21	E0707T21
MS/BH09 Test 2	EJS	Wally (HPD)	17/05/2021	E0907T21	E0907T21
MS/BH11 Test 1	EJS	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH11 Test 2	EJS	Wally (HPD)	17/05/2021	K1705T21	K1705T21

Notes:

1. **Operator** –SDP is Stuart Pearce and EJS is Ewan Stockwell. They are both employees of Cambridge Insitu Ltd.
2. **Probe** – all tests were conducted with a 95mm High Pressure Dilatometer (HPD). A single probe was used, known as “Wally”.
3. For the probe there is a transducer calibration, referenced by date. There are also separate calibrations for the membrane and system compliance.

Table 2.3 Borehole information

Borehole	Easting (m)	Northing (m)	Ground level (mAOD)	Groundwater level (mBGL)
MS/BH06	457033.748	525517.758	7.976	4.78
MS/BH07	457195.207	525424.790	7.330	4.19
MS/BH09	456823.949	525534.870	7.466	4.27
MS/BH11	457121.000	525296.160	7.255	3.90

Notes:

1. The coordinates and ground level of the boreholes have been provided by Allied Exploration & Geotechnics Ltd.
2. The ground water level is based on groundwater information provided by Allied Exploration & Geotechnics Ltd. For MS/BH07 and MS/BH11 this is based on borehole specific groundwater monitoring. For MS/BH06 and MS/BH09 this is based on the groundwater monitoring across the site.

3 Summary of results

Table 3.1 details the initial stress state for each of the tests. Table 3.2 summaries the linear and non-linear parameters for deriving shear modulus and stiffness for each loop. Figures 3.1 to 3.4 are graphs of key parameters.

Table 3.1 Initial stress state

Test	Depth (mBGL)	Elevation (mAOD)	u_0 (kPa)	P_o (kPa)	σ_{vo} (kPa)	σ'H/σ'V
MS/BH06 Test 1	25.75	-17.77	206	593	567	1.07
MS/BH06 Test 2	27.80	-19.82	226	796	612	1.48
MS/BH07 Test 1	25.20	-17.87	206	440	554	0.67
MS/BH07 Test 2	27.40	-20.07	228	614	603	1.03
MS/BH09 Test 1	22.40	-14.93	178	619	493	1.40
MS/BH09 Test 2	25.15	-17.68	215	666	553	1.33
MS/BH11 Test 1	22.80	-15.54	185	479	502	0.93
MS/BH11 Test 2	25.80	-18.54	215	651	568	1.24

Notes on Table 3.1

1. **Depth** is given as metres below ground level to the centre of the measuring section.
2. The pore water pressure u_0 influencing the test. Refer to Section 1.2.3 for additional detail.
3. $\mathbf{P_0}$ is cavity reference pressure and is also the best estimate of σ_{ho}, the total horizontal insitu stress.
4. σ_{vo} is our approximate judgment of the overburden stress assuming a unit weight of 22kN/m^3.
5. **σ'H/σ'V** is the ratio of the effective horizontal insitu stress to effective vertical insitu stress, $\frac{(\sigma_{ho}-u_0)}{(\sigma_{vo}-u_0)}$.

Table 3.2 Parameters for strength assuming a drained path

Test	Depth (mBGL)	Elevation (mAOD)	P_f Obs (kPa)	P_f Calc (kPa)	ϕ_{cv} (°)	ϕ_{pk} (°)	Ψ (°)	c' (kPa)	σ_yield (kPa)
MS/BH06 Test 1	25.75	-17.77	3990	1858	40	46.0	8.2	280	1264
MS/BH06 Test 2	27.80	-19.82	4835	2010	40	48.1	11.3	85	1182
MS/BH07 Test 1	25.20	-17.87	1549	984	38	38.5	0.6	33	544
MS/BH07 Test 2	27.40	-20.07	3616	1502	38	46.7	11.8	73	888
MS/BH09 Test 1	22.40	-14.93	4418	1152	39	43.3	5.7	112	533
MS/BH09 Test 2	25.15	-17.68	5538	1686	40	47.0	9.6	191	1020
MS/BH11 Test 1	22.80	-15.54	2069	1033	40	43.1	4.2	72	553
MS/BH11 Test 2	25.80	-18.54	4824	1669	38	47.5	12.8	183	1018

Notes on Table 3.2

1. **Depth** is the distance below ground level to the centre of the pressuremeter membrane.
2. **P_f Obs** is observed yield stress, the point where the loading response becomes noticeably curved.
3. **P_f calc** is calculated yield stress, the point where the curve fitting procedure indicates the loading response first becomes fully plastic.
4. **ϕ_{cv}** is the residual friction angle. These angles are decided by applying Withers et al, 1989. The angles have been validated using 1989 Manassero method (as modified by Whittle & Byrne, 2020).
5. **ϕ_{pk}** and **ψ** are internal angle of friction and dilation. They are derived in the first instance by applying Hughes et al, 1977 and optimised by curve fitting with an adapted version of Cater et al, 1986. These values have been validated using 1989 Manassero method (Whittle & Byrne, 2020).
6. ***c'*** is drained cohesion. It is not measured but is a 'found' value required for the best fit curve comparison result. It should be used with appropriate caution.
7. **σ_yield** is the stress at which first failure occurs. This is calculated by a modification to the Carter equations.
8. MS/BH07 Test 1 and MS/BH09 Test 1 have little or no unloading data and therefore the results for strength are subject to greater uncertainty than for complete tests.

Table 3.3 Linear parameters relating to stiffness

Test	Depth (mBGL)	G_i (MPa	G_y (MPa)	Loop no.	G_{ur} (MPa)	Youngs Modulus (MPa)	Mean Strain (%)	Mean Stress (kPa)	$d\gamma$ (%)	dPc (kPa)
MS/BH06										
Test 1	25.75	66	147	1	363	944	0.205	1632	0.144	523
				2	467	1214	1.483	2836	0.189	883
				3	477	1240	3.163	3961	0.287	1369
				4	506	1316	9.274	3401	0.306	1551
Test 2	27.80	244	467	1	913	2373	0.277	2422	0.089	810
				2	908	2361	0.787	3999	0.154	1402
				3	872	2267	1.392	5168	0.207	1804
				4	1159	3013	5.279	4439	0.146	1699
MS/BH07										
Test 2	25.20	65	164	1	249	646	0.239	1095	0.171	425
				2	257	667	0.764	1450	0.219	563
				3	266	692	2.362	2162	0.281	750
Test 3	27.40	97	305	1	322	838	-0.561	872	0.084	271
				2	472	1226	-0.243	1198	0.075	354
				3	624	1622	0.502	2243	0.125	778
				4	550	1430	1.836	3885	0.266	1468
				5	509	1324	3.679	5122	0.377	1921
				6	489	1270	9.259	3634	0.404	1979
MS/BH09										
Test 1	22.40	318	2193	1	1183	3075	0.072	2397	0.068	804
				2	1249	3246	0.424	3886	0.114	1419
				3	707	1837	0.899	2132	0.134	948
Test 2	25.15	172	597	1	813	2114	0.230	2374	0.098	795
				2	867	2255	1.550	5458	0.237	2054
				3	888	2310	3.077	7133	0.262	2333
				4	908	2361	9.913	5170	0.270	2453
MS/BH11										
Test 1	22.80	298	936	1	868	2258	0.021	1129	0.048	417
				2	1013	2634	0.180	1812	0.067	683
				3	840	2184	0.514	2662	0.113	948
				4	636	1653	1.952	2678	0.223	1416
Test 2	25.80	80	214	1	463	1204	0.206	1633	0.113	523
				2	613	1593	0.858	2566	0.141	864
				3	617	1605	2.564	4208	0.214	1322
				4	626	1628	5.688	5553	0.254	1595
				5	675	1755	9.147	3654	0.270	1825

Notes on Table 3.3

1. G_i is initial shear modulus taken from the slope of the loading curve. It is expected to be less than the value from the first valid unload/reload cycle because it is showing the influence of the borehole preparation on local fracturing whilst G_{ur} is more representative of the rock mass.

2. $\boldsymbol{G_y}$ is secant shear modulus at yield strain. It is not directly measured but inferred from curve modelling.
3. $\boldsymbol{G_{ur}}$ is modulus obtained by taking the slope of the chord bisecting a cycle of unloading and reloading. This can only be shear modulus if the material response is linear elastic.
4. For comparison purposes, values for secant Young's modulus $\boldsymbol{E}$ at three axial strain values are given. These are derived from the following relationship: $\boldsymbol{E = 2G_{ur}(1 + \nu)}$ where $\boldsymbol{\nu}$ is Poisson's ratio (refer to Table 3.2 for test specific values)
5. The **mean strain** is the mean cavity strain of the loop. The **mean stress** is the mean total stress of the loop.
6. $d\gamma$ is the change in shear strain over the length of the loop. dPc is the change in total stress across the loop. This is used to calculate the modulus as $dPc/d\gamma = G_{ur}$**.**
7. Highlighted results should be ignored. These loops were taken to early in the cavity expansion to be considered valid and are influenced by the pocket construction related relaxation.

Table 3.4 Non-linear parameters relating to stiffness

Test	Depth (mBGL)	Loop no.	Constant α (MPa)	Exponent β	G_s for $\gamma=10^{-4}$ (MPa)	G_s for $\gamma=10^{-3}$ (MPa)	G_s for $\gamma=10^{-2}$ (MPa)	E_s for $\gamma_a=10^{-4}$ (MPa)	E_s for $\gamma_a=10^{-3}$ (MPa)	E_s for $\gamma_a=10^{-2}$ (MPa)
MS/BH06										
Test 1	25.75	1	39.160	0.708	577	294	150	1277	652	333
		2	33.422	0.636	955	413	179	2033	879	380
		3	28.568	0.597	1169	462	183	2436	963	381
		4	37.845	0.622	1230	515	216	2599	1088	456
Test 2	27.80	1	172.440	0.791	1182	731	451	2740	1693	1047
		2	68.882	0.660	1578	721	330	3404	1556	711
		3	81.582	0.671	1689	792	371	3665	1718	806
		4	131.052	0.714	1826	945	489	4057	2100	1087
MS/BH07										
Test 1	25.20	1	29.143	0.712	414	213	110	918	473	244
		2	21.027	0.655	504	228	103	1085	490	222
		3	13.331	0.578	650	246	93	1340	507	192
Test 2	27.40	1	119.772	0.879	365	276	209	888	672	509
		2	142.266	0.852	556	395	281	1333	948	674
		3	117.232	0.781	881	532	321	2031	1227	741
		4	56.096	0.671	1161	544	255	2520	1181	554
		5	45.274	0.637	1282	556	241	2730	1184	513
		6	55.751	0.669	1176	549	256	2548	1189	555
MS/BH09										
Test 1	22.40	1	768.522	0.943	1299	1139	999	3274	2871	2518
		2	355.774	0.834	1641	1120	764	3895	2658	1814
		3	42.369	0.628	1303	553	235	2762	1173	498
Test 2	25.15	1	295.005	0.867	1004	739	544	2427	1787	1315
		2	181.873	0.774	1458	866	515	3348	1990	1183
		3	101.331	0.683	1878	905	436	4103	1977	953
		4	187.669	0.767	1605	938	549	3671	2147	1255
MS/BH11										
Test 1	22.80	1	632.558	0.958	931	845	768	2366	2148	1950
		2	110.543	0.730	1329	714	383	2979	1600	859
		3	99.979	0.722	1294	682	360	2888	1523	803
		4	64.085	0.678	1244	593	282	2710	1291	615
Test 2	25.80	1	69.595	0.758	647	370	212	1472	843	483
		2	100.423	0.759	924	531	305	2105	1209	694
		3	73.553	0.695	1221	605	300	2684	1330	659
		4	68.293	0.676	1350	640	304	2938	1393	661
		5	94.291	0.708	1388	709	362	3075	1570	801

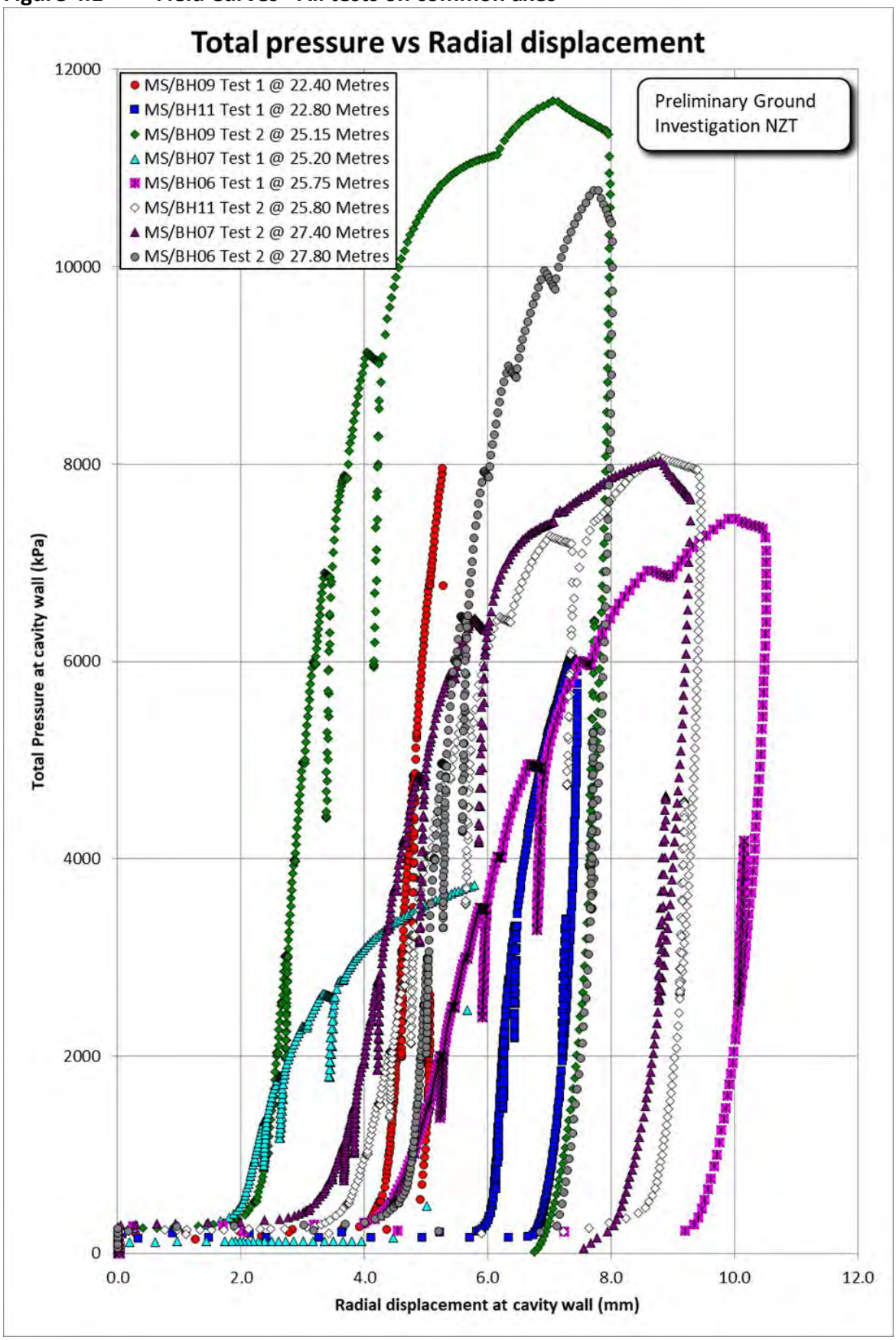
Notes on Table 3.4

1. If the material response is non-linear then the secant shear modulus can be approximated by a power law of the form $G_s = \alpha\gamma^{\beta-1}$ where α and β are discovered from a plot of reloading data on log scales. If the response is linear elastic then $\beta = 1$ and α would be identical to G_{ur}, quoted in Table 3.3.

2. Secant shear modulus parameters are given at three plane shear strain levels, $\boldsymbol{\gamma}$ of $10^{-4}/10^{-3}/10^{-2}$, but any value of shear strain can be used in the range 10^{-4} to 10^{-2}. All these modulus values are $\boldsymbol{G_{hh}}$.
3. For comparison purposes, values for secant Young's modulus $\boldsymbol{E_s}$ at three axial strain values are given. These are derived from the following relationship: $\boldsymbol{E_s = 2\alpha(1+v)\left(\gamma_a\sqrt{3}\right)^{\beta-1}}$ where $\boldsymbol{v}$ is Poisson's ratio. For these values 0.3 has been used. The $\sqrt{\boldsymbol{3}}$ term converts axial or invariant shear strain to plane shear strain, so that $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ can be used.
4. Highlighted results should be ignored. These loops were taken to early in the cavity expansion to be considered valid and are influenced by the pocket construction related relaxation.

4 Field Curves

Figure 4.1 Field Curves - All tests on common axes



APPENDIX A A DESCRIPTION OF THE EQUIPMENT

1 The High Pressure Dilatometer (HPD)

The 95mm High Pressure Dilatometer (95HPD) is a pre-bored hole pressuremeter for testing a 101mm diameter pocket. When a test is required it is lowered into a pocket in the ground conventionally formed by an H size barrel. On completion of a test it is removed from the borehole which is then extended by conventional drilling techniques.

The instrument is 2 metres long. The central third of the instrument is covered by a 6mm thick reinforced rubber membrane. Pressure is applied to the inside of the instrument and the membrane expands, pressing against the borehole wall. The radial displacement of the inside boundary of the membrane is measured at six points equally distributed around the centre of the expanding section. It is up to 95mm in diameter at the ends of the membrane and 94mm diameter at the centre of the membrane where displacements are sensed.

Figure 1.1 The 95mm High Pressure Dilatometer

This displacement, and the pressure necessary to cause the movement, are continuously monitored by strain gauged transducers contained within the instrument. Also within the instrument is the analogue and digital electronic circuitry necessary to condition the signals from the transducers. Every ten seconds a set of readings from all the measuring circuits are transmitted to the surface as an RS232 data stream which may be connected directly to the serial port of a microcomputer. Plotting these readings of displacement against pressure produces a loading curve for the material being tested. A number of mathematical analyses are available for translating this loading curve to fundamental strength and stiffness parameters for the ground.

Because the instrument has six strain arms there is some redundancy in the measurement of strain, and this enables the user to carry out a successful test even if one of the arms are defective. In order

to give a similar level of reliability to the pressure measuring system a second pressure cell is included in the HPD-MPX, and its readings provide a check of the performance of the first transducer.

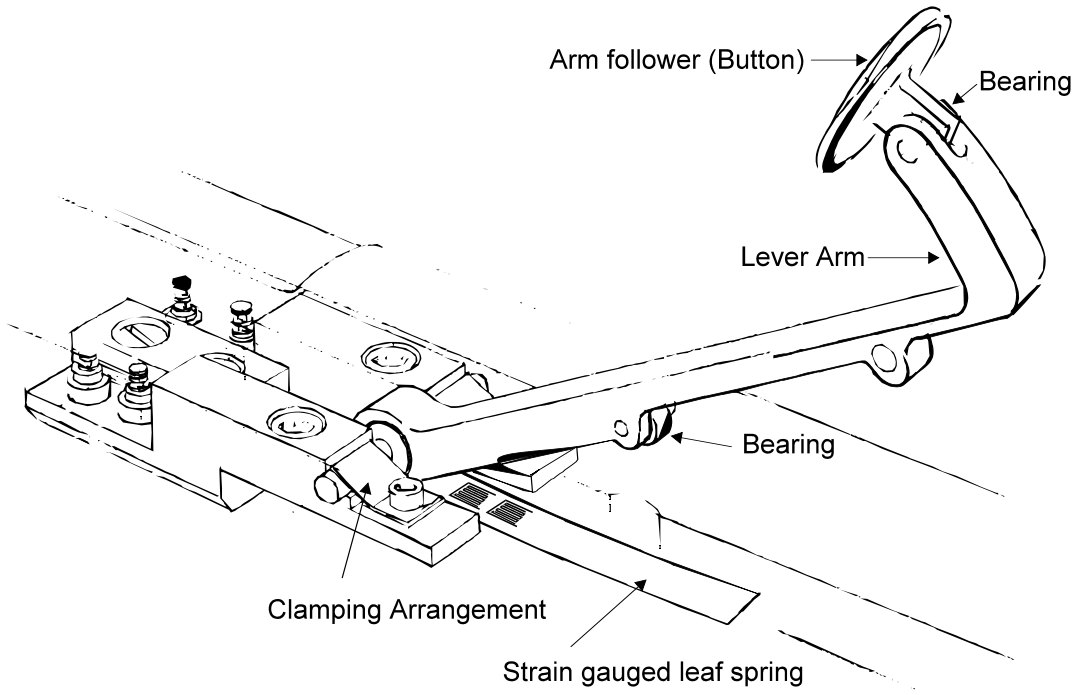


Figure 1.2 Displacement sensor of the 95mm HPD

The HPD can apply up to 30MPa of pressure to the ground, and can expand from an initial diameter of 95mm to nearly 150mm. It will resolve movements of less than 1 micron and pressure changes of less than 1kPa. Hence although it was developed to test weak rock it can make a test at two extremes of ground conditions - stiff clays, which yield at pressures below 1MPa, and weak rock with a shear modulus greater than 4GPa.

The instrument is based on a smaller device (the 73mm HPD) that has had a long and successful history of site work and has been used worldwide. It is a development of an instrument invented by Dr J.M.O. Hughes in 1978. Although internally complex by the standards normally applied to instrumentation of this kind, it is reliable and robust, and the routine maintenance is straightforward. Because all the signal conditioning electronics is contained in the probe itself , the instrument is unaffected by external changes such as replacing the cable.

An additional feature of this pressuremeter is an electronic compass module fitted to the foot of the instrument. This gives a continuous reading of the orientation of a fixed reference on the instrument with respect to magnetic North. The compass consists of two magneto-resistive sensors at right angles to each other. The output of the compass therefore is two signals which are the sine and cosine of the angle made with the Earth's magnetic field. The quotient of these gives an unambiguous direction.

Figure 1.3 Under the membrane of an HPD 95

Like all expansion pressuremeters in commercial use the HPD has one significant uncertainty- the loading curve which it produces is derived from following the movement of the *inside* boundary of an elastic membrane. This is different from the movements of the *outside* boundary of the membrane, and hence the movements in the material itself. For the majority of the tests for which the HPD is used, this uncertainty is not significant. However for a small number of tests it is critical; for this reason the calibration procedure described in Appendix B necessarily is complex in order to reduce the margin of uncertainty and set limits to it.

The instrument and all associated electronics for capturing the data are powered from a 12volt vehicle battery.

2 The Membrane

The membrane itself is a nitrile rubber sleeve. Because the behaviour of the membrane has an influence on the derived displacements it is kept relatively thin (8mm for the standard probe) so that its contribution is small. By its very nature there is a gap between the instrument and the borehole and steps have to be taken to prevent the membrane extruding axially. This is achieved by stiffening the ends of the membrane with rings of stainless steel fingers known because of their appearance as 'Christmas Trees'.

There is a version of the membrane which carries local reinforcement at the ends consisting of kevlar strands. When the applied pressures are fairly modest (no more than about 50% of the available range) then this membrane can be used without Christmas trees.

The entire length of the of rubber membrane is covered with a sheath of eighteen stainless steel strips which are axially stiff but free to expand radially. This sheath protects the membrane from sharp edges, and is known as a 'Chinese Lantern'. The individual strips do not overlap in the closed position.

3 The Pressurising System

The instrument is inflated by oil or gas. A strong hose connects the instrument to the pressure source, either a manually operated hydraulic pump or a pneumatic control system. The passage down the centre of the hose is large enough to incorporate a steel logging cable with four electrical conductors. Three of these conductors are used; one carries the digital signals output by the instrument, and two carry power to the instrument from a conventional 12 volt vehicle battery. The power consumption of the pressuremeter is small; up to 500 metres of hose and cable could be connected to the instrument with only minor modification.

Figure 3.1 The control system

The advantages of the oil inflation are that it is inherently safe, requires very little equipment and because it is re-cycled the consumable costs are low. However if the instrument is on a long cable it takes time for the oil to return to the surface and in a dry hole it will never return unaided.

When working over water, it is normal to fill the probe itself with oil but surcharge it with air. Should the membrane become punctured the oil will keep the water out of the probe.

4 Electronic Interface Unit (EIU)

All pressuremeter hardware is powered by a single 12 volt vehicle battery. The battery is connected to the EIU, which introduces some protection and distributes the power to a number of outlets, including one for the pressuremeter. The returning signals from the pressuremeter connect to the same socket. The digital signals pass through an opto-isolation circuit and are then made available on two identical sockets for connection to the serial port of a computer. There is also an analogue signal which represents the output of TPC A.

The unit has a panel meter which can be switched either to read the battery volts or to read the analogue signal representing pressure in the probe.

5 Data Logging / Analysis Software

Software developed by Cambridge Insitu is used to log the data during the test, and for analysing the results subsequently.

The logging software stores the incoming data, displays the pressure/expansion curve in real time, and provides a text file output of the test data in engineering units. This file is read directly by the analysis program but can also be read by any of the common spreadsheet programs.

The analysis software provides routines which implement a number of standard analyses. The analyses tend to be graphically driven, meaning that the analyst identifies and marks significant parts of the curve, either for breakpoints or slope. The final screen for the analysis is then output as hardcopy backup for the decisions made.

APPENDIX B CALIBRATING CAMBRIDGE PRESSUREMETERS

INTRODUCTION

The calibrations are of two kinds. The most straightforward are those related to the performance of the transducers that determine changes in stress and displacement. However, no matter how exact the measurement, what is being determined are the changes caused to the *inner* surface of a sealed membrane. The purpose of the test is to determine the alterations to the cavity wall on the *outer* surface of the membrane. The second aspect to the pressuremeter calibration therefore is calculating the difference between these two surfaces. The difference is due to the strength of the membrane and the finite stiffness of the instrument.

All Cambridge pressuremeters use similar procedures so examples are given from a variety of probes. This description is laid out in the following order:

1. Scale factors
2. The displacement measuring system
3. Pressure measuring transducers
4. Reference ('zero') outputs
5. Membrane stiffness
6. Instrument compliance
7. Instrument straightness
8. Membrane thinning
9. Repeatability (or how much effort should be devoted to calibrations)

1 Scale Factors

The transducers in the probes are based on full bridge strain gauge circuits, where one half of the bridge is in compression and the other is seeing tension. The gauges are matched and distributed so that the effects of temperature alteration cancel out. Any such transducer produces an output dependent on the voltage being applied to it, the stress deflecting it and the amplification or buffering between it and the recording system.

The instruments contain electronic devices that provide a regulated voltage to the transducers and amplification of the resulting output signals. Because this electronic conditioning is a fixed part of the system it is not mentioned when presenting calibrations. The electrical output of the transducer, in volts, is quoted only as a function of the deflecting stress. This function is termed 'sensitivity' and gives the scale factor for deriving pressure or displacement from the transducer electrical output.

Although the output of the transducers is described as voltages, the true output of the system is a digital data stream of ASCII encoded numbers representing volts. All variables associated with producing the digital output from the strain gauge signals are a function of the pressuremeter itself, and are independent of external changes (such as alterations to the connecting cable).

When using the sensitivity calibrations to convert readings from volts into engineering units we make two important assumptions about this output; that it is linear and that the hysteresis is negligible. The calibration procedure is the evidence that these assumptions are reasonable.

2 The Displacement Measuring System

The displacement measuring devices are often referred to as 'the arms'. The arms are calibrated by mounting a micrometer above each in turn and recording the output for a given deflection. When calibrating an instrument it is necessary to plot these readings for both an increasing and reducing

deflection. The difference at a given point between the increasing and reducing path is a measure of the hysteresis. The worst case figure is noted, and corrective action is taken if the hysteresis is outside an acceptable limit - normally 0.5% of the sensitivity. We use micrometer heads with a non-rotating stem to ensure we are not spoiling the hysteresis measurement.

The slope of the best fit straight line through all the points is used to quote the arm sensitivity - as an output for a given deflection in units of millivolts per millimetre (mV/mm). See Figure 2.1.

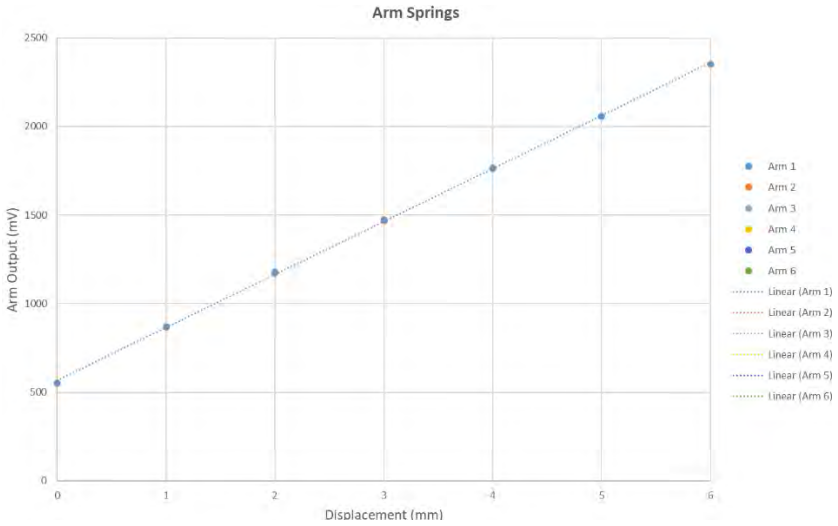


Figure 2.1 Arm Calibration example

3 Pressure Measuring Transducers

For pressure measuring circuits the maximum possible sensitivity is desirable, the only requirement is that the sensitivity be known and be linear and stable.

The sensitivity of *internal* pressure transducers is determined by placing a large metal cylinder over the probe and applying a known pressure to the inside of the instrument. The pressure being applied is measured by a standard test gauge. As with the arms, readings are plotted, the hysteresis noted, and the best fit straight line drawn through the plotted points.

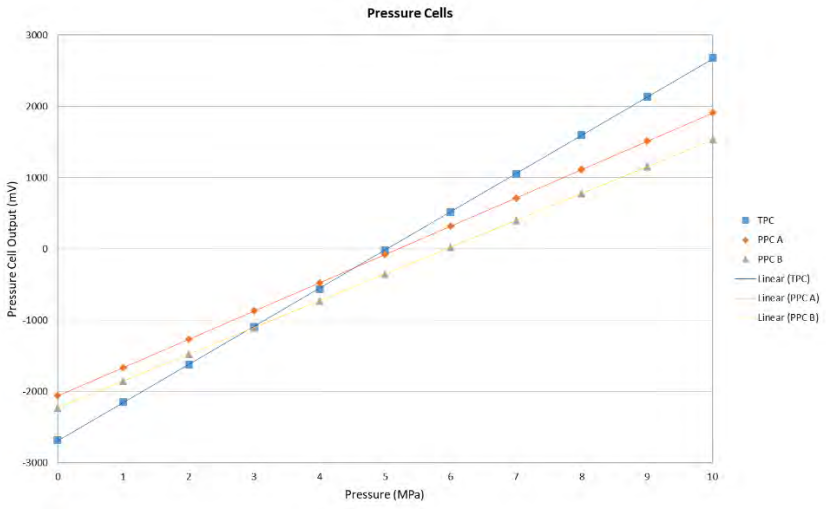


Figure 3.1 Pressure cell calibration example.

The pore pressure transducers on the SBP are calibrated in the same way. In use, the diaphragm of the transducer sees external water pressure through a filter, which requires a sealed path through the pressuremeter membrane. For calibrating, this can be awkward to mimic, as it requires an externally applied pressurising system that has to seal to the outer surface of the membrane. Instead, a membrane without the passage to the filters is used as a temporary measure, so that the pore pressure transducers become, in effect, total pressure transducers and see the internal pressure.

Pressure sensitivities are quoted in units of millivolts per MPa. See Figure 3.1.

4 Reference ('zero') outputs

The other parameter that the transducers have is a known output for an 'at rest' position. This is the value of the outputs produced by the circuits with atmospheric pressure both inside and outside the instrument, and any displacement measuring system at the initial radius position. This is called a little misleadingly 'zero'.

The absolute value of this figure is normally unimportant - it is not necessary that the figure be zero volts for zero displacement or stress, just that it be known. For practical purposes, as the analogue to digital converter outputs a number between –3.2767 and +3.2767 volts, the 'at rest' readings for the arms are set to be about -2 volts to allow a large output range with a margin for gradual drift over time.

A similar situation applies to the pressure cell – the absolute value of the 'zero' output is unimportant provided it allows the full pressure of the system to be resolved. Adjustment positions using 1% metal film resistors are provided in the instruments for setting all 'zero' outputs.

It is recommended to take (and make a record of) zero readings both at ground level and also at test depth immediately prior to carrying out a test. A significant change between zero readings must be investigated. 'Significant' would mean a change of 30 millivolts from the last set of zero readings. It is not unusual for shifts of a few millivolts to occur from day to day. It is important that the zero readings be stable when viewed over a period of a few minutes.

Note that when using oil to inflate a probe, ground level readings are the preferred reference because once in the borehole the pressure transducers will read the head of oil. For gas inflation it is probably better to use the zero readings when the probe is in place in the borehole, because it will then be at the temperature most applicable to the test. However the self boring probe is fitted with pore pressure transducers. These two transducers must use zeroes recorded at ground level if they are to read the full water pressure in the ground.

5 Membrane stiffness

The membrane that is expanded by a pressuremeter has its own initial tension requiring a finite pressure to move it. The readings measured by the stress cells need to be reduced by this pressure in order to determine the net stress being applied to the ground.

The membrane correction is idealised as two components – a fixed pressure (in kPa) to move the membrane from its position at rest on the instrument, and a variable pressure dependent on the radial expansion, in units of kPa/mm.

The technique for obtaining the correction data is to pressurise the instrument in free air, ideally using similar rates of expansion as would be applied during a test.

The slope and the intercept on the pressure axis of the graph produced by this test give the membrane correction information for each arm. See Figure 5.1 and Figure 5.2.

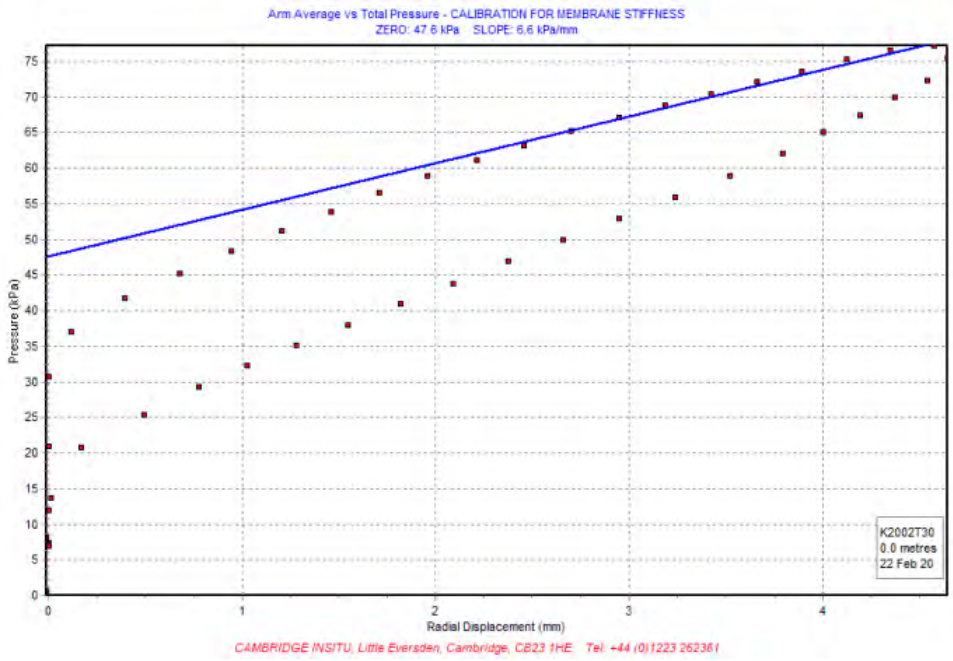


Figure 5.1 An example of an SBP membrane stiffness calibration- Slope

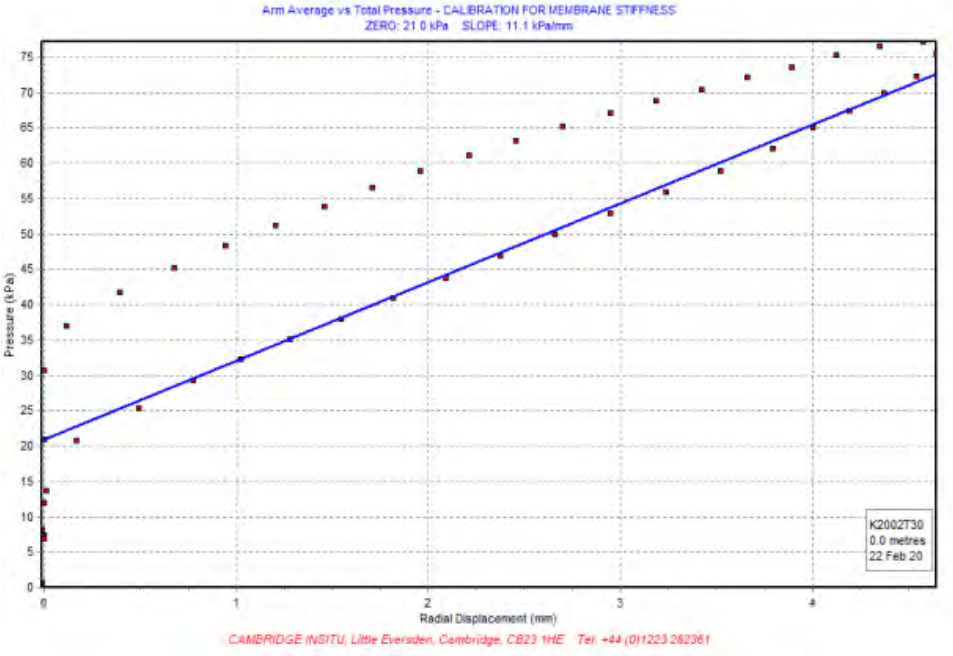


Figure 5.2 An example of an SBP membrane stiffness calibration- intercept

Knowing that the membrane does not necessarily possess isotropic properties, it has been customary to derive a different set of figures for each arm position. However an unconfined inflation in air exaggerates any variation in membrane properties; an average correction factor is more appropriate. The argument is that the ground has significant strength and stiffness, so that the membrane is always the weaker component. Hence although in air the weakest part of the membrane will move first when expanding, in the ground this cannot happen. Conversely, when the unconfined membrane is unloaded, the strongest part of the membrane will dominate. The consequence is that in air the

membrane response looks like a hysteresis loop. The nearest approximation to the behaviour of the membrane in the ground will be the unloading phase of the test in air.

Typical correction figures are 20kPa and 15kPa/mm. Occasionally we calibrate membranes in a batch to save time when replacing them. The calibration values are written on the membrane.

6 Instrument compliance

The instruments will deform as a consequence of the pressure being internally applied. Put simply, the probes stretch. Because the displacement measuring system uses the body of the instrument as a reference, movements of the body are seen as apparent displacements of the membrane; some ingenuity is needed to isolate the displacement measuring system from this problem. This system compliance has implications for the measurement of shear modulus, and it can become a significant source of error when measuring very high modulus values.

There are a number of effects to consider but they are collectively determined using a single procedure. The correction figure which results is known for historical reasons as 'membrane compression', unfortunately not a good description.

For the Cambridge family of pressuremeters real membrane compression, that is the membrane changing in thickness as a direct result of the pressure differential across it, is almost too small to be measurable. There are a number of other factors to consider of greater magnitude than membrane compression.

Inflating the instrument inside a metal cylinder will provide data on the magnitude of these effects. However a separate source of error, which is a function of the calibration procedure itself, then becomes apparent. The membrane is able to expand axially by a small amount, and as a result experiences a change in thickness which may not occur in the ground. Although steps can be taken to keep this axial movement to a minimum, it cannot be eliminated.

As a consequence of the relatively poor fit of a calibration cylinder, and also the low coefficient of friction between the membrane and the steel by comparison with the membrane and the ground, the instrument will move about in the cylinder - its centre will not be the same as the centre of the cylinder. Only average radial movement can be derived from this calibration process, and it is not sensible to try for separate factors for individual arm.

If metal protective strips are fitted then part of the correction response is due to these strips taking up the form of the cylinder, a process that would only occur in the ground if the material was good rock. This is the explanation for much of the initial curvature that occurs when an assembled probe is inflated inside a metal sleeve - it is a serious error to attempt to derive a correction factor from this part of the loading.

Taking account of all the above, the following method is used. The outer sheath is removed and a thick wall metal tube of known properties is placed over the membrane of the instrument. The instrument is inflated slowly until the membrane contacts the wall of the tube. The test continues, either as a gentle continuous inflation or in discrete steps, holding each step briefly to ensure maximum accuracy. The probe is pressurised up to maximum working pressure. The pressure is then reduced, also in steps of 5 bars. Some users prefer the unloading should be down to 20 bars, then the probe should be reloaded again to maximum pressure and unloaded to zero, in effect doing a large unload/reload cycle. In a good calibration, all loading and unloading slopes will be similar, but it sometimes happens that the probe moves with respect to the cylinder and this will affect the data. In this event doing the second reloading would give the best correction information.

The calibration is obtained by plotting the pressure/displacement data on a large scale, and finding the best fit slope through the points. The slope ought to be the known expansion of the cylinder for the pressure applied. In practice it is always a little more, the difference being the 'membrane compression' figure. We quote the figure in terms of 'mm/GPa' a typical compression being between 2 & 5mm/GPa, depending on the type of probe. See Figure 6.1.

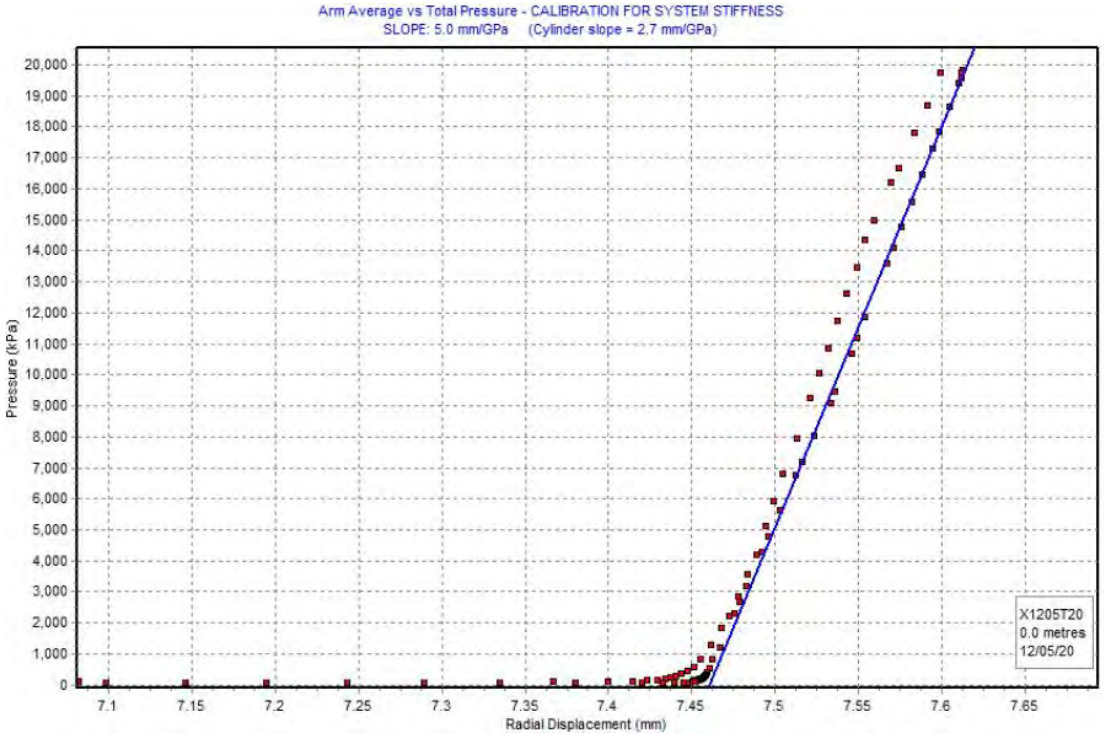


Figure 6.1 An HPD system compliance calibration

Quoting the compression in this manner allows the software to calculate the appropriate error for every step of pressure and to make the necessary adjustment to the measured displacements.

To put the correction in context, a slope of 3mm/GPa is equivalent to a modulus greater than 4GPa.Because the calibration is highly repeatable, within about 5%, the actual uncertainty is considerably higher than 4GPa, so shear modulus of 20GPa or more can be determined within acceptable limits.

7 Instrument straightness

All instruments can become bent during operations due to the large forces that occasionally are applied when the probe is not well supported. Before bringing the instrument on site it is good practice to check that the instrument is straight (within a small tolerance). The method for doing this is to support the instrument at the points where the membrane is clamped, and then to rotate the instrument whilst the run out is observed at a number of points. A record is kept indicating the total runout at these points, and the probe can be straightened if the deformation is significant.

The instrument is never perfect, and it happens that frequently a consistent bias in the displacement system (especially in the vicinity of initial movement of the membrane) can be linked to a lack of straightness.

This is an especially important check for the self boring probe.

8 Membrane thinning

During a test the pressuremeter membrane changes in thickness as a consequence of being stretched. This change in thickness can be calculated by assuming to a first approximation that the cross-section area of the membrane remains constant. The calculation is incorporated into the program that converts raw data into engineering units.

Note that the term 'membrane' includes the stainless steel protective sheath, and that the measurement made by the arms is the radial distance to the inside of the membrane.

Definition of Terms

a	is the internal radius of the membrane at rest
b	is the external radius of the membrane at rest
c	is the internal radius of the membrane expanded
r	is the external radius of the membrane expanded
t	is the thickness of the stainless steel sheath strips
d	is the measured movement of the strain arm
E	is the actual expansion of the membrane

Calculation

At rest the cross-section area of rubber = $\pi(b-t)^2 - \pi a^2$

The expanded cross-section area of rubber = $\pi(r-t)^2 - \pi c^2$

Because the rubber is incompressible, these must be equal:-

Therefore $(b-t)^2 - a^2 = (r-t)^2 - c^2$

Now:- $c = a + d$

and:- $r = b + E$

hence $(b-t)^2 - a^2 = [(b+E)-t]^2 - (a+d)^2$

$$\therefore [(b-t)+E]^2 = (b-t)^2 - a^2 + (a+d)^2$$

$$(b-t)^2 + d(2a+d)$$

$$(b-t) + E = \sqrt{[(b-t)^2 + d(2a+d)]}$$

$$E = \sqrt{[(b-t)^2 + d(2a+d)]} - (b-t)$$

This is the form in which the calculation is commonly applied to the data, with 2*a*, 2*b* and *t* being known from the manufacturer's data, and *d* being the measurement made by the displacement sensors during the test.

Typical dimensions for three types of probe are:-

	47mm RPM	**88mm SBP**	**95mm HPD**
	(mm)	(mm)	(mm)
2*a*	38.00	79.15	81.00
2*b*	47.00	88.10	95.00
t	0.5	0.5	0.5

To apply the correction at a given expansion the *average* radius of the expanding membrane is calculated. This average is then entered into the equation and the ratio between the corrected average and the raw average is expressed as a scale factor (for example it is about 0.86 for an RPM at all expansions). The scale factor is then applied to the individual arm displacement outputs.

9 Repeatability (or how much effort should be devoted to calibrations)

Although it is important regularly to check the sensitivities of the strain gauge circuits, it is unusual for them to change markedly. Indeed it is common for the hysteresis to improve with use or exercise. 90% of the performance of a strain gauge bridge application can be predicted from its design; the calibration removes the uncertainty due to manufacturing tolerances, and can give early warning of impending problems in a particular circuit.

The expansion test is concerned with making relative measurements, not absolute measurements. The displacement measuring system will resolve movements of less than 0.5 microns over a range of 13 millimetres; the pressure measuring system will resolve changes of 0.1 kPa over a range of 20MPa. This resolution is considerably higher than can be seen with a standard micrometer or test gauge. To put it into context, 0.5 microns is approximately the wavelength of ultraviolet light. Obviously there is no practical possibility of checking by measurement a movement so small.

Hence the term 'calibrating' is inappropriate. What is done in practice is to check that the various sensors are linear over a number of relatively coarse steps or intervals. We assume that this linear behaviour will be true for very much smaller changes.

We expect successive calibrations on the same sensor to be within 2% and investigate a difference greater than 3%.

We also ignore smaller sources of error in this assumption of linearity, such as temperature change. The full bridge configuration is inherently insensitive to temperature variation, and in addition the strain gauges used are matched to the characteristics of the surface to which they are bonded. When critical measurements are being made during a test, for example when taking a reload loop, it is reasonable to assume the temperature remains constant. The ground is usually at a constant temperature whenever a test is carried out, but sometimes there are problems - the temperature of the gas being supplied to the downhole tool can have an influence especially if the gas bottle reservoir is lying outside in direct sunlight.

Spreadsheet software is used to present the results of the calibrations for sensitivity. One benefit of this is that gradients are calculated by linear regression routines; this ensures different operators given the same set of data will derive identical calibration factors. The calibrations are presented as a tabulation of transducer output against a known reference, with the linearity and hysteresis quoted for each calibration step.

The membrane corrections seldom change greatly and the strength of material tested means that for the most part any errors in the magnitude of the correction are of minor importance. In general, if the material is weak (shear strength less than 100kPa) then membrane strength and stiffness are important. If the material is extremely stiff (shear modulus greater than 1GPa) then correcting for instrument compliance is important. In between these two extremes the influence of the imperfections of the machine on the derived parameters is minor.

APPENDIX C THE TEST PROCEDURE

1 Placing the HPD

The HPD test is carried out in a 101mm pocket that has been formed by coring or occasionally by rock roller. Coring is the conventional method because the recovered core can give some information about the pocket before the instrument is placed. Samples of the core are normally of sufficient quality to permit standard laboratory testing, which can be compared with the pressuremeter results.

The pocket itself should be at least 2 metres long. This allows the user some choice about the exact point in the pocket in which to place the HPD. Note the following crucial measurements

- From the foot of the instrument to the centre of the measuring section is 0.9 metres.
- The expanding part of the instrument is about 0.6 metres.
- The instrument is 2 metres long - if the BW extension rod is added to this then the effective length from the foot of the pressuremeter to the start of the rotary drill string is 3 metres. If the pocket is longer than 3 metres then the diameter of the drill rod used to place the pressuremeter must not exceed 75mm; this together with two thicknesses of hose, is the maximum that will fit into a 101mm pocket.

From these dimensions it is apparent that the instrument must be at least 1.3 metres into the pocket, and for safety we use 91.7 metres as a minimum. The very lowest part of the pocket should be avoided as this is often the area most spoiled by the coring, but as the test centre is some distance from the foot of the instrument this is not normally a problem.

Soft patches in the core suggest a point that ought to be in the test section. However soft patches at the ends of the expanding section may result in the membrane bursting before the pocket has been properly loaded.

Heavily fractured material around the test centre, although not likely to burst the membrane, will present problems of a different kind. The analyses that currently exist for the pressuremeter test assume that the material is intact - if this is not the case, then although the data may be good, deciding what they mean may prove complex.

It is a truism that the quality of the test is dependent on the quality of the initial coring. However many good tests have been made in pockets where no core at all was recovered. Standard coring practice is designed to preserve the core without regard for the borehole wall. This is the opposite of what the priorities need to be for the pressuremeter test.

Details about the core, if available, are noted as they can be useful in interpreting the test results.

2 Description of the Test

The test the probes makes are loading tests. Pressure is applied to the instrument and readings are taken of this pressure and the resulting displacements of the cavity. Plotting pressure against displacement gives a test curve with a characteristic 'S' shape. The HPD makes two kinds of test:

A) The material yields well before the maximum pressure capability of the equipment is reached.

B) Tests where the maximum pressure capability of the HPD is the limiting factor.

This project only saw type A tests.

For a pre-bored test, at regular intervals the pressure was held constant for at least one minute. This gives the loading curve a slightly stepped appearance. These are known as ‘creep’ readings . Because the probe outputs at a constant rate there are also readings from between these pressure steps.

Creep readings were not taken within unload/reload cycles or the final unloading. Analysis of the creep data can inform about the transition from elastic to plastic deformation.

Tests in material that can be failed in shear- Type A

It is the loading curve of these tests that tend to take the 'S' shaped form. At the start of the test the membrane is lying on the body of the HPD. There are then several distinct parts to the test:

(1) Pressure is applied, the membrane lifts off the body of the HPD and expands out to touch the sides of the borehole. Hence there are large displacements for very little pressure.

(2) Further increments of pressure define the first curve of the 'S' shape; this curve is the instrument taking up the contour of the pocket and the cuttings left behind by the coring being squeezed out.

(3) Following this is a linear part of the loading curve. The pressure being applied is remoulding the material adjacent to the HPD that has been failed by the coring process, but is not yet sufficient to extend the zone of failure into fresh material. In this part of the test the pressure is increasing but is having little effect on the strain.

(4) Once the pressure is sufficient to extend the zone of failed material the upper curve of the 'S' starts to be defined, eventually reaching an almost linear condition once more where strain is increasing rapidly for very little increase in pressure.

(5) At this stage the cavity can be unloaded and the full unloading curve be drawn. The first part of this will be nearly linear, curving away as the pressure and strain reduce to zero.

There are several ways of using the data contained in the pressure/strain curve but the most common is to use it to derive fundamental parameters about the strength of the material being tested. Therefore the precise manner in which the test is carried out should be chosen to make it easier to assess these parameters.

The slope of the initial linear part can give a value for the initial shear modulus G_i but because this part of the curve is sensitive to the disturbance produced by the coring the derived value may well not be representative of the true shear modulus of the material.

A better estimate of G can be made by taking unload/reload loops at intervals along the loading path. To do this a little of the pressure that has been applied is released and then reapplied in a controlled manner, taking readings of the changing strain. This produces a characteristic loop. The slope of the best fit straight line through the long axis of the loop can be used to derive G_r.

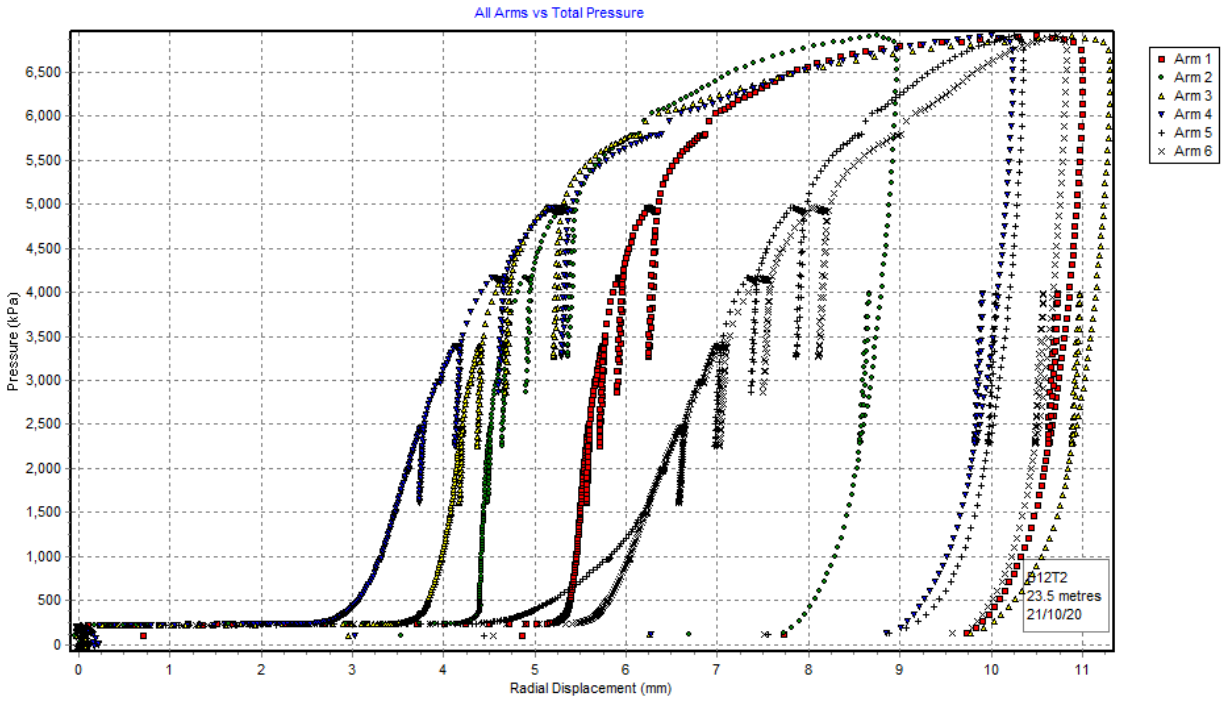


Figure 2.1 Example of HPD test in a material showing significant deformation

The value of G produced in this way is relatively insensitive to the initial drilling disturbance. The shear modulus is probably the single most useful parameter that the HPD test can produce. Because of this significance it is usual to take at least two loops at suitable points on the test curve . Suitable points would be on the linear part of the curve and as soon as there are indications of failure. Loops can also be taken on the unloading curve. Before starting the loop the pressure is held for 3 minutes to allow residual creep effects to minimise – 3 minutes is about the time taken to carry out a cycle.

The ratio of G_i to G_r can give an indication of the extent of the disturbance created by the coring of the pocket.

Deductions about the material strength or internal friction angle are made from the part of the curve following yield until the end of loading. Note that it is also possible to analysis the final cavity contraction curve for strength and stiffness. In many ways this is preferable, because there is only minor uncertainty concerning the origin of the contraction event.

3 Logging Rate

A line of data representing the output of all transducers was logged every 6 seconds for the SBP and 10 seconds for the HPD.

4 Terminating a test

The decision about when to stop a test depends on a number of factors, as follows:

- For any test the operator is trying to record at least two unload/reload cycles and to record a full cavity contraction. This is because in recent times the advantages of analysing the unloading of a cavity have become apparent.
- If possible the operator wants to see the material yield, and record at least some of the plastic response of the material.

- If the maximum pressure capability of the instrument is reached then this is an obvious termination imperative. However no test on this contract reached the pressure limit of the equipment.
- This decision making process can be informed by indications that the material is showing unusual behaviour such as a structural breakdown.
- If the maximum displacement capability of the instrument is reached then this is an obvious reason to terminate the test. The criteria for termination based on displacement depends on the material and the size of the initial pocket. A tight pocket in any material can be taken further than one in an oversize pocket that yields at stress levels greater than 100 bars.

APPENDIX D ANALYSIS OVERVIEW

This appendix gives details of the methods used to derive the results of pressuremeter tests on this contract. The text is illustrated with examples from the fieldwork.

1 MATERIAL PROPERTIES FROM PRESSUREMETER TESTS IN SOIL.

1.1 Notation

P_o	Initial cavity reference stress (total)
P_f	Pressure when yield first occurs at the cavity wall (total)
P_{max}	Maximum pressure reached
r	Radius
r_o	Initial radius of cavity
ε_c	Cavity strain
G	Shear Modulus

1.2 Overview

There are two established approaches to the interpretation of expansion pressuremeter test data. The first, developed by Menard, uses empirical correlations to allow measured co-ordinates of pressure and displacement to be inserted directly into design equations. This approach depends on a standardised test procedure and a large data bank of pressuremeter tests correlated with observations of the response of finished structures.

The second approach, which will be described here, relies on solving the boundary problem posed by the pressuremeter test.

The aim of the pressuremeter test is to expand a long cylindrical cavity within an undisturbed mass of soil. Fundamental strength properties of the material can be deduced from measurements made of cavity pressure and displacement. In practice no instrument can be placed into the ground without affecting the surrounding soil. In the case of a self-bored pressuremeter test the disturbance is generally within the elastic range of the soil and can be allowed for in the analysis procedure.

1.3 Defining strain

For a pressuremeter measuring the radius of an expanding cavity the conversion from displacement to strain is:

$$\varepsilon_c = \frac{r - r_o}{r_o} \qquad \text{[Equ 1.1]}$$

where r is the current radius of the cavity and r_o is the original radius of the cavity in the insitu state. This is simple strain and when displacements are measured at the borehole wall is termed cavity strain, ε_c.

r_o can be approximated by the at rest radius of the instrument. The preferred approach is to identify when the applied pressure has reached the insitu lateral stress, and interpolate from this the corresponding radius, which then becomes r_o.

Note that although the pressuremeter measures the radius of the cavity wall, ε_c is a specific instance of circumferential or hoop strain. It is usually expressed as a percentage.

Figure 1.1 shows how pressures and strains in the expanding borehole are defined.

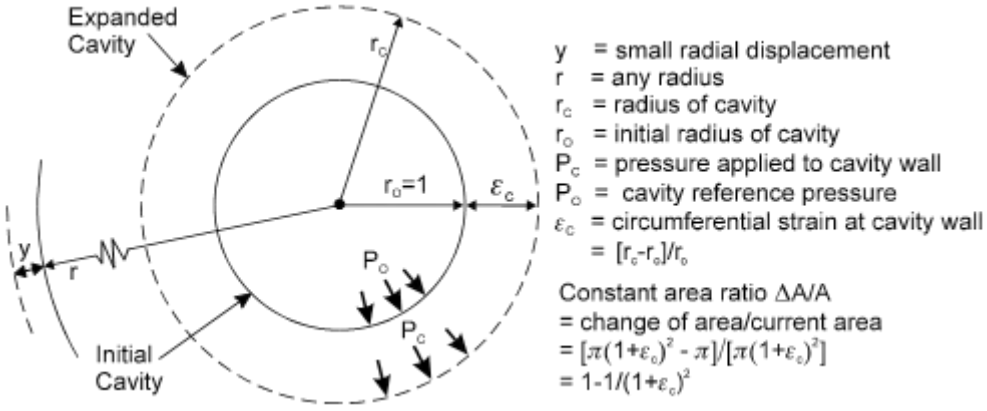


Figure 1.1: Pressures and strains around the expanding cavity

The other strain commonly used is the constant area ratio, which is shear strain. As Figure 1.1 indicates it can be defined in terms of simple strain.

The large expansion pressuremeter test results in the soil experiencing very large strains and the approximations of simple strain conventionally used in pressuremeter testing when converting displacements are inappropriate. True strain or natural strain is the sum of the incremental increase in radius divided by the current radius, which is conveniently defined as:

$$Ln\left(\frac{r}{r_o}\right) \text{ or } Ln(1+\varepsilon_c) \qquad \text{[Equ 1.2]}$$

This makes it possible to use the 'at rest' radius of the probe as an origin for strain, even though the soil particle adjacent to the probe before starting to inflate the membrane has been displaced by at least the instrument radius.

Some calculations are easier with true strain. Consider the equation for determining shear modulus from the slope of rebound cycles - Mair and Wood (1987) write this as:

$$2G = \left[\frac{r}{r_o}\right]\left[\frac{\Delta P}{\Delta \varepsilon}\right] \qquad \text{[Equ 1.3]}$$

It is apparent from [Equ 1.2] that the term $(\frac{r}{r_o})$ is a correction factor made necessary as a consequence of using simple strain - the equation reduces to:

$$2G = \left[\frac{\Delta P}{\Delta \varepsilon}\right] \qquad \text{[Equ 1.4]}$$

if ε is defined in terms of true strain. As $\Delta\varepsilon$ is merely a change in strain, no knowledge of the actual strain origin is required in order to calculate a modulus parameter.

1.4 Average displacements versus the output of the separate axes

There are a number of displacement sensors in the expansion probe but recommended practice is to quote parameters from the average displacement curve. This is for two reasons:

- The reference for the measured displacements is the body of the instrument itself - trying to separate the individual axes means assuming that the body of the instrument remains fixed at all times, which is not realistic.
- All available analyses assume isotropic properties in the surrounding soil, and only the average pressure/strain curve represents this condition.

These remarks assume that the instrument is in full working order throughout the test - failure of a displacement follower means that alternative strategies must be adopted.

The significance of the first point above has been demonstrated by an examination of cycles of unloading taken from separate arms (Whittle 1993) and by work with a six arm version of the Self Boring Pressuremeter (Whittle et al 1995).

1.5 The Analysis program WINSITU

We use (and supply to others) software for analysing a pressuremeter test. The program is called **WINSITU,** it has been in use for a number of years.

To use the program the user must first read in a text file of test data in engineering units. The program needs to know the type of instrument being used, and the user may choose to enter additional background information about the test.

The next task is to identify for the program the nature of the individual data points. Broadly, the options are these:

- a point can be part of the expansion curve
- or part of a reload loop
- or part of the contraction curve
- or none of the above. This might mean a 'rogue' data point, but it is more likely to be true of parts of the loading where the expansion was slowed prior to taking an unload/reload cycle. Data points recorded at this time are neither part of the expansion nor part of a cycle, and should be identified as such.

There is a quick on-screen routine for marking the points. Once marked, they appear in different colours. Most of the analyses use a limited set of the available data - for example the Gibson & Anderson analysis for undrained shear strength uses only points on the expansion curve.

The program implements all the standard analyses mainly in a graphical form. As fig 1.1 implies, there are significant changes of gradient in the pressure/strain curve denoting critical soil parameters. The user of the program is provided with on-screen tools to mark these breakpoints or to obtain the slope of the loading curve. The tools can be visualised as rulers, whose position is stored by the program in the file of test data. The evidence for any derived parameter is a screen dump of the appropriate analysis that shows the position of any rulers set by the user and quotes the parameter obtained. Even when the user declines to make a choice it is good practice to provide the screen dump as evidence of why a choice is difficult.

The results for a test appear as a summary sheet of derived parameters followed by a number of plots showing the application of the various procedures.

Sometimes analyses are required which are not included in the WINSITU program. In such instances commonly available spreadsheet software is used to implement the new analysis. Inevitably in such circumstances there is some risk of human error affecting the conversion of data in engineering units to the form required for analysis. WINSITU has export facilities and wherever possible is used as the data source for the spreadsheet.

2 ANALYSES FOR INSITU LATERAL STRESS

2.1 Notation

P_o	Initial cavity reference stress (total)
P_f, P'_f	Pressure when yield first occurs at the cavity wall, total and effective
$\sigma_{ho}, \sigma'_{ho}$	Insitu lateral stress, total and effective
$\sigma_{vo}, \sigma'_{vo}$	Insitu vertical stress, total and effective
k_o	Ratio of horizontal to vertical effective insitu stress
C_u	Undrained shear strength
τ_f	Shear stress when yield first occurs
G_i	Shear modulus from the initial slope of the loading curve
u_o	Ambient pore water pressure
γ_w	Saturated unit weight of soil
k_{onc}	k_o for over consolidated soils
OCR	Over consolidation ratio
β	Exponent of non-linearity

2.2 Overview

The expansion pressuremeter test is a sequence of measured co-ordinates of pressure and displacement of the cavity wall (once suitable corrections have been made to compensate for the response of the elastic membrane).

Conventionally, an origin for the expansion has to be determined. For insertion methods that imply stress *relief*, the origin is taken to be the point where insitu conditions are restored to the cavity. This means that an estimate of the insitu lateral stress has to be made, and the measured radius of the cavity at the point where the insitu lateral stress is restored is used to convert subsequent displacements to strain.

It is sometimes possible to recognise the insitu lateral stress by finding a point of inflexion as the cavity begins to expand in earnest, the so-called lift-off method. It is also possible to recognise by inspection the shear stress limit as this is indicated by the onset of a markedly non-linear response. An iterative procedure first suggested by Marsland & Randolph (1977) allows the insitu lateral stress to be inferred. The method uses a very simple model and the results should be treated with appropriate caution. In material where the cavity has been formed without removing material the analysis is not useful.

A more complex approach uses the full set of parameters derived from a pressuremeter test within a model and discovers whether the measured field curve can be recovered. The input data set is then adjusted in a strictly controlled manner until the best match for all parameters is obtained. If the material has been taken to a limiting condition, this approach is unlikely to give sensible results for insitu lateral stress although for the undrained case alternatives approaches may be possible (Houlsby & Withers, 1988).

All these methods amount to obtaining a value for the cavity reference pressure, P_o. It is not possible to measure the insitu lateral stress σ_{ho} because the act of placing instrumentation always results in some disturbance, even if small. The methods above are indirect indicators for determining σ_{ho}.

It is open to question whether the reference stress is equivalent to the insitu lateral stress, and it is usual to bring a range of evidence to bear in order to decide if a particular value for P_o is also a plausible value for σ_{ho}. External evidence might take the form of using the derived reference stress within a k_o calculation, or checking that the derived vertical/horizontal anisotropy can be supported by the material shear strength:

$$\sigma_{ho} - \sigma_{vo} < 2C_u \quad \text{[Equ 2.1]}$$

In practice there is a wide range of values that would satisfy this condition so only the most extreme estimates for σ_{ho} would be identified by such a test.

2.3 Marsland & Randolph (1977) Analysis

Marsland & Randolph analysis relies on being able to identify the onset of plastic behaviour, the yield stress P_f. The argument is as follows:

- In the vicinity of the insitu lateral stress the soil response is simple elastic manner and therefore the total pressure/ cavity strain plot will be linear.
- Elastic behaviour will cease when the undrained shear strength of the soil is reached in the wall of the cavity, and hence the pressure /strain plot will begin to curve (see Figure 2.1)
- This can be expressed as:

$$P_f = P_o + C_u \quad \text{[Equ 2.2]}$$

From this it follows that P_o can be deduced by iteration. Initially an estimation is made of a value for P_o and used to define a temporary strain origin a total pressure/ log volumetric strain plot is then generated in order to derive a value for C_u. The sum of these two parameters is compared with the selected value of P_f. The choice of P_o is then suitably adjusted and the process repeated until a match is found. It is a straightforward matter to carry out this procedure on the computer.

The modified method in current use is a response to the difficulty that perfectly plastic deformation is not a realistic enough model for many materials and yield may occur at a different shear stress than the large strain shear strength. Hawkins et al (1990) suggested that the most appropriate choice was that value of shear stress pertaining at the apparent onset of plasticity, so [Equ 2.2] now becomes:

$$P_f = P_o + \tau_f \quad \text{[Equ 2.3]}$$

τ_f can be obtained from a total pressure/ log volumetric strain plot by selecting the slope at the pressure and strain corresponding to the choice of P_f (in practice, using the Palmer (1972) argument to identify the mobilised shear stress at failure).

The analysis is implemented graphically, using a number of rulers to identify significant points on the curve (see Figure 2.1).

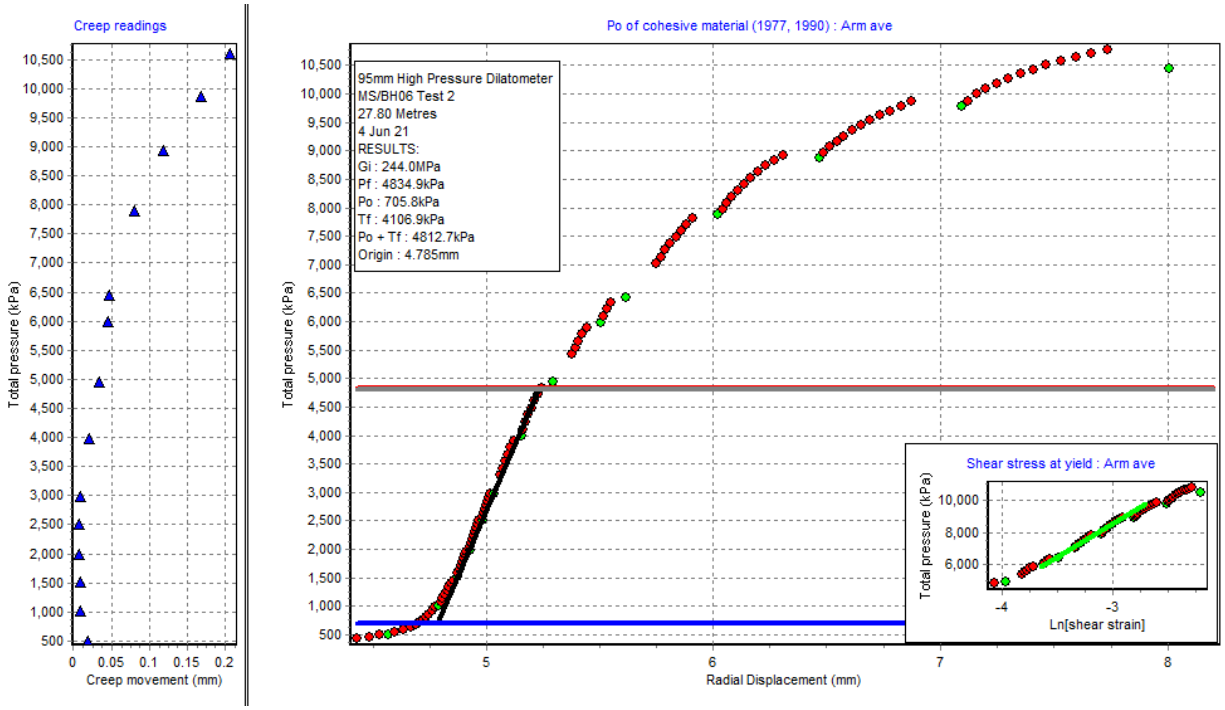


Figure 2.1 An example of the Marsland & Randolph analysis

There are a number of potential problems:

- There can a choice of slopes for G_i, giving multiple possibilities for P_f. In practice it is only tests where the material has been stress relieved that give an unambiguous initial slope.
- The assumption of simple elastic response - in practice most soils exhibit marked non-linear elastic characteristics, so that the pressure at which the material appears to go fully plastic is more than one increment of shear strength above P_o - this point is developed later. The original analysis was developed as an aid to the interpretation of pre-bored pressuremeter tests in clays where the process of forming the pocket results in the complete unloading of the cavity prior to the test commencing. It is certain therefore that the soil has seen stress relief. It is arguable whether in these circumstances that the yield point remains unchanged, as more than elastic unloading has taken place, but the form of such tests does tend to an unambiguous choice for the onset of plasticity.
- In many pressuremeter tests the situation is not so clear cut. The very factors that make the test desirable also results in more realistic behaviour being seen in the form of the early part of the test, with non-linear elasticity being a feature. Hence a choice of P_f is by no means easy. In general, the better the test the harder such a choice becomes.
- A disturbed test does not necessarily imply stress relief. If the probe is pushed into the ground then stress increase will take place and plasticity will be masked by a rise in the pore water pressures around the instrument. In this event the analysis can contribute nothing – forcing such data to fit the assumptions of the analysis will over-estimate the insitu lateral stress.
- The failure mode represented by [Equ 2.3] is only appropriate for tests in undrained material. However there is good empirical evidence that no matter the mode of failure, identifying a yield stress and working back to the insitu stress works for all soils, provided one takes the apparent mobilized shear stress at failure, not large strain. For this reason the procedure is often applied with apparent success to tests in frictional material.

3 SHEAR MODULUS

3.1 Notation

α	Shear stress constant when the strain scale is shear strain
β	Exponent of non-linearity
C_u	Undrained shear strength
ε_c	Cavity strain
E_H, E_V	Young's modulus in the horizontal and vertical direction
f	Proportion of strength used
G	Shear modulus
G_s	Secant shear modulus
G_t	Tangential shear modulus
G_{100}	Secant modulus at the maximum elastic shear strain, sometimes termed G_{min} or G_{yield}
G_p	Pressuremeter modulus
G_{HH}, G_{VH}	Shear moduli for transversely isotropic material where the first suffix is direction of loading and the second is the direction of particle movement
k_o	Ratio of horizontal to vertical effective insitu stress
n	Ratio of horizontal to vertical Young's modulus E_H/E_V
η	Radial stress constant when the strain scale is shear strain
P_c	Total pressure measured at the cavity wall
τ, τ_c	Shear stress, suffix c means at the cavity wall
v_{HH}, v_{HV}	Poisson's ratios for transversely isotropic material
γ	Shear strain
γ_c	Shear strain at the borehole wall
γ_f	Shear strain for given strength proportion

3.2 Background

For users of high resolution pressuremeter data the primary purpose of the test is obtaining realistic parameters for the elastic properties of the ground. Up to yield, where yield is defined as the first instance of mobilising the maximum shear stress, the slope of the loading curve can be used as a source of stiffness data. In practice this part of the cavity loading will be affected by disturbance, difficult to quantify, caused by the method used to place the probe in the ground (Figure 3.1, the pseudo-elastic slope).

Once the material is loaded past its yield condition a zone of plastically deformed material starting from the cavity wall begins to extend into the soil mass. One consequence is that the stress history of the insertion process is erased as all elements within the plastic zone are put into a uniform condition. At a radius remote from the cavity wall and the pressuremeter there will be a single boundary where the material is on the point of yielding. If the direction of loading is reversed, the response seen at the pressuremeter will be that of the material beyond the boundary being unloaded elastically and then plastically. If the unloading continues then reverse plastic yield will result.

In Figure 3.1, small cycles of unloading and reloading exploit the response prior to the reverse yield condition to derive the elastic properties of the ground. It is evident that although each cycle is taken at a different cavity radius and stress, the procedure is highly repeatable. This test was pre-bored, so

the cavity was completely unloaded prior to the pressuremeter test commencing. The consequences of this are clear when the slope of the initial loading is compared to the unload/reload cycles.

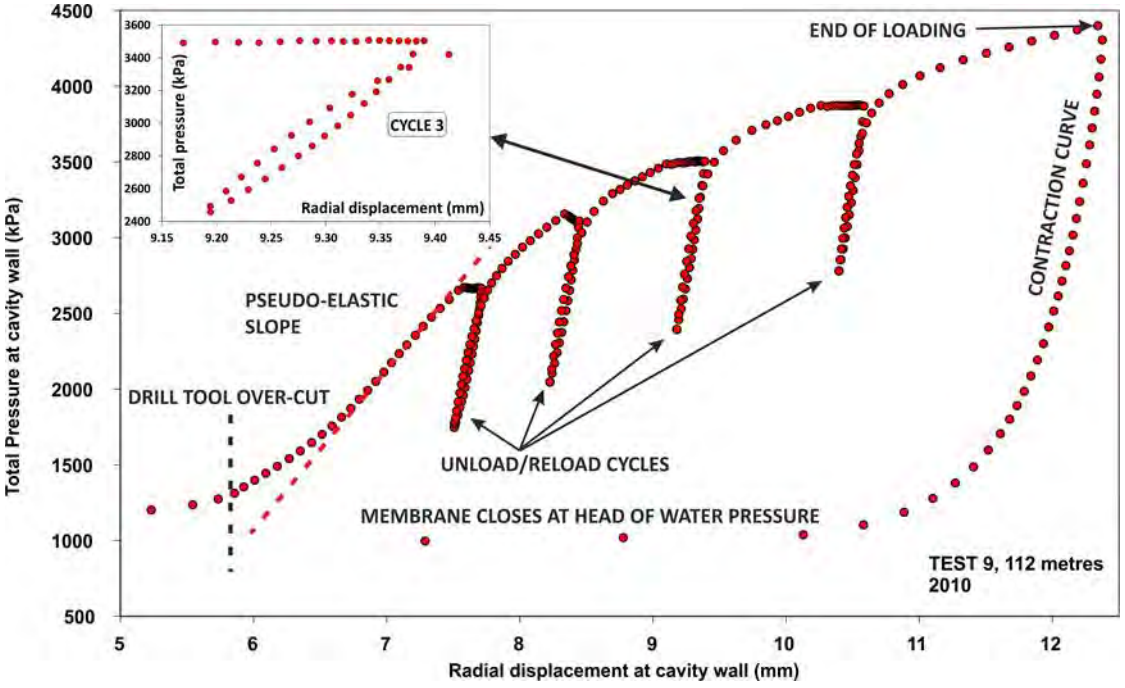


Figure 3.1: Field curve –pre-bored test in silty sand

It would be straightforward to place a line through each of the cycles in Figure 3.1 and use the slope to calculate the shear modulus, G. This is common practice but, unless the material is intact rock, is misleading. The third cycle in Figure 3.1, is shown as an inset, and has a clear hysteretic characteristic. This is due primarily to the influence of strain level on the current modulus. The elastic response of the ground where all deformation is fully recoverable applies to a strain level beyond the reliable resolution of the pressuremeter at shear strains of about 0.002%. The unload/reload cycles are showing the largely recoverable response when the stress alteration is less than that required to make the material yield, shear strains in the range 0.01% to 1%. This is the strain range that is significant for design purposes.

If there are sufficient data in the cycle then it is possible take tangents to the unload or reload path of radial stress against cavity strain and find the current shear stress (Palmer 1972), as in Figure 3.5.It is straightforward to turn these shear stress values into a shear modulus degradation trend. In practice the quantity of data are limited and the alternative is finding a function that describes the unload or reload path. Bolton & Whittle (1999) shows that this non-linear response is adequately represented by a power law. Using the power law parameters to solve the Palmer semi-differential solution gives a continuous stiffness degradation curve (Figure 3.2 and Figure 3.2). The individual points in these figures are the product of taking tangents to the measured data, the lines are the power law trend. Alternatives to the power law method include Jardine (1992) where a 'transformed strain' approach is applied to unload/reload data. The semi-empirical formulations were developed for specific soil types and are not transferable.

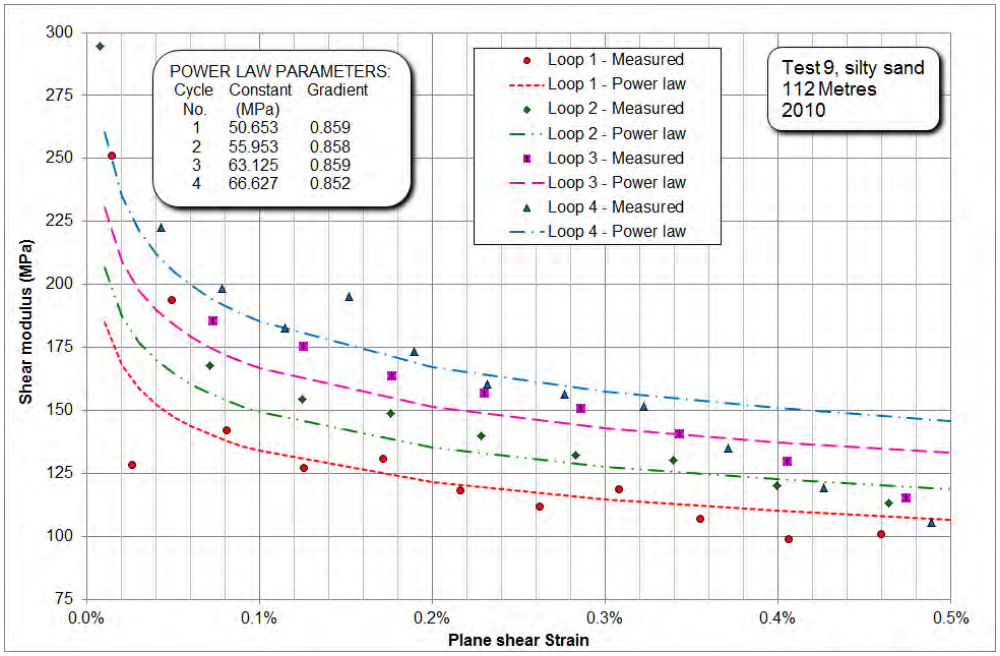


Figure 3.2 Shear modulus degradation curves (drained loading)

If the material has low permeability, giving an undrained loading, then the mean effective stress σ'_{av} following yield is constant, and all cycles will follow a similar path (Figure 3.3).

The material tested in Figure 3.1 is a silty sand and the loading is a drained event. The trend of each cycle (the strain dependency) is almost identical, but successive cycles (Figure 3.2) plot a higher stiffness, because of increasing mean effective stress, σ'_{av}.

A full data reduction will adjust these trends to a reference stress level such as the effective insitu lateral stress, σ'_{ho}. This requires σ'_{av} for each cycle to be calculated. Hence although stiffness is obtainable from all insertion methods, no matter how disturbed, it may still be necessary to determine additional strength related parameters in order fully to reconcile the stiffness data.

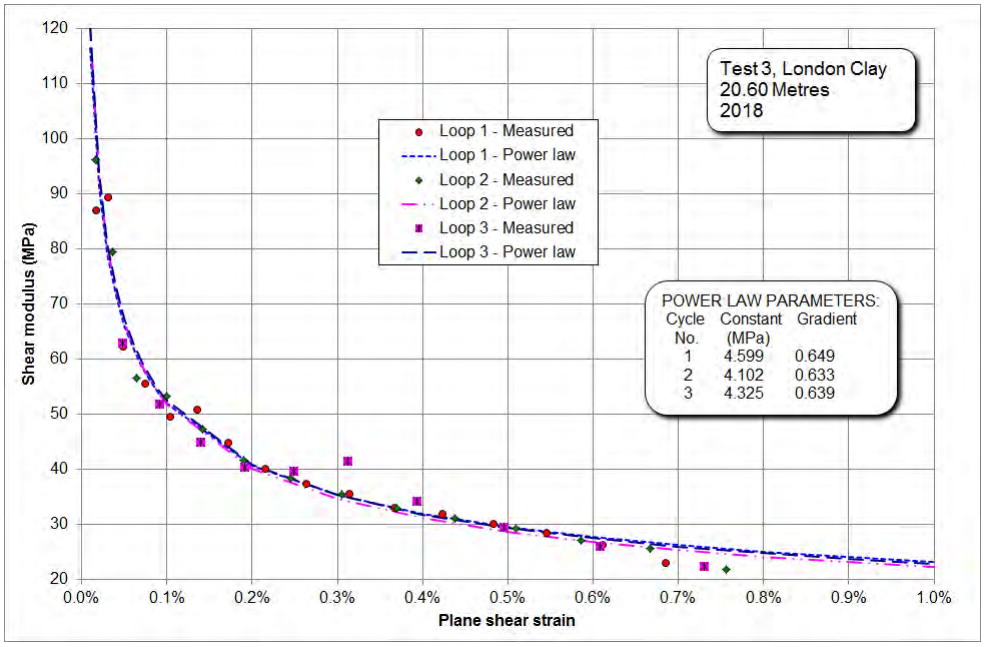


Figure 3.3 Shear modulus degradation curves (undrained loading)

Used vertically, the pressuremeter gives shear modulus parameters of type G_{hh}, where the first suffix shows the direction of loading and the second the direction of particle movement. Many design calculations requiring a value for shear modulus mean in practice the independent shear modulus G_{vh}. It is not possible to discover the ratio connecting G_{hh} and G_{vh} from a conventional pressuremeter test unless it is assumed that the ratio is related to k_o. This is only partly true. Nevertheless, because of the quality and relative speed with which G_{hh} can be determined it may be convenient to measure G_{hh} and assume an appropriate reduction factor. For engineering problems where the direction of loading is lateral, G_{hh} is the most relevant stiffness parameter.

Unloading and reloading are a feature of many laboratory material test procedures and pile loading tests. In the context of a cavity expansion in an infinite medium the first account of the theory behind the procedure is given by Hughes (1982). Cycles are a prominent feature of the Wroth Rankine lecture (Wroth, 1984). Bellotti et al (1989) give an explanation and methodology for manipulating the stress dependency of tests in sand. Muir Wood (1990) and Jardine (1992) explore the potential of the cycles for describing the non-linear strain dependency of the ground. Bolton & Whittle (1999) propose the simple procedure (described below) based on a power function.

Examining the detail within an unload/reload event requires high resolution local displacement measurement. Even in devices that do use local measurement it is necessary to be certain that what is measured is an accurate representation of the movements of the cavity wall, and not the finite stiffness of the probe itself.

The pressuremeter test shears the material. The modulus measured is shear modulus G and is independent of Poisson's ratio ν. G can be used to derive Young's modulus E but ν must be given or estimated. It is also straightforward to derive the bulk modulus M from the shear modulus.

3.3 Describing the unload/reload cycle

Figure 3.4 shows an unload/reload cycle extracted from a field curve such as the example in Figure 3.1. In this case the data are part of a test in stiff clay. In the interval between pausing the loading to take the cycle and the actual reversal of stress there are several data points showing the expansion continuing for no pressure increase. This phase of time dependent deformation is referred to as 'creep'.

Separating the contribution of the multiple processes that contribute to this behaviour is complex. It is unlikely that it will be possible to wait long enough for all creep behaviour to cease. This test in clay is an undrained event. There is a large excess pore pressure in the soil mass at the commencement of the cycle and waiting more than a short time would allow consolidation to take place. However the reducing displacement between readings shows that creep has fallen to a level low enough to permit a cycle to be taken.

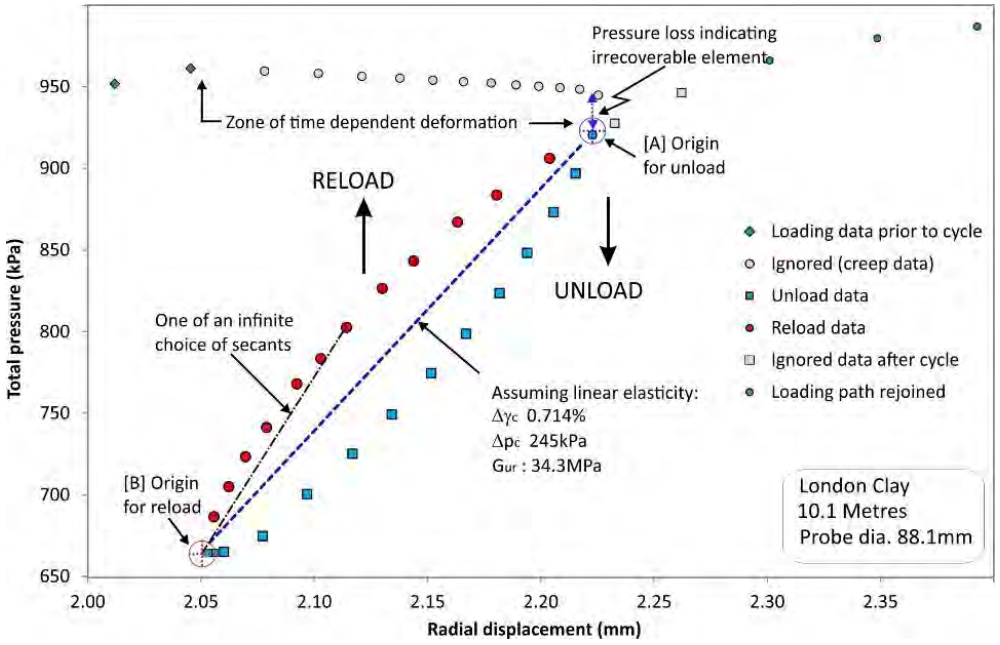


Figure 3.4 Annotated unload/reload cycle

The decrease of pressure continues until sufficient data has been recorded to give a clear indication of the path of the unloading response. The pressure decrease needs to be less than that required to cause reverse plastic failure, which for an undrained test is equivalent to twice the shear strength.

The reloading phase mirrors the unloading with a similar rate of pressure change and eventually crosses the cycle unload path. There are a few points before the main loading path is re-joined because the cycle is not a completely recoverable event.

A chord has been drawn through the start and lowest point of the cycle. The slope of this can be used as a means of calculating shear modulus. If the material response was linear elastic then the result would be the shear modulus. It is apparent that the unloading and reloading data show a non-linear response, and the chord that has been drawn is only the minimum secant. There are an infinite number of steeper secants that could be drawn. The unloading and reloading responses mirror each other, and a rotation of the unloading data would describe the same path as the reloading data. This is made explicit in Figure 3.5.

3.4 Non-linear stiffness/strain response

If the material fails in shear then it is likely that for shear strains smaller than the yield value, the stiffness/strain relationship is not linear. The unload/reload cycle can be made to give a comprehensive description of this relationship by looking at smaller steps of pressure/strain other than the points at the extreme ends of the cycle.

Figure 3.5 plots the unloading and reloading data from Figure 3.4 in this way. Each path has its own origin, as indicated Figure 3.4, and the unloading data have been rotated to emphasise that both sets of data are showing the same thing. It follows that it is only necessary to examine one half of the rebound cycle, and the origin for data obtained after the reversal of stress in a loop has the smallest uncertainty because creep is at a minimum (Whittle *et al*, 1992). Figure 3.5 also shows the underlying shear stress response. The test is an undrained event so taking tangents to the radial stress data gives the current shear stress (Palmer 1972, Hughes 1973).

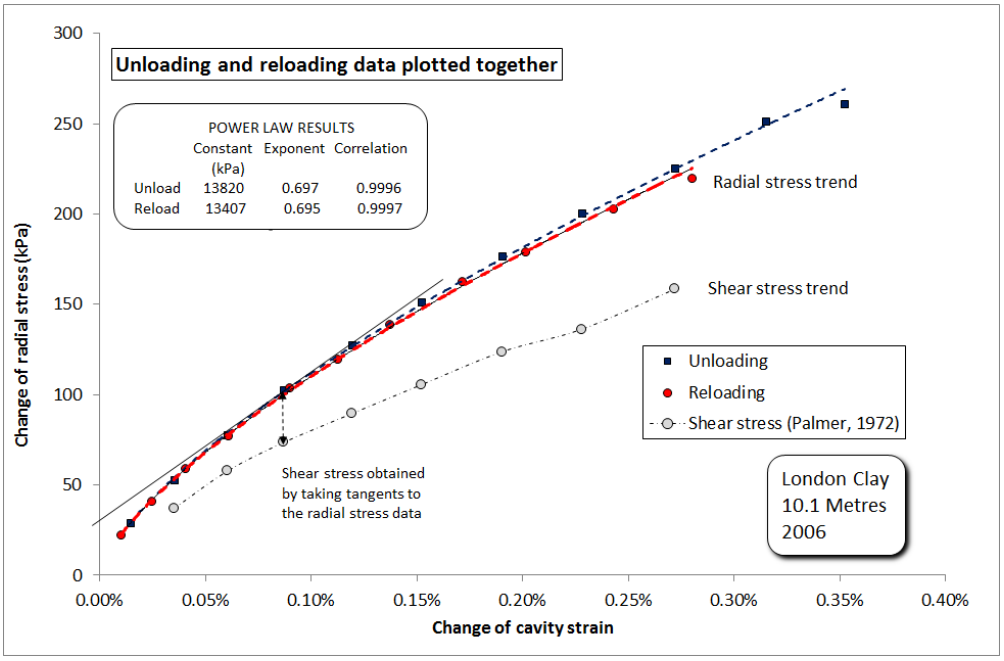


Figure 3.5 The non linear elastic response

The simplest description of the reloading response is a power law. The exponent of the power law defines the non-linearity of the response and is denoted β. It is generally a number between 0.5 and 1 where 1 indicates linear elasticity. In the example β is almost 0.7, appropriate for a silty clay.

The results in Figure 3.5 show the power law trend in radial stress/cavity strain space. Using parameters that the pressuremeter test can determine, this result can be written as:

$$P_c = \eta_h \varepsilon_c^{\beta} \quad \text{[Equ 3.1]}$$

η_h is the radial stress constant when the strain scale is current cavity strain (circumferential strain at the cavity wall). Because the test is undrained there are no volumetric strains so shear strain is twice the circumferential strain. This approximation is valid for small strains below the yielding value. The result in radial stress/shear strain space is given by:

$$P_c = \eta \gamma^{\beta} \quad \text{[Equ 3.2]}$$

Where $\eta = \eta_h / 2^{\beta}$.

For an undrained expansion, Palmer (1972) shows that the current shear stress τ_c is given by

$$\tau_c = \frac{dP_c}{d[\ln \gamma_c]} \quad \text{[Equ 3.3]}$$

Substituting for dP_c using the right hand side of [Equ 3.2] allows the differential equation to be solved giving

$$\tau_c = \eta \beta \gamma^{\beta} \quad \text{[Equ 3.4]}$$

Bolton & Whittle refer to $\eta\beta$ as the shear stress constant and call it α. Shear modulus G_s is given by;

$$G_s = \tau / \gamma \quad \text{[Equ 3.5]}$$

so the expression for secant shear modulus is given by

$$G_s = \alpha \gamma_c^{\beta - 1} \quad \text{[Equ 3.6]}$$

This gives a means of determining the secant shear modulus at any elastic shear strain, although an arbitrary cut-off strain must be assumed below which the modulus will be constant and a maximum – this strain is below the resolution of the SBPM.

Note:

When comparing triaxial results with pressuremeter results, invariant shear strain ε_T is given by:

$$\gamma_T = \gamma_c/\sqrt{3} \quad \text{[Equ 3.7]}$$

Tangential shear modulus G_t is given by

$$G_t = G_s + \varepsilon_c\left(\frac{dG_s}{d\varepsilon_c}\right) \quad \text{[Equ 3.8]}$$

Hence from the power law:

$$G_t = \alpha\beta\gamma_c^{\beta-1} \quad \text{[Equ 3.9]}$$

[Equ 3.6] gives a means of determining the secant shear modulus for shear strains below the yielding value down to 10^{-4}. This is the safe resolution limit of the current generation of pressuremeters and is more than the elastic strain at which the stiffness degradation commences. It is usual to plot the trend between 10^{-4} and 10^{-2} plane shear strain (0.01% to 1%, see Figure 3.2 and Figure 3.3). Ideally the large strain limit should be the yield shear strain of the material. 1% is appropriate for many stiff clays but will be too large for sands and too small for soft clay. Secant shear modulus at yield strain is G_y and is the secant shear stiffness governing the pressuremeter loading curve.

It is not necessary to take cycles of small strain amplitude to obtain small strain stiffness parameters. It is better to make the cycles as large as practicable (subject to the condition that the material is not allowed to fail in extension) to obtain parameters from as wide a strain range as possible.

The Bolton & Whittle analysis was developed for undrained tests. For a test in drained material the solution can be used assuming that whilst the material is deforming elastically there are no volumetric strains. Alternatively, the power approach is merely a curve fitting exercise and the solution in radial stress/cavity strain space [Equ 3.1] can be used to generate a smooth data set. This allows a numerical solution for drained tests to be applied (Manassero, 1989). The results are similar to the undrained parameters with a tendency for β to be slightly higher (more linear). The difficulty is that to apply the drained analysis the ambient water pressure and the constant volume friction angle ϕ'_{cv} must be known or estimated. Figure 3.6 is an example of a test in highly weathered mudstone, with the shear stress/shear strain response obtained by treating a reloading phase as a drained and undrained event. The difference between the two trends will depend on the potential for dilation.

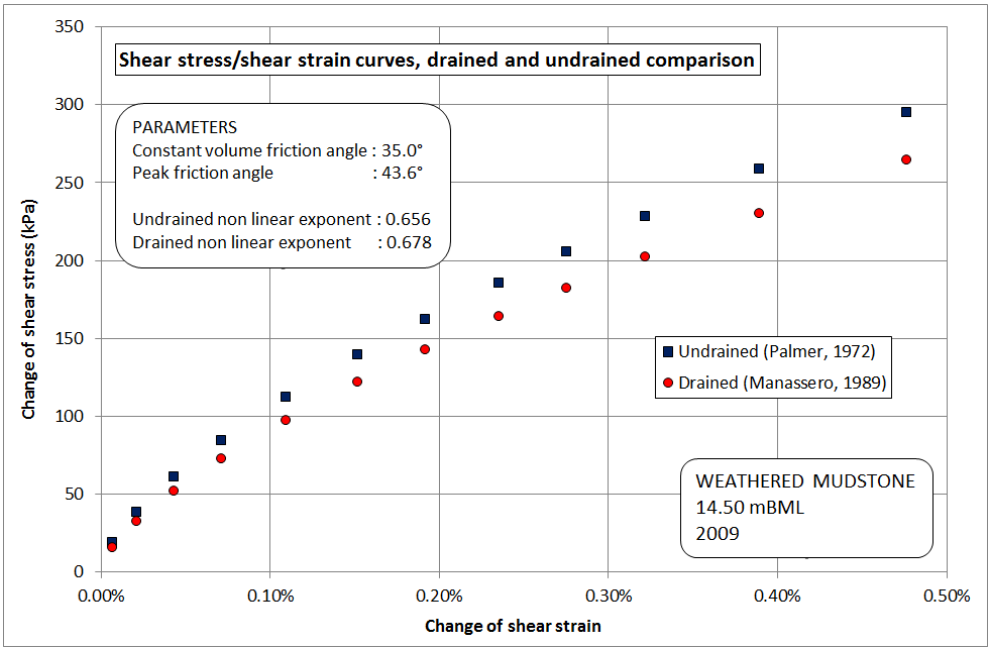


Figure 3.6 Drained & undrained interpretation of the same data

3.5 Plotting stiffness against strength proportion.

For some applications it is convenient to derive stiffness values as a proportion of the mobilized strength. If the shear strength C_u is known, and f represents the proportion of strength used, then the shear strain γ_f for this proportion is given by:

$$\gamma_f = \left(\frac{fC_u}{\alpha}\right)^{1/\beta} \quad \text{[Equ 3.10]}$$

For example, it is common to require stiffness for $C_u/2$. Given γ_f it is then straightforward to apply the preceding non-linear stiffness expressions to derive the relevant modulus.

3.6 Cross hole anisotropy

The pressuremeter test gives values for G_{HH}, the shearing stiffness in the horizontal plane. This is directly applicable to the analysis of radial consolidation or cylindrical cavity expansion due to pile insertion. G_{VH} is applicable all shearing which has an element of deformation in the vertical plane, such as under a footing or round an axially loaded pile.

To convert from G_{HH} to G_{VH} some relationship between the two must be assumed. Wroth et al (1979) suggest that anisotropy arises from two causes:

- Structural anisotropy due to the deposition of soil on well-defined planes
- Stress induced anisotropy, due to the differences in normal stress acting in different directions.

The second cause implies the stiffness in any direction will be a function of the effective insitu stress in that direction, ie a function of k_o.

It can be shown that:

$$G_{HH} = \frac{E_H}{2(1+v_{HH})} \quad \text{[Equ 3.11]}$$

For undrained expansion:

$$v_{HH} = 1 - \frac{n}{2} \quad \text{[Equ 3.12]}$$

Where:

$$n = \frac{E_H}{E_V} = k_o \quad \text{[Equ 3.13]}$$

From this $$E_H = (4 - n)G_{HH}$$ [Equ 3.14]

and $$E_v = \frac{(4 - n)G_{HH}}{n}$$ [Equ 3.15]

This is as far as argument from first principles can go, because of the additional contribution of the manner in which the material is deposited. k_o is likely to lie between 0.5 and 2, so from [Equ 3.15] $\frac{E_H}{G_{HH}}$ lies between 2 and 3.5. From [3.16] $\frac{E_v}{G_{HH}}$ lies between 1 and 1.75.

It is likely that G_{VH} will be linked to E_V by Poisson's ratio in a relationship of the form of [Equ 3.15]. Plausible values of $\frac{E_v}{G_{VH}}$ would seem to be 2.4 to 3. Hence in a material with k_o of 2, G_{VH} could be as low as $\frac{G_{HH}}{3}$. Simpson et al (1996) come to the same conclusion but find in practice heavily over-consolidated London clay gives relationships of the order of: $G_{VH} \cong 0.65G_{HH}$. The influence of the strain range is not separately considered in these studies, and it is possible that the G_{100} values would be similar in all planes.

Lee & Rowe (1989) give details of the anisotropy characteristics of many clays varying from lightly over consolidated to heavily over consolidated. The general conclusion is $\frac{E_v}{G_{VH}}$ lies between 4 and 5, rather more than the isotropic relationship of 3. However, their paper was concerned with the impact of anisotropic stiffness properties on surface settlement. Deriving G_{VH} from E_v is therefore unsatisfactory, because although $G_{VH}$is insensitive to the direction of loading, E_v is not.

4 ANALYSES FOR STRENGTH, DRAINED LOADINGS

4.1 Notation

α	$1/M$
$A^{\#}$	Constant
A	$A = \frac{T}{(1+\alpha)}$
β	$1/N$
B	$B = \frac{-Z}{(1-\beta)}$
c	Cohesion
C	$C = 1 - A - B$
d	The stress exponent, describing the variation of stiffness with stress level
ε_c	Cavity strain also termed circumferential strain
ε_{max}	Maximum cavity strain at the end of loading
ε_{yc}	Cavity strain at the onset of reverse plasticity
ε_R	Radial strain
ε_v	Volumetric strain
ε_θ	Circumferential strain at the elastic/plastic boundary
h	The exponent of a non-linear elastic power law
G	Shear modulus
G_s	Secant shear modulus
J	A scale factor to adjust for stiffness at differing stress levels
k_a^{cv}	$k_a^{cv} = \frac{1}{k_p^{cv}}$
k_p^{cv}	Constant volume stress ratio coefficient
$M\ or\ n$	$n = M = \frac{1-sin\psi}{1+sin\psi}$ M and n are used interchangeably. Withers, Howie, Hughes and Robertson typically uses n and Carter et al typically use M
N	$N = \frac{1-sin\phi'}{1+sin\phi'}$
P_o	Effective cavity reference pressure
P_l	Effective limit pressure for an infinite cavity expansion
P'_{max}	Maximum effective pressure reached during expansion
P, P'	Pressure at cavity wall, suffix ‘ denotes effective
q_{xx}	The co-efficient of a non-linear elastic power law. The first suffix is r or s denoting radial stress or shear stress intercept. The second suffix is c or s and defines the strain scale, circumferential or shear.
q_{ref}	Radial stress elastic constant at insitu or reference stress
r	Radius
r_o	Initial radius of cavity
r_a	Current radius of cavity
R	Radius of the elastic/plastic boundary
S	$S = \frac{(1+sin\psi)sin'\phi}{1+sin\phi'}$
σ_{AV}	Mean effective stress
σ_c	Circumferential stress
σ_r	Radial stress
σ_R	Radial stress at the cavity wall at first yield
σ_{RU}	Radial stress at the cavity wall at yield in cavity contraction
σ'_{ho}	Effective insitu horizontal stress
T	$T = 2 + Z$

u	Increment of radial displacement at a point in the continuum
u_o	Initial pore water pressure in the ground
ϕ'	Peak angle of internal friction
ϕ_{cv}	Critical state angle of internal friction
ψ	Dilation angle
τ	Shear stress
v	Poisson's ratios
w	The intercept of a plot of stiffness against stress level
χ	$\chi = \frac{(1-v)-v(M+N)+(1-v)MN}{MN}$
γ	Shear strain
$\boldsymbol{Y}$	$\boldsymbol{Y} = \frac{1+\alpha}{1-\beta} = \frac{NM+N}{NM-M}$
Z	$Z = \frac{2\chi}{(\alpha+\beta)}$

4.2 Overview

For drained expansion tests in purely frictional material the strength is described in terms of the peak angle of internal friction and dilation. The method used is that due to Hughes et al (1977). The form of the shear stress/ shear strain curve is simple elastic/perfectly plastic and dilation and friction are related by Rowe's dilatancy law. Although the soil response during elastic deformation is more realistically described as non-linear elastic, this has no effect on the plastic part of the curve from where strength is derived.

The technique is to plot effective pressure against cavity strain on log scales and to discover by inspection the maximum slope of the resulting curve. It is usual to only quote a single value for friction and dilation. The same assumptions have been applied by Withers et al (1989) to produce a solution for cavity contraction.

Manassero (1989) is a numerical solution that applies Rowe's dilatancy law as a flow rule. Elastic strains in the plastic area are ignored for simplicity.

For tests in c′ – phi material a method based on the solution of Carter et al (1986) is used. In such material the value for friction angle can often be identified from the Hughes analysis.

4.3 Hughes et al (1977)

In addition to the usual conditions governing the expansion of a cylindrical cavity in plane strain this analysis assumes the following:

- A simple elastic/perfectly plastic model
- The expansion is fully drained, i.e. no excess pore water pressures are allowed to develop
- Following yield the sand deforms at a constant angle of internal friction
- Volumetric and shear strains are connected by Rowe's dilatancy law (1962)

Rowe's dilatancy law can be written:

$$\frac{1+sin\phi'}{1-sin\phi'} = \left(\frac{1+sin\phi_{cv}}{1-sin\phi_{cv}}\right)\left(\frac{1+sin\psi}{1-sin\psi}\right) \quad \text{[Equ 4.1]}$$

At failure the effective pressure at the cavity wall p′ is given by:

$$P' = \sigma'_{ho}(1+sin\phi') \quad \text{[Equ 4.2]}$$

Following failure:

$$\ln(P') = S\ln[\frac{\varepsilon_c}{1+\varepsilon_c} + \frac{c}{2}] + A^{\#} \quad \text{[Equ 4.3]}$$

where S is

$$S = \frac{(1+sin\psi)sin'\phi}{1+sin\phi'} \quad \text{[Equ 4.4]}$$

[Equ 4.3] indicates that *s* is approximately the gradient of effective pressure plotted against cavity strain on log scales. Once obtained, $sin\phi'$ and $sin\psi$ can be derived.

By incorporating Rowe's stress dilatancy theorem (1962) and by knowing or estimating constant volume friction angle, the gradient can be turned into values for the peak angles of internal friction and dilation:

$$sin\phi' = \frac{S}{1+(S-1)sin\phi_{cv}} \quad \text{[Equ 4.5]}$$

$$sin\psi = S + (S-1)sin\phi_{cv} \quad \text{[Equ 4.6]}$$

The factor $\frac{c}{2}$, representing elastic strain in the plastic region, is usually ignored - it has been shown to introduce an error of about 0.03% in the strain scale for a typical dense sand.

An example of the Hughes analysis is shown in Figure 4.1. Both the ambient pore water pressure U_o and ϕ_{cv} are required to implement the analysis. Because the expansion is drained the membrane normally collapses at the head of water pressure, and an estimate of U_o can often be made from this behaviour. ϕ_{cv} must either be given or estimated. The analysis is sensitive to the choice of strain origin.

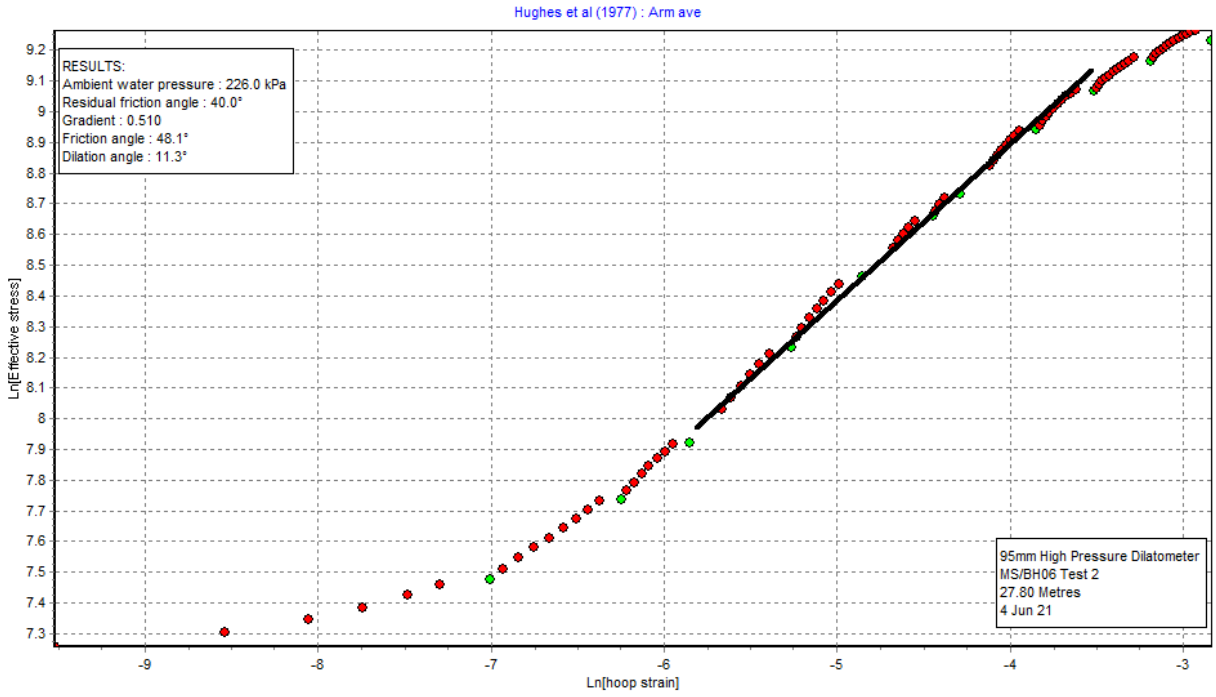


Figure 4.1 Example of Hughes et al (1977) solution

If the test shown in figure 4.1 was taken to a high enough cavity strain then the final part of the loading would show strain softening indicating that the peak friction angle is passed and the current internal angle is reducing towards a residual value. Curvature at relatively low strain (as in the example) indicates the presence of some cohesion, in which case the ultimate slope of the trend gives the best estimate of the friction angle.

4.4 Withers, Howie, Hughes and Robertson (1989)

Withers, Howie, Hughes and Robertson (1989) is an analysis for the unloading of a cone pressuremeter in sand.

The solution is a development of the Hughes et al (1977) analysis for a cavity expansion in sand. During expansion, given a low disturbance insertion, effective radial stress is related to circumferential strain by the following:

$$P' = \sigma'_{ho}\left[\frac{2}{1+N}\right]\left[\left(\frac{G}{\sigma'_{ho}}\right)(1+N)\left(\frac{1+N}{1-N}\right)\varepsilon_c + \left(\frac{1-n}{2}\right)\right]^{\left[\frac{1-N}{1+n}\right]} \quad \text{[Equ 4.7]}$$

This solution cannot be sensibly applied to CPM expansion data. The final unloading, however, is in principle valid. It starts with an elastic phase which ends when the effective radial stress is

$$P'_{max} = NP' \quad \text{[Equ 4.8]}$$

The cavity strain at the onset of reverse plasticity will be

$$\varepsilon_{yc} = \varepsilon_{max} - \left[\frac{(1-N)P'_{max}}{2G}\right] \quad \text{[Equ 4.9]}$$

The solution for the plastic contraction is

$$P' = NP'_{max}\left[\frac{2G\left(\varepsilon_{max}-\varepsilon_{yc}\right)(1+nN)}{nP'_{max}(1-N)(1+N)} - \left(\frac{1-n}{n(1+N)}\right)\right]^{\frac{nN^2-n}{nN^2+N}} \quad \text{[Equ 4.10]}$$

If $\log\frac{P'}{P'_{max}}$ is plotted against $\log\left[\left(\varepsilon_{max}-\varepsilon_{yc}\right)/(1+\varepsilon_{max})\right]$

$$s = \frac{nN^2-n}{nN^2+N} \quad \text{[Equ 4.11]}$$

In principle these equations can be used to draw the entire test curve. In practice this is generally unsuccessful, because the simple assumptions cannot capture the complex response of most sands.

Quite frequently, there is no long straight portion in this plot. It can be imagined that after reaching failure in contraction at the peak angle of internal friction the sand quickly falls into an ultra loose condition. The analysis can depend, therefore, on identifying the point of maximum curvature in log log space and is not very convincing.

However when the analysis does work it can be useful in assessing the origin for strain on the *loading*. Because the contraction starts from a defined origin there is no uncertainty in the strain scale. Adjusting the loading scale to give similar answers using the Hughes et al analysis indirectly corrects for insertion disturbance.

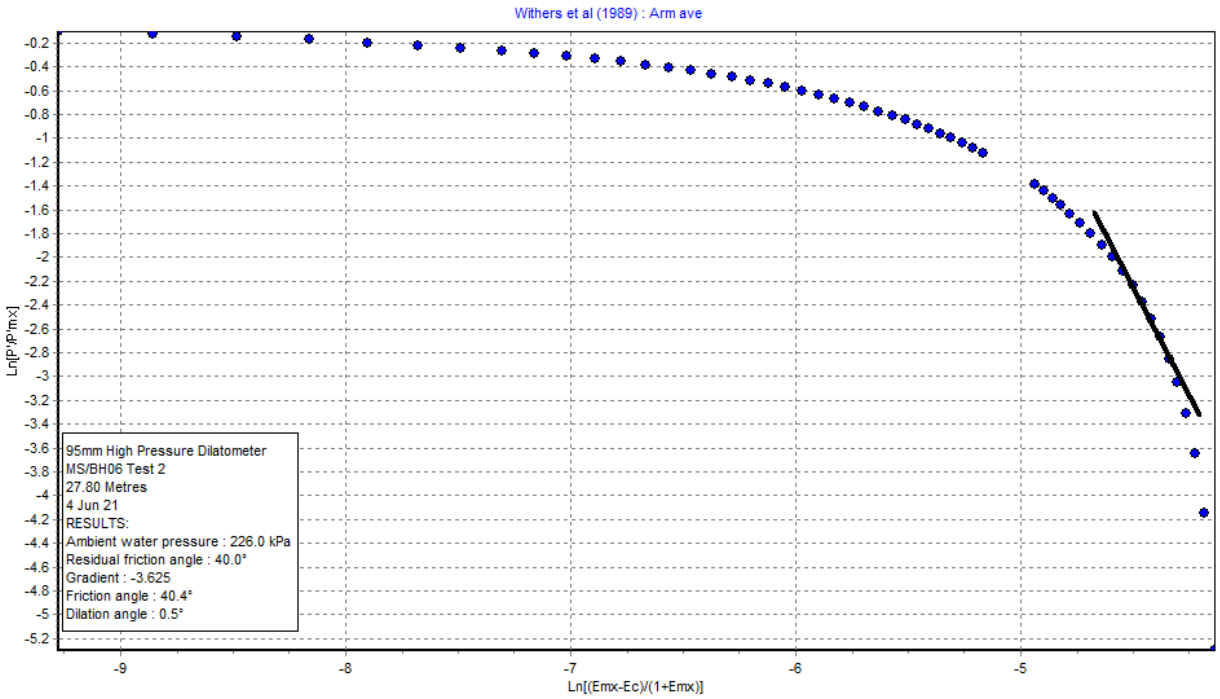


Fig 4.2 Example of Withers et al (1989) solution

4.5 Carter et al (1986, adapted 2010)

Carter et al (1986) is a closed form analytical solution for cavity expansion tests in ideal cohesive frictional material. There is an explicit small strain expression of the solution which makes a convenient basis for a curve comparison routine. What is presented here is a modified version of the solution incorporating non-linearity in the elastic phase of the test. A power law is used to describe the non-linear response and the parameters for the power law are obtained from rebound cycles carried out during the test. Unload/reload cycles offer the means of obtaining the elastic properties of the ground independently of disturbance caused by the process of placing the instrumentation - it is a necessary aspect of the methodology presented here that the analysis be constrained by the measured values of soil stiffness.

The process starts with the parameter set already obtained from the conventional analyses for cavity reference pressure, stiffness and internal angle of friction. Using the measured pressures but calculating the cavity strains according to the input parameter set, a theoretical curve is generated. This is overlaid on the measured field data. If the mis-match is significant, then certain parameters can be adjusted to improve the match. The fixed parameters are the stiffness data. The curve comparison procedure covers elastic loading, plastic loading and elastic contraction – the plastic contraction part of the test is ignored for the present. For simplicity, all stresses in the following description are effective. As does Carter *et al* the method is developed first in terms of a purely frictional material and is then modified for cohesion. The solution is presented in terms appropriate for cylindrical cavity expansion, the spherical case has been ignored.

There are two main reasons for using this procedure. With the analyses available at the present time it is difficult to separate out the contribution of cohesion and friction in a dilating material. This can be done reasonably easily with the curve comparison approach. The other reason is that the influence of cavity reference pressure on the overall curve is very obvious. Tests in material of this type are often pre-bored and there is very little that can be done to assess the cavity reference pressure when the initial part of the loading curve is dominated by disturbance effects. With this procedure implausible values are identified very easily.

4.5.1 Carter, Booker and Yeung (1986)

Assuming small deformations (where 10% cavity strain is considered small), Carter *et al* offer the following general solution for a cylindrical cavity expansion:

$$\frac{u}{r} = \varepsilon_\theta \left[A \left(\frac{R}{r}\right)^{1+\alpha} + B \left(\frac{R}{r}\right)^{1-\beta} + C \right] \quad \text{[Equ 4.12]}$$

In terms of parameters that the pressuremeter can measure directly, circumferential strain ε_c and radial stress P at the cavity wall, this solution can be written as:

$$\varepsilon_c = \varepsilon_\theta \left[A \left(\frac{P'}{\sigma_R}\right)^{\boldsymbol{Y}} + B \left(\frac{P'}{\sigma_R}\right) + C \right] \quad \text{[Equ 4.13]}$$

Carter et al point out the similarity between this solution and that offered by Hughes et al (1977). Using the current notation the solution of Hughes et al can be written:

$$\varepsilon_c = \varepsilon_\theta \left(\frac{P'}{\sigma_R}\right)^{\boldsymbol{Y}} \quad \text{[Equ 4.14]}$$

The omission of the linear and constant terms in [Equ 4.14] comes about because the earlier solution ignores elastic strain in the plastic region. The attraction of the earlier solution is that plotting cavity strain against radial stress on log scales gives the gradient γ which can used to discover the approximate values of friction angle ϕ and dilation angle ψ, so it is helpful to carry out the Hughes *et al* analysis as a means of providing input parameters for the Carter *et al* solution. The Hughes log-log plot also indicates the influence of cohesion, because the data will plot a strain-softening curve rather than a straight line.

4.5.2 Elastic Strain and non-linear stiffness

In the simple elastic model the cavity strains before yield are given by:

$$\text{Where } P_o < P' < \sigma_R \text{ then } \varepsilon_c = \frac{P - P_o}{2G} \quad \text{[Equ 4.15]}$$

Then at first yield when $P' = \sigma_R = P_o(1 + \sin\phi)$:

$$\varepsilon_c = \frac{P_o \sin\phi}{2G} \quad \text{[Equ 4.16]}$$

The non-linear elastic versions of [Equ 4.15] and [Equ 4.16] are:

$$\text{Where } P_o < P' < \sigma_R \text{ then } \varepsilon_c = \left[\frac{P\prime - P_o}{q_{ref}}\right]^{\frac{1}{h}} \quad \text{[Equ 4.17]}$$

Then at first yield when $P' = \sigma_R$

$$\varepsilon_c = \left[\left(\frac{P_o}{q_{ref}}\right)\left(\frac{N-1}{N(2h-1)+1}\right)\right]^{\frac{1}{h}} \quad \text{[Equ 4.18]}$$

The derivation of the non-linear elastic equations is given later. At the end of loading the cavity has a maximum pressure P'_{max} and expansion ε_{max} and the first part of the final unloading is elastic with a non-linear characteristic prior to yield in extension. The elastic circumferential strain is given by:

$$\text{Where } P'_{max} > P' > \sigma_{RU} \text{ then } \varepsilon_c = \varepsilon_{max} - \left[\frac{P'_{max} - P\prime}{J q_{ref}}\right]^{1/h} \quad \text{[Equ 4.19]}$$

Then at first yield when $P'_{max} > P'$ and $P' = \sigma_{RU}$

$$\varepsilon_c = \varepsilon_{max} - \left[\left(\frac{P'_{max}}{Jq_{ref}}\right)\left(\frac{N^2-1}{N(2h-1)+N^2}\right)\right]^{1/h} \quad \text{[Equ 4.20]}$$

The explanation of the terms Q_{ref} and h and J is now presented, based on the methodology of Bolton and Whittle (1999). This solution uses a power law to describe the development of shear stress with strain for strains below the elastic/plastic threshold:

$$\tau = q_{ss}\gamma^h \quad \text{[Equ 4.21]}$$

The co-efficient and exponent of the power law in [Equ 4.21] can be derived from plotting reloading data from unload/reload cycles. The origins for the data are the loop turnaround points. However, for the purposes of curve fitting, the trend of radial stress versus cavity strain is required. This is not shear modulus, where the data would be shear stress plotted against shear strain. Figure 4.3 is an example (not from a test on this contract).

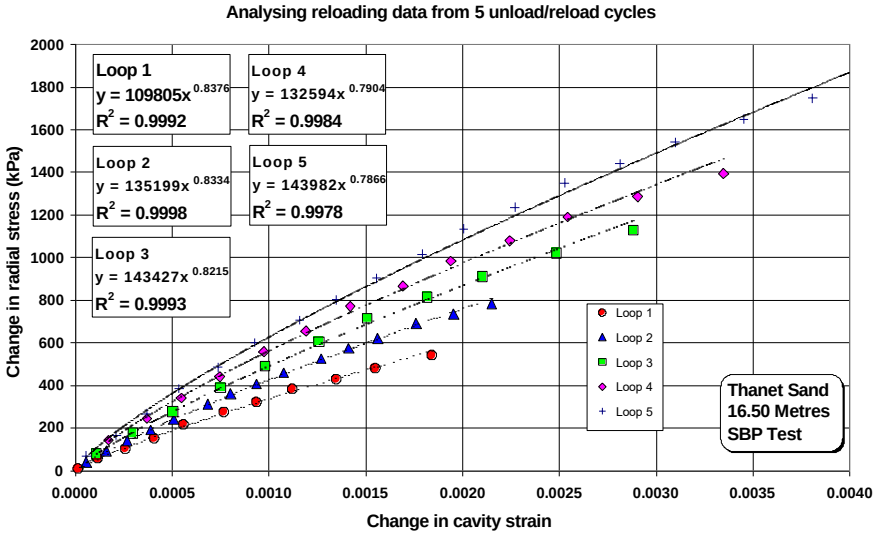


Figure 4.3 Plotting stiffness curves

It is easy to manipulate the trends in Figure 4.3 to give shear modulus. Assuming no volumetric strains are being developed whilst the material is deforming elastically, shear strain can be derived by multiplying the cavity strain values by two. Furthermore Bolton & Whittle show that the shear stress coefficient is related to the radial stress coefficient as follows:

$$q_{ss} = hq_{rs} \quad \text{[Equ 4.22]}$$

and secant shear modulus G_s is

$$G = q_{ss}\gamma^{h-1} \quad \text{[Equ 4.23]}$$

4.5.3 Manipulating stiffness data for changes in mean effective stress

The stiffness data represented by q_{ref} and h give the stress/strain response of the elastic part of the curve. It is necessary to know the cavity strain at yield when this relationship will cease, given by [Equ 4.18]. Thereafter a single value of shear modulus, at yielding strain, is used implicitly by [Equ 4.13].

When the final unloading commences the shear modulus applicable to this part of the test will also depend on q_{ref} and h with q_{ref} multiplied by a scale factor decided by the increase in the mean effective stress. All that is then required is to know when the elastic unloading stops, and this is given by [Equ 4.20].

The yielding value of shear modulus for [Equ 4.13] is likely to be lower than that from simply taking the slope of the first loop in the test but probably higher than the initial slope of the virgin loading curve, which will be influenced by disturbance.

Bellotti et al (1989) give a procedure for converting modulus at intermediate stress levels to a reference level, the insitu mean effective stress p_o. It is based on the relationship proposed by Janbu (1963) and in terms of the nomenclature used here can be written:

$$q_{ref} = q_{rc}\left(\frac{P_o}{\sigma_{AV}}\right)^d \quad \text{[Equ 4.24]}$$

Given a value of radial stress at the cavity wall P, the mean effective stress can be calculated as follows:

For unload/reload where $P' > \sigma_R$ then $\sigma_{AV} = (\frac{P - c\cos\phi}{1+\sin\phi})$ [Equ 4.25]

For unload/reload where $P' < \sigma_{RU}$ then $\sigma_{AV} = (\frac{P + c\cos\phi}{1-\sin\phi})$ [Equ 4.26]

These two equations also incorporate the contribution of cohesion, c.

The modulus exponent d is obtained by plotting the mean effective stress against modulus and finding the best fit power law. The best correlation is obtained using q and h together as both are needed to fully describe the shape of the elastic response. Once a value for q_{ref} is obtained it is possible to predict the appropriate 'q' value for any other part of the curve, such as the final unloading, by calculating the mean effective stress for that point and multiplying by the ratio of that stress to the initial stress state. This is the scale factor J in [Equ 4.19] and [Equ 4.20].

4.5.4 Influence of Cohesion

It is straightforward to introduce the influence of cohesion using Caquot's principle. All stresses are raised by $c\cot\phi$,so that [Equ 4.13] now becomes:

$$\varepsilon_c = \varepsilon_\theta[A\left(\frac{P' + c\cot\phi}{\sigma_r + c\cot\phi}\right)^{\boldsymbol{Y}} + B\frac{P' + c\cot\phi}{\sigma_r + c\cot\phi} + C] \quad \text{[Equ 4.27]}$$

If there is no cohesion then the additional terms are zero and the equations revert to the frictional only form.

4.5.5 Deriving the limit pressure

Despite being a small strain solution it is possible to use the Carter et al solution in its adapted form to discover the limit pressure of an infinitely large expansion. At the limit state the ratio R/r_a of the elastic-plastic boundary to the current cavity size reaches a constant condition, which can be written:

$$\frac{1}{\varepsilon_\theta} = \left[T\left(\frac{R}{r_a}\right)^{1+\alpha} - Z\left(\frac{R}{r_a}\right)^{1-\beta}\right] \quad \text{[Equ 4.28]}$$

or re-arranged to give:

$$\frac{1}{\varepsilon_\theta} = \left[T\left(\frac{P_l}{\sigma_R}\right)^{\boldsymbol{Y}} - Z\left(\frac{P_l}{\sigma_r}\right)\right] \quad \text{[Equ 4.29]}$$

where P_l is limit pressure. To apply these results, [Equ 4.19] is used to discover the elastic yield strain ε_R . Now estimate the ratio P_l/σ_R and use [Equ 4.29] within an iterative procedure to modify the guess until the known value of ε_R is obtained. Once the ratio has been identified, multiply it by the yield stress σ_R to obtain the limit pressure. This is effective limit pressure and we add to it the ambient pore water pressure to give the total limit pressure.

4.5.6 Deriving the elastic equations

Assuming the non-linear elastic response of the soil prior to yield can be described by a power law of the form $\tau = q_{ss}\gamma^h$ (after Bolton & Whittle 1999) and assuming that whilst the soil is deforming elastically there are no volumetric strains then it follows that the principal stresses at first yield can be written as:

$$\sigma_r = P_o + \frac{\tau}{h} \quad \text{[Equ 4.30]}$$

$$\sigma_c = \sigma_r - 2\tau \quad \text{[Equ 4.31]}$$

Where τ represents the mobilised shear stress at failure. For a perfectly plastic frictional material development of the plastic zone occurs at a constant stress ratio, with the radial stress the major principal stress so at yield

$$\frac{\sigma_r}{\sigma_c} = N = \frac{(1+sin\phi)}{(1-sin\phi)} \quad \text{[Equ 4.32]}$$

Substituting [Equ 4.30] into [Equ 4.31] and the result into [Equ 4.32] leads to:

$$Np_o + \frac{N}{h}\tau - 2N\tau = P_o + \frac{\tau}{h} \quad \text{[Equ 4.33]}$$

And this can be re-arranged to find τ/h:

$$\frac{\tau}{h} = P_o\left(\frac{(N-1)}{N(2h-1)+1}\right) \quad \text{[Equ 4.34]}$$

So substituting into [Equ 4.30] gives:

$$\sigma_R = P_o\left(1 + \frac{(N-1)}{N(2h-1)+1}\right) \quad \text{[Equ 4.35]}$$

Alternatively, using the friction angle ϕ:

$$\sigma_R = P_o\left(1 + \frac{sin\phi}{h(1+sin\phi) - sin\phi}\right) \quad \text{[Equ 4.36]}$$

The final unloading starts with the radial stress at a maximum P'_{max}. 'Non-linear' yield in extension first occurs at the borehole wall when the radial stress is:

$$\sigma_r = P'_{max} - \frac{2\tau}{h} \quad \text{[Equ 4.37]}$$

The circumferential stress at yield will be $\sigma_r + 2\tau$ hence:

$$\sigma_c = P'_{max} - \frac{2\tau}{h} + 2\tau \quad \text{[Equ 4.38]}$$

The mobilised shear stress τ is discovered in a similar way to the elastic loading equations noting that yield in contraction occurs with the circumferential stress being the major principal stress. Radial stress ($2\tau/h$) for the elastic part of the final unloading is:

$$\frac{2\tau}{h} = \left(\frac{P'_{max}(N-1)}{N-1+h}\right) \quad \text{[Equ 4.39]}$$

The equivalent to [Equ 4.35] for the final unloading is:

$$\sigma_{RU} = P'_{max}\left[1 - \frac{(N-1)}{(N-1+h)}\right] \quad \text{[Equ 4.40]}$$

Alternatively, using the friction angle ϕ:

$$\sigma_R = P'_{max}\left(1 - \frac{2sin\phi}{h(1-sin\phi)+2sin\phi}\right) \quad \text{[Equ 4.41]}$$

If $h = 1$, the value for linear elasticity, [Equ 4.35] and [Equ 4.40] revert to the standard equations for yield in a frictional material. Typical values for h in sand like material would be 0.6 – 0.8.

For a c' – phi material the failure does not occur at a constant stress ratio but can be made to seem so if all stresses are raised by $c\ cot\phi$. Thus, [Equ 4.32] becomes:

$$\frac{\sigma_r + ccot\phi}{\sigma_c + ccot\phi} = N \quad \text{[Equ 4.42]}$$

So failure on first loading occurs when:

$$\sigma_R = \sigma_{ho} + \left[\frac{(\sigma_{ho} + ccot\phi)(N-1)}{N(2h-1)+1}\right] \quad \text{[Equ 4.43]}$$

Or:

$$\sigma_R = \sigma_{ho} + \left[\frac{(\sigma_{ho} + ccot\phi)sin\phi}{h(1+sin\phi) - sin\phi}\right] \quad \text{[Equ 4.44]}$$

If there is no cohesion then [Equ 4.36] and [Equ 4.44] are the same. If the material is linear elastic, $h = 1$ and [Equ 4.43] reverts to the familiar Mohr-Coulomb expression for first yield. Similarly, the expression for first yield in unloading in a c'-phi material is obtained by taking equation [Equ 4.37] and [Equ 4.38] and using the argument that the failure stress ratio is given by:

$$\frac{\sigma_c + ccot\phi}{\sigma_r + ccot\phi} = N \quad \text{[Equ 4.45]}$$

This leads to the following expression for the yielding stress in unloading:

$$\sigma_{RU} = P'_{max} - \left(\frac{(P'_{max} + ccot\phi)(\mathrm{N}-1)}{(N-1+h)}\right) \quad \text{[Equ 4.46]}$$

Or:

$$\sigma_{RU} = P'_{max} - \left(\frac{(P'_{max} + ccot\phi)2sin\phi}{h(1-sin\phi)+2sin\phi}\right) \quad \text{[Equ 4.47]}$$

4.5.7 Example

A typical result of the curve fitting method applied to a test is given in Figure. This particular test shows some cohesion. The elastic range on the final unloading is predicted reasonably well, although this is not always the case. The list of parameters in the top left hand corner includes the Janbu exponent of how stiffness varies with stress level at yield strain.

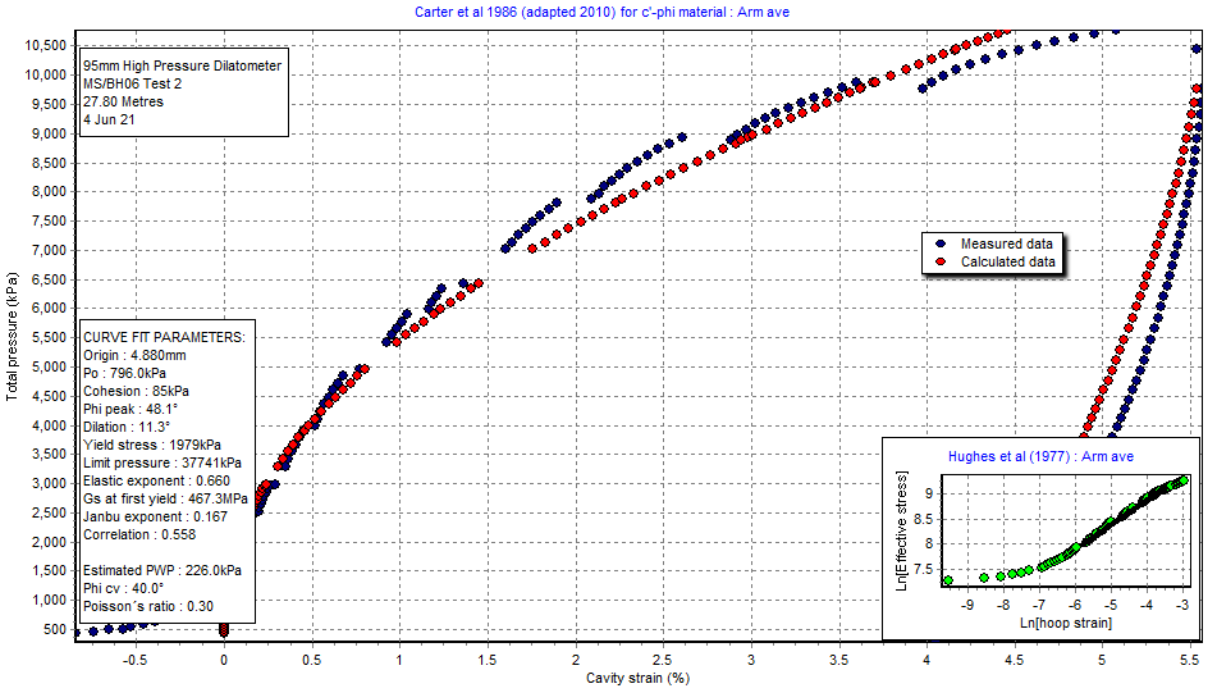


Figure 4.5 Drained test, curve fitting example, some cohesion

APPENDIX E EXAMPLE CALCULATION OF A LINE OF DATA (HDP)

What is described in some detail in this appendix is the steps necessary to convert the raw data output from a High Pressure Dilatometer into engineering units.

In order to convert pressuremeter signals into calibrated data the following steps are taken:

- Zeroing and scaling
- Compression correction
- Membrane correction
- Displacement and average total pressure
- Calculation of pressure outside membrane

1 Calibrations and raw data

The transducer correction consists of two values. The “zero” refers to the raw data output when the instrument is at rest. The “slope” describes the given mV change per mm of movement, or mV change per MPa of pressure difference. Together these are used to convert the transducers raw voltage output into engineering units.

The membrane correction describes the resistance offered by the membrane. It consists of the “zero”, which describes the inertia of the membrane, and the “slope”, which describes the stiffness of the membrane.

The compression value describes how the probe is deformed as the instrument is pressurised. This effect will affect the arm carrier reading as the body of the probe deflects outwards.

The calibrations for this particular test are presented as follows: -

INSTRUMENT CALIBRATIONS:

	TRANSDUCER CORRECTION				MEMBRANE CORRECTION				COMPRESSION	
	ZERO		SLOPE		ZERO		SLOPE			
ARM 1	-1590.6	mV	113.7	mV/mm	60	kPa	14.4	kPa/mm	7.0	mm/GPa
ARM 2	-1385.5	mV	112.5	mV/mm	60	kPa	14.4	kPa/mm	-24.2	mm/GPa
ARM 3	-1861.3	mV	120.1	mV/mm	60	kPa	14.4	kPa/mm	11.6	mm/GPa
ARM 4	-1326.7	mV	112.5	mV/mm	60	kPa	14.4	kPa/mm	5.1	mm/GPa
ARM 5	-1880.6	mV	105.8	mV/mm	60	kPa	14.4	kPa/mm	7.4	mm/GPa
ARM 6	-2343.8	mV	109.5	mV/mm	60	kPa	14.4	kPa/mm	5.6	mm/GPa
TPC A	-61.9	mV	68.5	mV/MPa						
TPC B	49.2	mV	77.9	mV/MPa						

The line of raw data reads from left to right as follows. The units are volts: -

LINE	TPC A	ARM 1	ARM 2	ARM 3	ARM 4	ARM 5	ARM 6	TPC B	SIN	COS
204	0.5531	-1.3697	-1.1102	-1.3910	-0.8961	-1.4996	-2.0560	0.7717	-1.0710	-0.5917

2 Zeroing and scaling

The raw data is in units of volts and needs to be corrected for zero offsets and scaled using the sensitivities quoted in the calibration data.

The first operation is to deduct the zero offsets. These are the figures found in the first column of the calibration information but quoted here in volts. The columns for Sin and Cos disappear at this stage, as they are not transferred to the calibrated data file:

	TPC A	ARM 1	ARM 2	ARM 3	ARM 4	ARM 5	ARM 6	TPC B	
Output	0.5531	-1.3697	-1.1102	-1.3910	-0.8961	-1.4996	-2.0560	0.7717	
Zero	-0.0619	-1.5906	-1.3855	-1.8613	-1.3267	-1.8806	-2.3438	0.0492	
Result	0.6150	0.2209	0.2753	0.4703	0.4306	0.3810	0.2878	0.7225	[1]

This result [1] can now be scaled. The information for this is found in the second column of calibration data and is expressed as millivolts per millimetre to calculate displacement, and as millivolts per megaPascal to calculate pressure. As before, the results of the calculations are quoted in volts:

	TPC A	ARM 1	ARM 2	ARM 3	ARM 4	ARM 5	ARM 6	TPC B	
From [1]	0.6150	0.2209	0.2753	0.4703	0.4306	0.3810	0.2878	0.7225	
Slope	0.0685	0.1137	0.1125	0.1201	0.1125	0.1058	0.1095	0.0779	
Result	8.9781	1.9428	2.4471	3.9159	3.8276	3.6011	2.6283	9.2747	[2]
Resulting units	(MPa)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(MPa)	

At this point in the procedure, a choice has to be made about which total pressure cell or combination of cells to use in producing the calibrated data. The difference between the cells is because cell A is read at the beginning of a data scan and cell B at the end. The time taken to make the scan allows some pressure change to occur in the probe. In this example the average of cells A and B are used: $(8.9782 + 9.2747)/2 = 9.1264 MPa.$

3 Compression Correction

The data is now in engineering units which reflect what is taking place inside the membrane. The remaining corrections are introduced to give a better representation of what is taking place at the point where the membrane bears on the borehole wall.

The displacement data is adjusted for the instrument displacements due to the pressure being applied to it. This is expressed as a linear movement in millimetres per GigaPascal of pressure being applied, and is found in the 5th column of the calibration details:

	ARM 1	ARM 2	ARM 3	ARM 4	ARM 5	ARM 6	
Compression Correction Factor (mm/GPa)	7.0	-24.2	11.6	5.1	7.4	5.6	column 5
Internal Pressure (MPa)	9.1264	9.1264	9.1264	9.1264	9.1264	9.1264	
Adjustment: (compression correction factor * internal pressure)/1000	0.0639	-0.2209	0.1059	0.0465	0.0675	0.0511	[3]
Internal Displacement (mm)	1.9428	2.4471	3.9159	3.8276	3.6011	2.6283	[2]
Compression Corrected Displacement (mm)	1.8789	2.6680	3.8100	3.7810	3.5336	2.5772	[4]

4 Membrane Correction

The displacement data calculated so far is the movement measured by the arms to the inside of the membrane. The figures quoted in the calibrated data listings are the movement of the outside of the protective sheath. This is derived from the internal movement by assuming that the cross-section area of the membrane is a constant. A full explanation of this and the derivation of the equation used is discussed in the appendix on calibration technique.

The equation is $E = t - b + \sqrt{[(b - t)^2 + d(2a + d)]}$ [a]

Where:

a	is the internal radius of the membrane at rest
b	is the external radius of the membrane at rest
r	is the external radius of the membrane expanded
t	is the thickness of the stainless steel sheath strips
d	is the measured movement of the strain arm
E	is the actual expansion of the membrane

For the pressuremeter used to produce this example:-

$2b$	= 97.0 mm
$2a$	= 81.0 mm
t	= 1.0 mm

Because the membrane can be assumed to have the same thickness at all points on the cross-section the technique employed is to calculate a scale factor from the average displacement. Since the membrane is assumed to remain at the same volume independent of pressure this scale factor is appropriate for use at all pressures.

	ARM 1 mm	ARM 2 mm	ARM 3 mm	ARM 4 mm	ARM 5 mm	ARM 6 mm	
Compression Adjusted Displacements	1.8789	2.6680	3.8100	3.7810	3.5336	2.5772	[4]
Average Comp Adjusted Displacement	3.0415	3.0415	3.0415	3.0415	3.0415	3.0415	[5]
True Average Displacement (use equ [a])	2.6184	2.6184	2.6184	2.6184	2.6184	2.6184	[6]
Scale Factor; [6]/[5]	0.8609	0.8609	0.8609	0.8609	0.8609	0.8609	[7]
Fully Corrected Displacement; [7]*[4]	1.6176	2.2969	3.2801	3.2551	3.0421	2.2188	[8]

5 Displacement and average total pressure

The result, using displacements from [8] and the average total pressure quoted in kPa:

LINE	ARM 1 mm	ARM 2 mm	ARM 3 mm	ARM 4 mm	ARM 5 mm	ARM 6 mm	TPC kPa	
204	1.6176	2.2969	3.2801	3.2551	3.0421	2.2188	9126.4	[9]

In practice the errors introduced by rounding-off calculations may result in small differences in the final figure. This is the line of data seen in the calibrated data file that is passed from the logging program to the analysis program.

6 Calculation of pressure outside membrane

However, the conversion to data ready for analysis is not yet complete. The column for pressure is the pressure *inside* the membrane. What is required is the pressure on the *outside* of the membrane where it bears against the borehole wall. Before using the calibrated data file, therefore, the analysis program corrects the pressure data for the influence of the membrane, using the data in the calibrations for membrane correction. It is separately calculated for each arm position, although in practice an average correction value tends to be used. The correction figure is the sum of the zero figure (column 3 in the calibrations) plus the increased stiffness with strain (column 4 in calibrations):-

	ARM 1	ARM 2	ARM 3	ARM 4	ARM 5	ARM 6	
From Result [8] (mm)	1.6176	2.2969	3.2801	3.2551	3.0421	2.2188	
Average True Displacement (mm)	2.6184	2.6184	2.6184	2.6184	2.6184	2.6184	[10]
Membrane Correction Slope (kPa/mm)	14.4	14.4	14.4	14.4	14.4	14.4	[11]

Membrane Stiffness Correction (kPa); [10]*[11]	37.7	37.7	37.7	37.7	37.7	37.7	[12]
Membrane Zero Correction (kPa)	60.0	60.0	60.0	60.0	60.0	60.0	[13]
Total Membrane Correction (kPa); [12]+[13]	97.7	97.7	97.7	97.7	97.7	97.7	[14]

This is the total membrane correction at each arm position and is now deducted from the total pressure cell readings as follows:

	Average TPC	
Uncorrected pressure (kPa)	9126.4	from result [2]
Total Membrane correction (kPa)	97.7	from result [14]
Corrected pressure (kPa)	9028.7	[15]

When the calibrated data is taken from the Analysis program the format differs from the PRN file produced by the logging program (see D, above). The analysis output gives the average radial displacement of opposing pairs of arms, together with a column of corrected pressure readings for each arm pair, and the uncorrected pressure:

LINE	Arms(1+4)/2 mm	Arms (2+5)/2 mm	Arms (3+6)/2 mm	TPC 1 KPa	TPC 2 KPa	TPC 3 KPa	TPC KPa
204	2.4364	2.6695	2.7494	9028.7	9028.7	9028.7	9126.4

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PRELIMINARY GROUND INVESTIGATION-NZT TEESWORK

Results of pressuremeter tests carried out by Cambridge Insitu Ltd

Client reference	**4339**
Contractor	**Allied Exploration & Geotechnics Ltd**
Cambridge Insitu reference:	**CIR1505/21**
Report date:	**August 2021**
Version:	**1.0**

VOLUME 2 of 2

Data for all tests and calibrations

CAMBRIDGE INSITU LTD
Little Eversden
Cambridge
ENGLAND
CB23 1HE

[redacted]

Volume 2 Details of work carried out

Table 1 below details the pressuremeter testing carried in the boreholes. Table 2 provides background information about the tests and probe used. Table 3 provides borehole information. Notes on the work carried out and tables of information are provided below.

Table 1 Tests details

Test	Internal ref.	Depth (mBGL)	Date	Max Pressure (kPa)	Material	Remarks
MS/BH06 Test 1	B06T01	25.75	03/06/2021	7435	Mudstone	-
MS/BH06 Test 2	B06T02	27.80	04/06/2021	10774	Mudstone	-
MS/BH07 Test 1	B07T01	25.20	06/07/2021	3747	Mudstone	Membrane extrusion at 3.7MPa. Issues recorded drilling pocket.
MS/BH07 Test 2	B07T02	27.40	07/07/2021	7979	Mudstone	-
MS/BH09 Test 1	B09T01	22.40	08/07/2021	7924	Mudstone	Membrane extrusion at 7.9MPa. Issues recorded drilling pocket.
MS/BH09 Test 2	B09T02	25.15	09/07/2021	11664	Mudstone	-
MS/BH11 Test 1	B11T01	22.80	10/06/2021	6048	Mudstone	-
MS/BH11 Test 2	B11T02	25.80	11/06/2021	8092	Mudstone	-

Notes:

1. **Depth** is given as metres below ground level to the centre of the measuring section. The RPM membrane is 0.26m long so the affected zone is ± 0.13m of the test centre.
2. **Max Pressure** is the maximum pressure reached by the end of loading and may be used as a rough indication of how the material strength is changing with depth**.**
3. **Material** is as reported on site without reference to borehole logs.

Table 2 Probe details and calibrations

Test	Operator	Probe	Transducer calibration	Membrane stiffness	System compliance
MS/BH06 Test 1	SDP	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH06 Test 2	SDP	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH07 Test 1	EJS	Wally (HPD)	17/05/2021	E0107T21	E0107T21
MS/BH07 Test 2	EJS	Wally (HPD)	17/05/2021	E0707T21	E0707T21
MS/BH09 Test 1	EJS	Wally (HPD)	17/05/2021	E0707T21	E0707T21
MS/BH09 Test 2	EJS	Wally (HPD)	17/05/2021	E0907T21	E0907T21
MS/BH11 Test 1	EJS	Wally (HPD)	17/05/2021	K1705T21	K1705T21
MS/BH11 Test 2	EJS	Wally (HPD)	17/05/2021	K1705T21	K1705T21

Notes:

1. **Operator** –SDP is Stuart Pearce and EJS is Ewan Stockwell. They are both employees of Cambridge Insitu Ltd.
2. **Probe** – all tests were conducted with a 95mm High Pressure Dilatometer (HPD). A single probe was used, known as “Wally”.
3. For the probe there is a transducer calibration, referenced by date. There are also separate calibrations for the membrane and system compliance.

Table 3 Borehole location information

Borehole	Easting (m)	Northing (m)	Ground level (mAOD)	Groundwater level (mBGL)
MS/BH06	457033.748	525517.758	7.976	4.78
MS/BH07	457195.207	525424.790	7.330	4.19
MS/BH09	456823.949	525534.870	7.466	4.27
MS/BH11	457121.000	525296.160	7.255	3.90

Notes:

1. The coordinates and ground level of the boreholes have been provided by Allied Exploration & Geotechnics Ltd.
2. The ground water level is based on groundwater information provided by Allied Exploration & Geotechnics Ltd. For MS/BH07 and MS/BH11 this is based on borehole specific groundwater monitoring. For MS/BH06 and MS/BH09 this is based on the groundwater monitoring across the site.

The remainder of this volume is laid out as follows:

- There is a plot of all the field curves on the same axes.
- Thereafter the individual results and plots showing the derivation of the results are given. For each test the pages are in approximately the following order:

Plots from the analysis program WINSITU:

1. A Results Summary Sheet
2. A plot of total pressure against cavity strain, using the output from the average of all displacement followers.
3. A plot of Total pressure/Radial displacement showing the slope identified as the initial shear modulus and creep curve. Where applicable the apparent yield stress and the cavity reference pressure inferred from this yield stress are also shown. (Marsland & Randolph 1977, Hawkins 1990)
4. A log-log plot of current cavity strain against effective radial stress, using loading data, quoting the gradient (Hughes et al, 1977). This can be used to derive a peak friction angle and dilation angle if the constant volume friction angle is known (or estimated.
5. A log-log plot of current cavity strain against effective radial stress, using contraction data, quoting the gradient (Withers et al, 1989). This can be used to derive a peak friction angle and dilation angle if the constant volume friction angle is known (or estimated).
6. Plots on axes of Radial displacement/Total Pressure showing enlarged views of unload/reload cycles and quoting shear modulus G.
7. Plots on axes of Ln[shear strain]/Ln[radial stress] showing loop reloading paths and quoting the gradient and intercept for each loop.
8. A plot on axes of secant shear modulus/Log[Shear strain] showing the decay of stiffness against strain curves derived from fitting a power law function to reloading data, all cycles. Individual data points obtained from applying Palmer (1972) directly to reloading data are also shown.
9. A plot on axes of Average Cavity Strain/Total pressure giving the results of curve fitting the field curve with the best set of parameters using a non-linear elastic/perfectly plastic solution (Carter et al 1986, modified).
10. Using contraction data, a plot of shear stress against normal stress calculated via an adapted version of the Manassero method. This gives the peak and residual friction angles and the maximum shear stress.

Plots taken from the data collection software package WINLOG:

11. On axes of Radial Displacement/Total Pressure showing average displacement.
12. On axes of Radial Displacement/Total Pressure showing all displacement sensors.

Because the information presented here comes from a variety of sources it is not possible to number the pages in a coherent manner, although within a test some pages may be numbered.

Winsitu colour coding

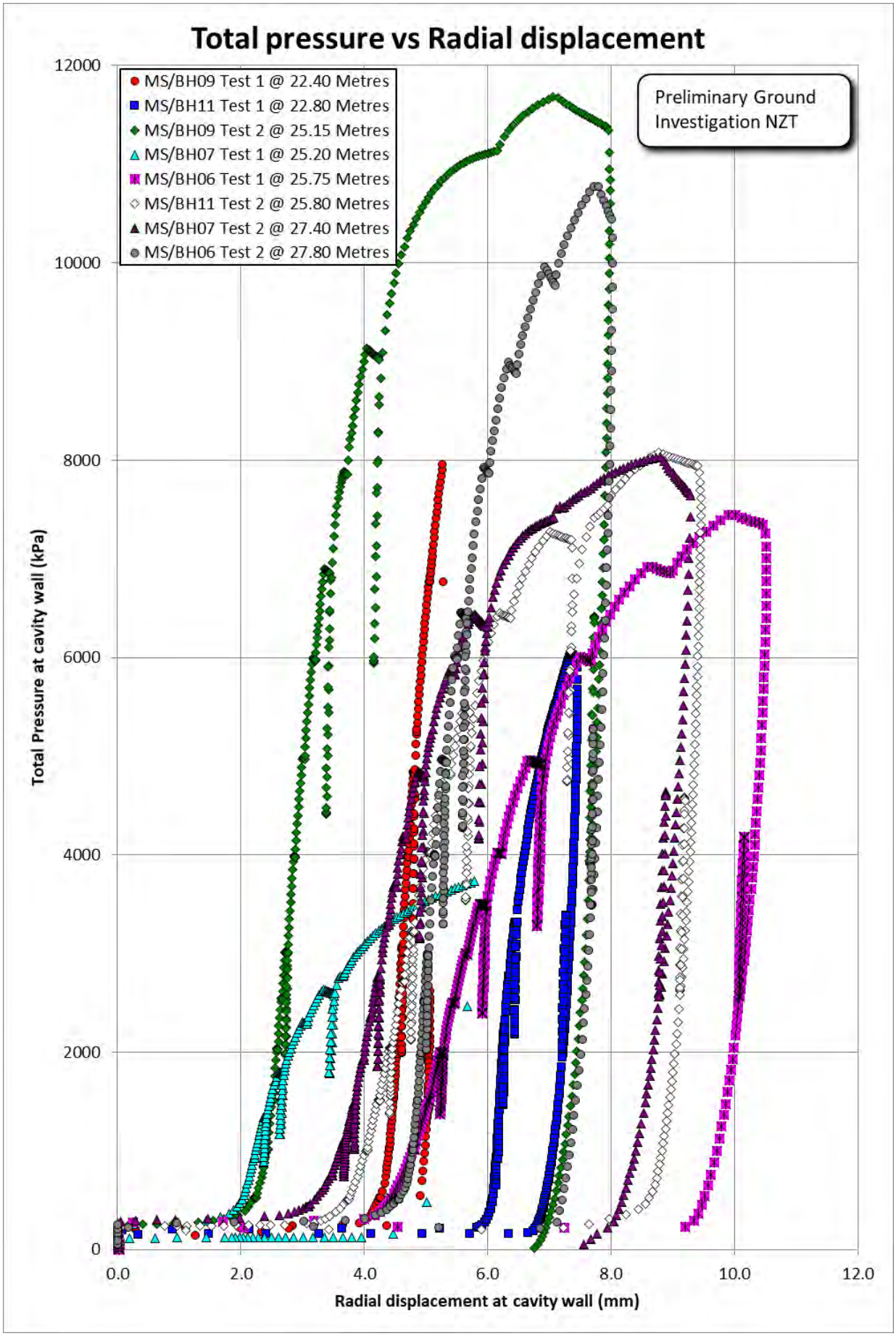
Plots from the analysis program WINSITU use a colour coding scheme to distinguish between different kinds of data. The options are these:

Data description	Colour
On the loading path	red
On the unloading path	blue

To be ignored	grey
Loop unloading	yellow
Loop reloading	Magenta
Creep hold	Dark creep
Creep end	Light green

When a particular plot displays one colour only then this is arbitrary and the colour has no significance. When more than one colour is shown then the meaning is indicated above.

Figure 1 **All tests on common axes – All boreholes**



TEST DATA FOR INDIVIDUAL TESTS

All boreholes

(TAKEN FROM WINSITU and WINLOG FILES)

Test	Internal Ref.	Depth (mBGL)	Date
MS/BH06 Test 1	B06T01	25.75	03/06/2021
MS/BH06 Test 2	B06T02	27.80	04/06/2021
MS/BH07 Test 1	B07T01	25.20	06/07/2021
MS/BH07 Test 2	B07T02	27.40	07/07/2021
MS/BH09 Test 1	B09T01	22.40	08/07/2021
MS/BH09 Test 2	B09T02	25.15	09/07/2021
MS/BH11 Test 1	B11T01	22.80	10/06/2021
MS/BH11 Test 2	B11T02	25.80	11/06/2021

MS/BH06 Test 1 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH06
Test name : MS/BH06 Test 1
Test date : 3 Jun 21
Test depth : 25.75 Metres
Water table : 4.78 Metres
Ambient PWP : 206.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 YNB/RW on 3 Jun 21

Remarks: Material yields at 4MPa. Unable to fit curve after 7% cavity strain, signifcant creep occuring.

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=5.14"
Po from Marsland & Randolph (kPa) : "Arm ave=588.1"
Best estimate of Po (kPa) : "Arm ave=593.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=3989.6"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 40.0
Angle of internal friction (°) : "Arm ave=46.0"
Dilation angle (°) : "Arm ave=8.2"
Gradient of log-log plot : "Arm ave=0.478"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=40.1"
Dilation angle (°) : "Arm ave=0.2"
Gradient of log-log plot : "Arm ave=-3.609"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=66.2"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	363.0	0.205	1632	0.144	523
Arm ave	2	466.8	1.483	2836	0.189	883
Arm ave	3	477.0	3.163	3961	0.287	1369
Arm ave	4	506.2	9.274	3401	0.306	1551

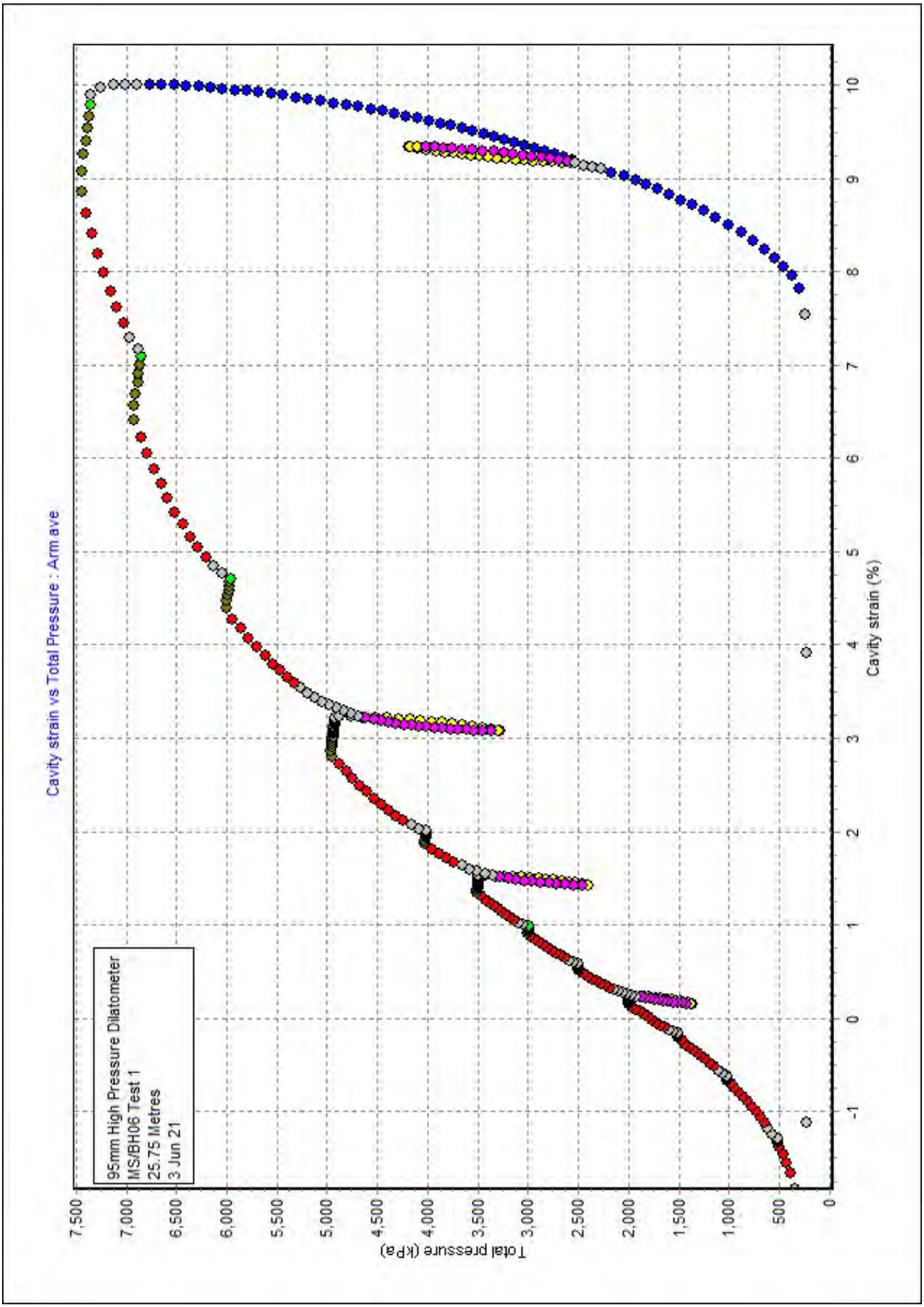
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

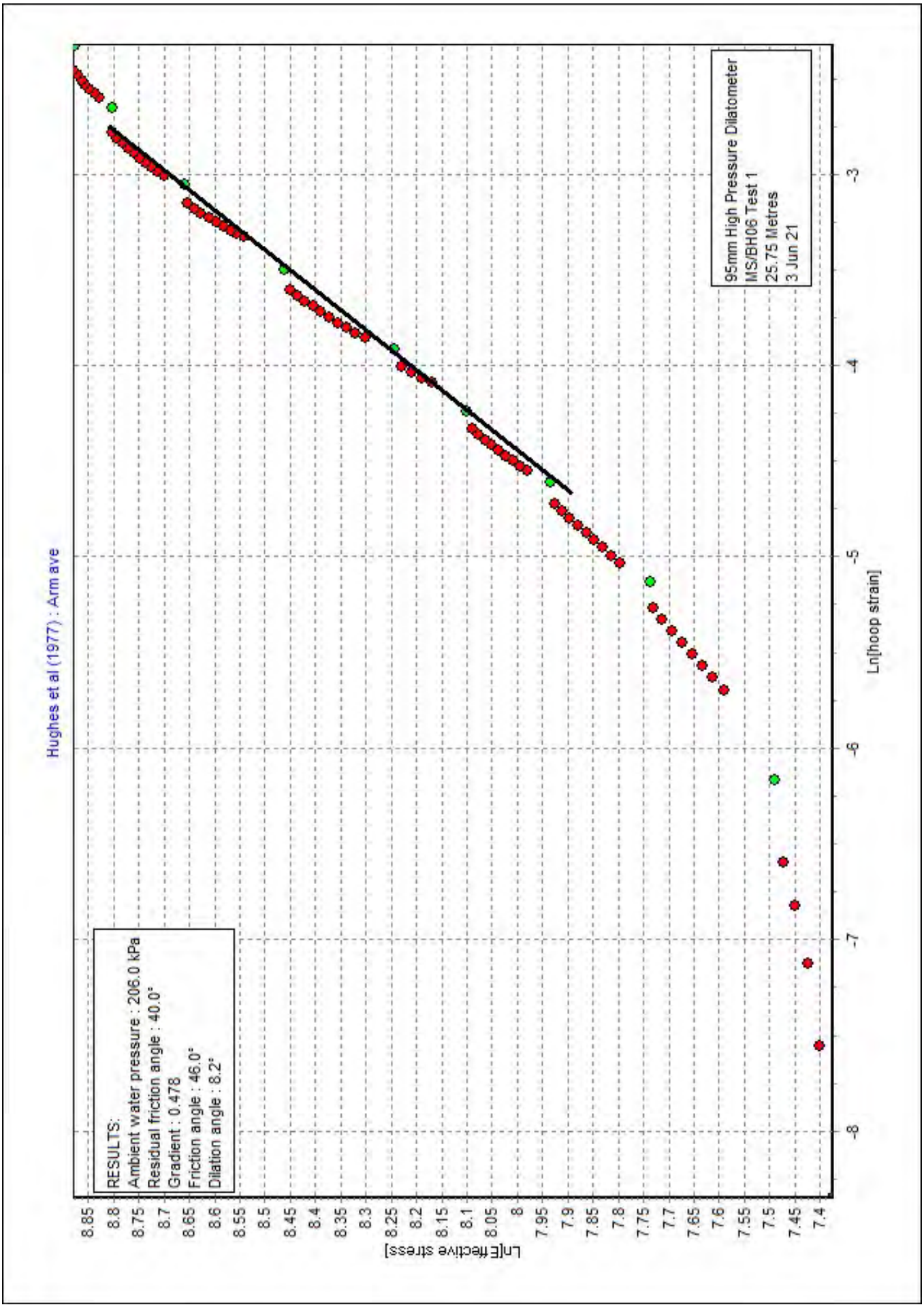
Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	55.318	39.160	0.708
Arm ave	2	52.511	33.422	0.636
Arm ave	3	47.882	28.568	0.597
Arm ave	4	60.805	37.845	0.622

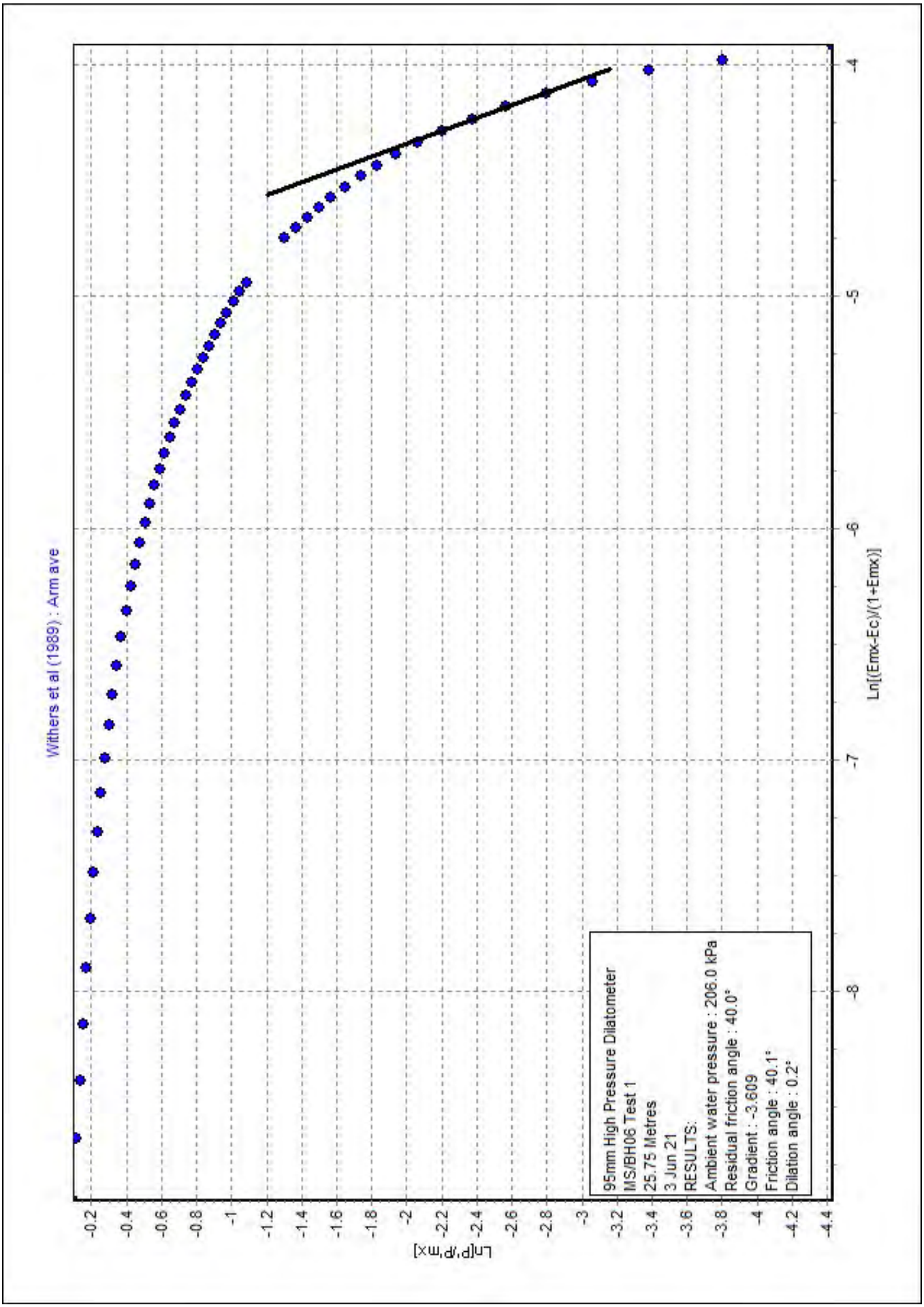
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 5.14
Po (kPa) : 593
Cohesion (kPa) : 280
Angle of peak friction (deg) : 46.0
Angle of peak dilation (deg) : 8.2

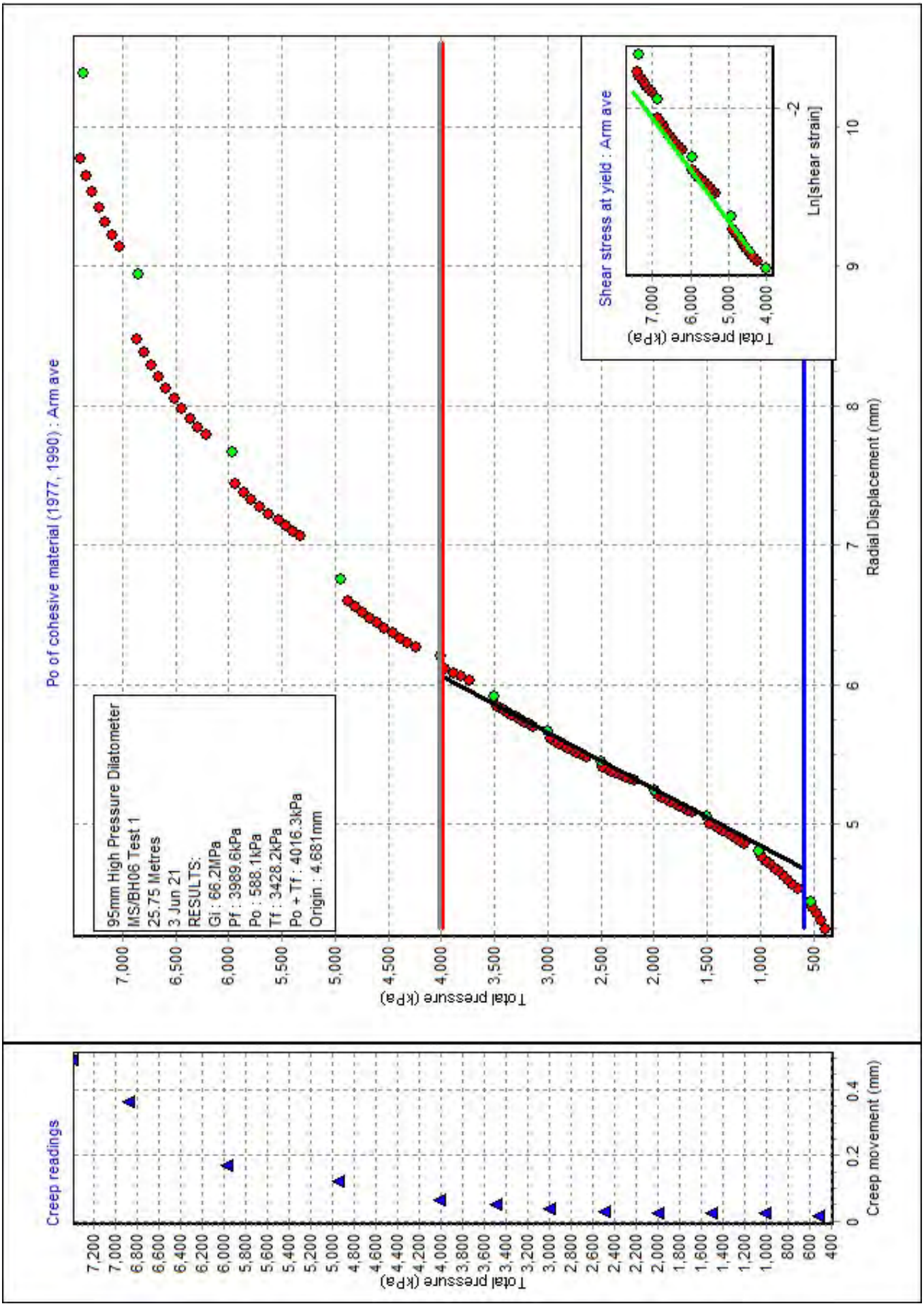
MS/BH06 Test 1 - SUMMARY OF RESULTS

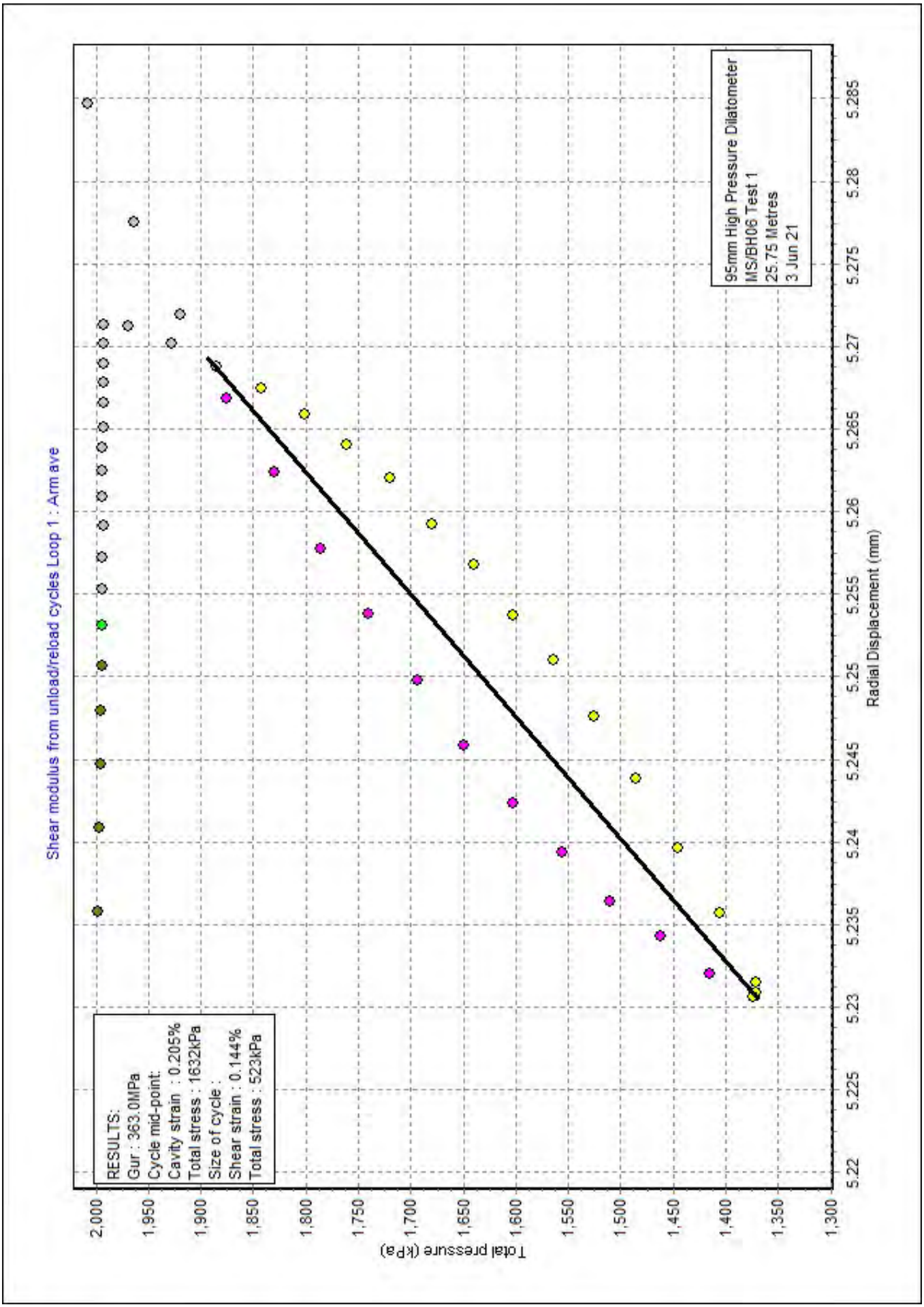
Total yield stress (kPa)	:	1858
Total limit stress (kPa)	:	18999
G at first yield (MPa)	:	147.0
Non-linear exponent	:	0.636
Janbu exponent	:	0.269
Correlation	:	0.980
Ambient pore water pressure (kPa)	:	206
Residual friction angle (deg)	:	40.0
Poisson's ratio	:	0.30

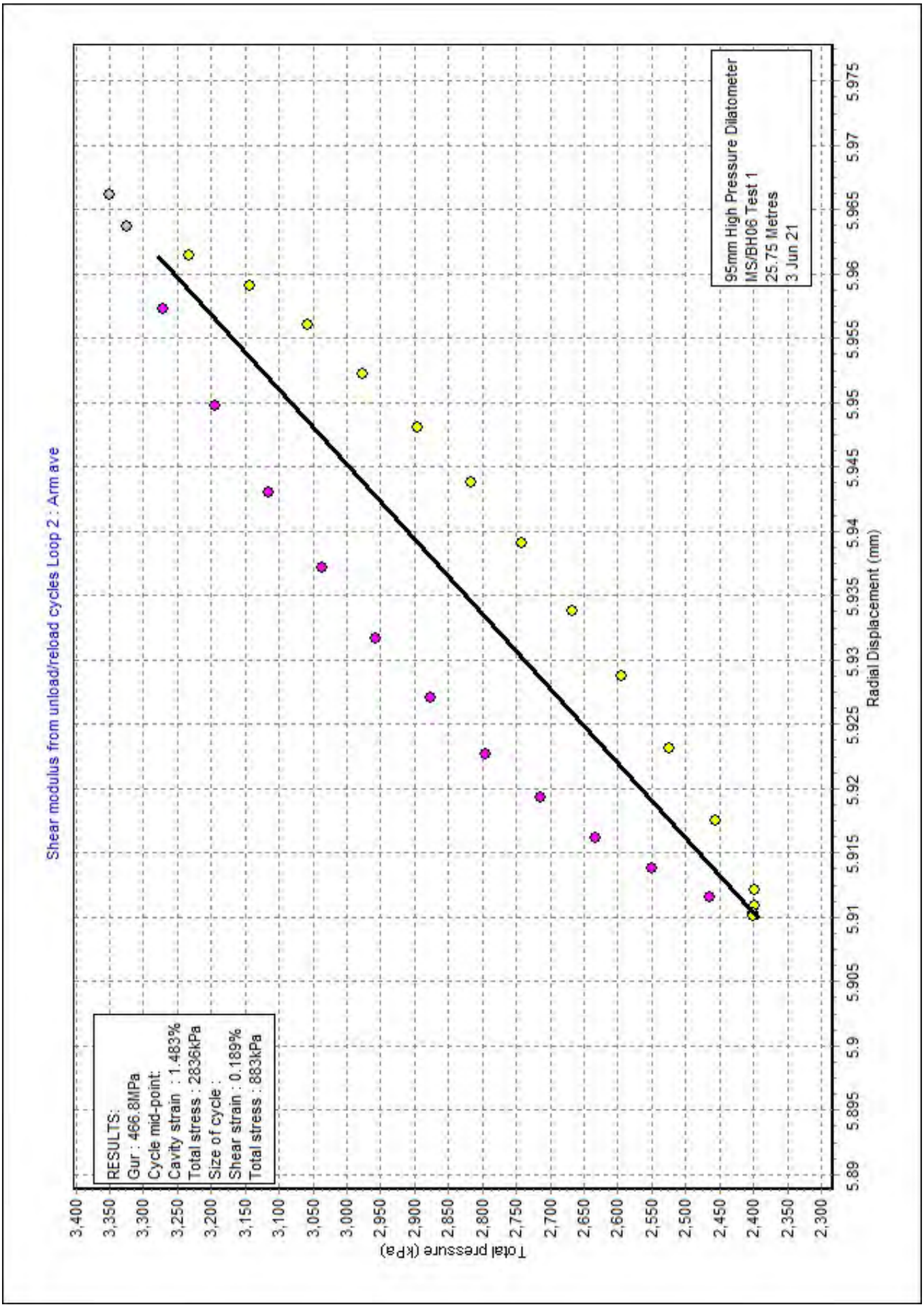

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Total pressure (kPa)
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Cavity strain (%)
-1
0
1
2
3
4
5
6
7
8
9
10


Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 206.0 kPa
Residual friction angle : 40.0°
Gradient : 0.478
Friction angle : 46.0°
Dilation angle : 8.2°
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Ln[Effective stress]
Ln[hoop strain]


Withers et al (1989) : Arm ave
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Ambient water pressure : 206.0 kPa
Residual friction angle : 40.0°
Gradient : -3.609
Friction angle : 40.1°
Dilation angle : 0.2°


Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Gi : 66.2MPa
Pf : 3989.6kPa
Po : 588.1kPa
Tf : 3428.2kPa
Po + Tf : 4016.3kPa
Origin : 4.681mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]
Creep readings
Total pressure (kPa)
Creep movement (mm)


Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 363.0MPa
Cycle mid-point:
Cavity strain : 0.205%
Total stress : 1632kPa
Size of cycle :
Shear strain : 0.144%
Total stress : 523kPa
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
2,000
1,950
1,900
1,850
1,800
1,750
1,700
1,650
1,600
1,550
1,500
1,450
1,400
1,350
1,300
5.22
5.225
5.23
5.235
5.24
5.245
5.25
5.255
5.26
5.265
5.27
5.275
5.28
5.285


Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 466.8MPa
Cycle mid-point:
Cavity strain : 1.483%
Total stress : 2836kPa
Size of cycle :
Shear strain : 0.189%
Total stress : 883kPa
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
3,400
3,350
3,300
3,250
3,200
3,150
3,100
3,050
3,000
2,950
2,900
2,850
2,800
2,750
2,700
2,650
2,600
2,550
2,500
2,450
2,400
2,350
2,300
5.89
5.895
5.9
5.905
5.91
5.915
5.92
5.925
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5.935
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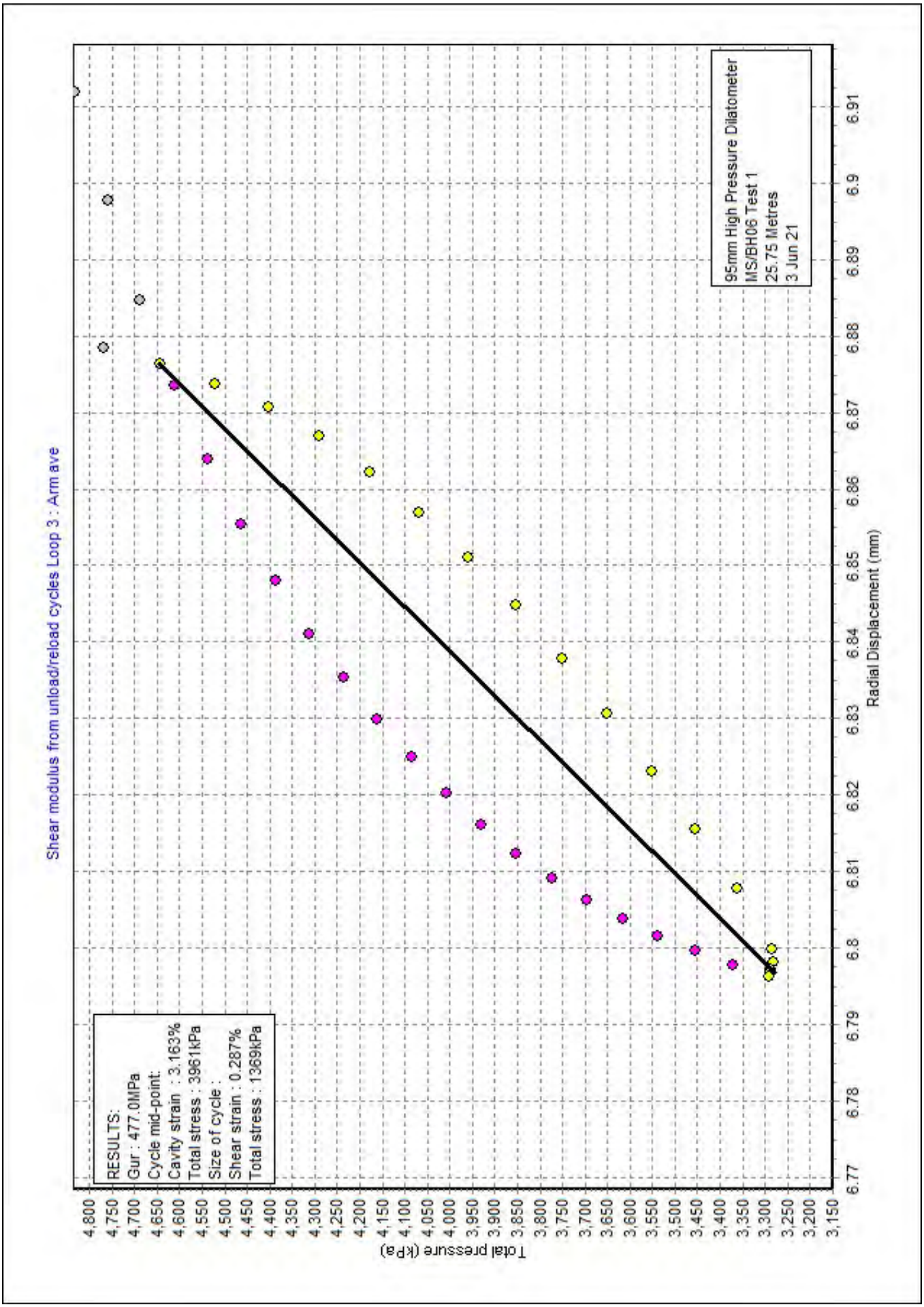
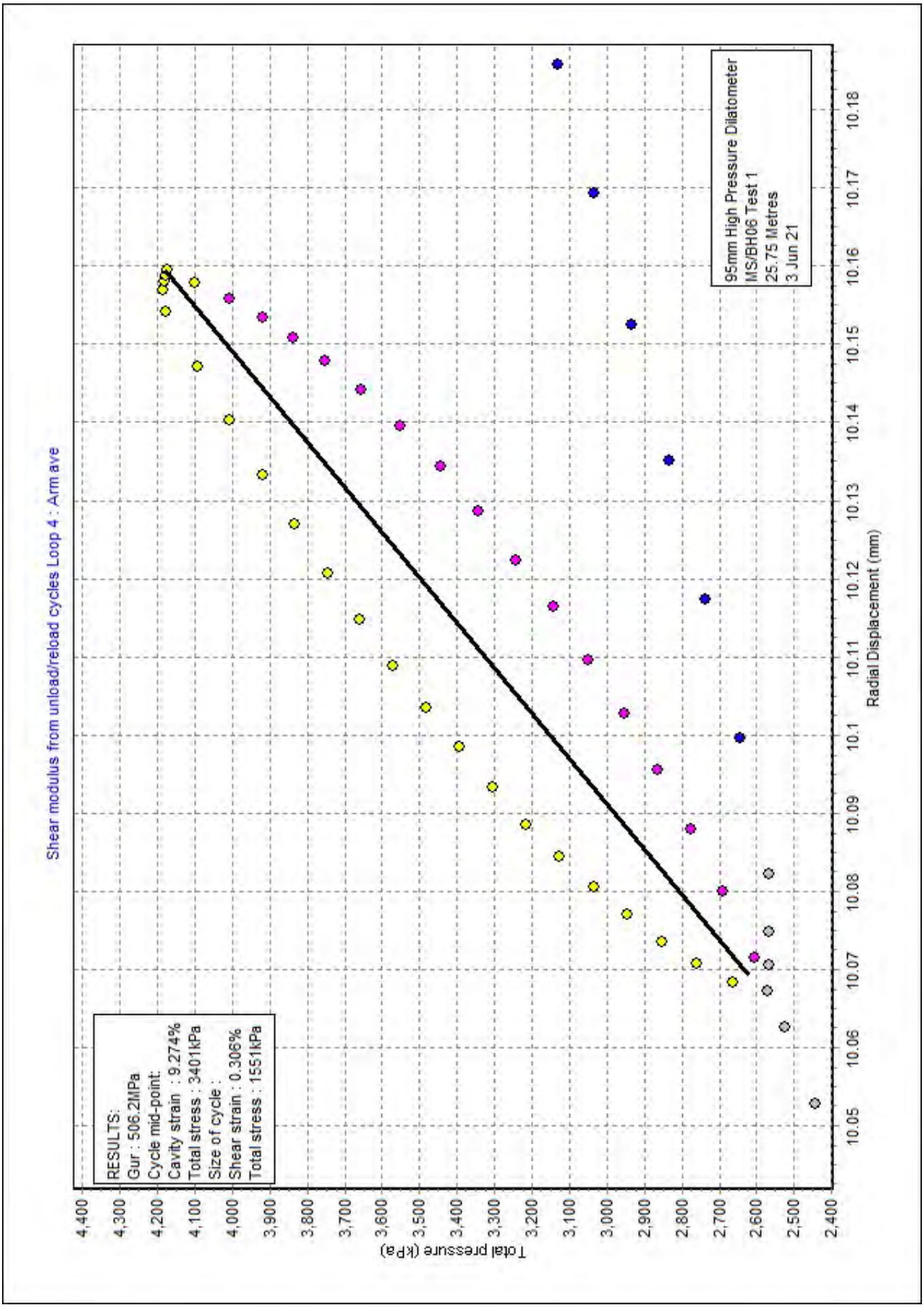
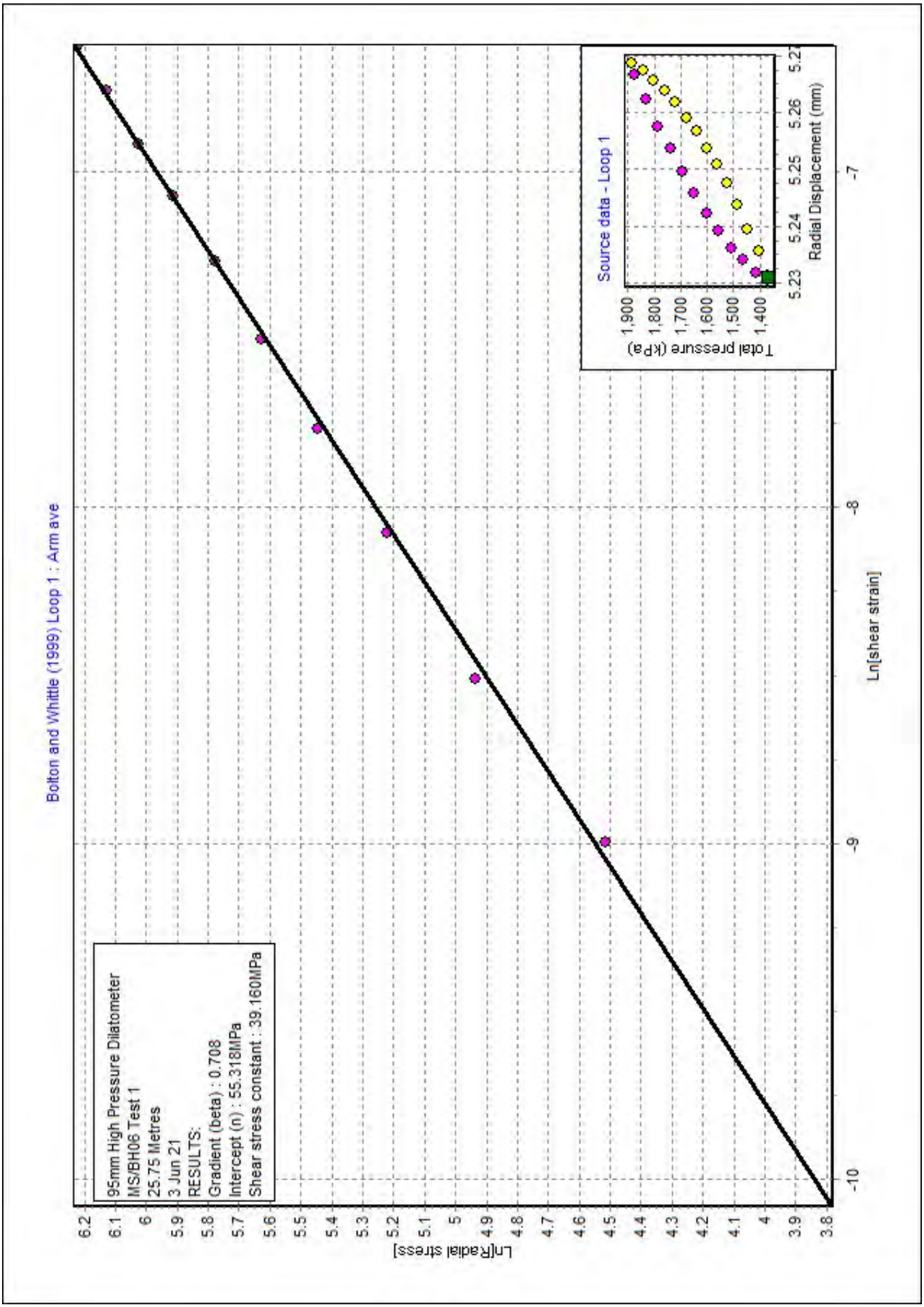
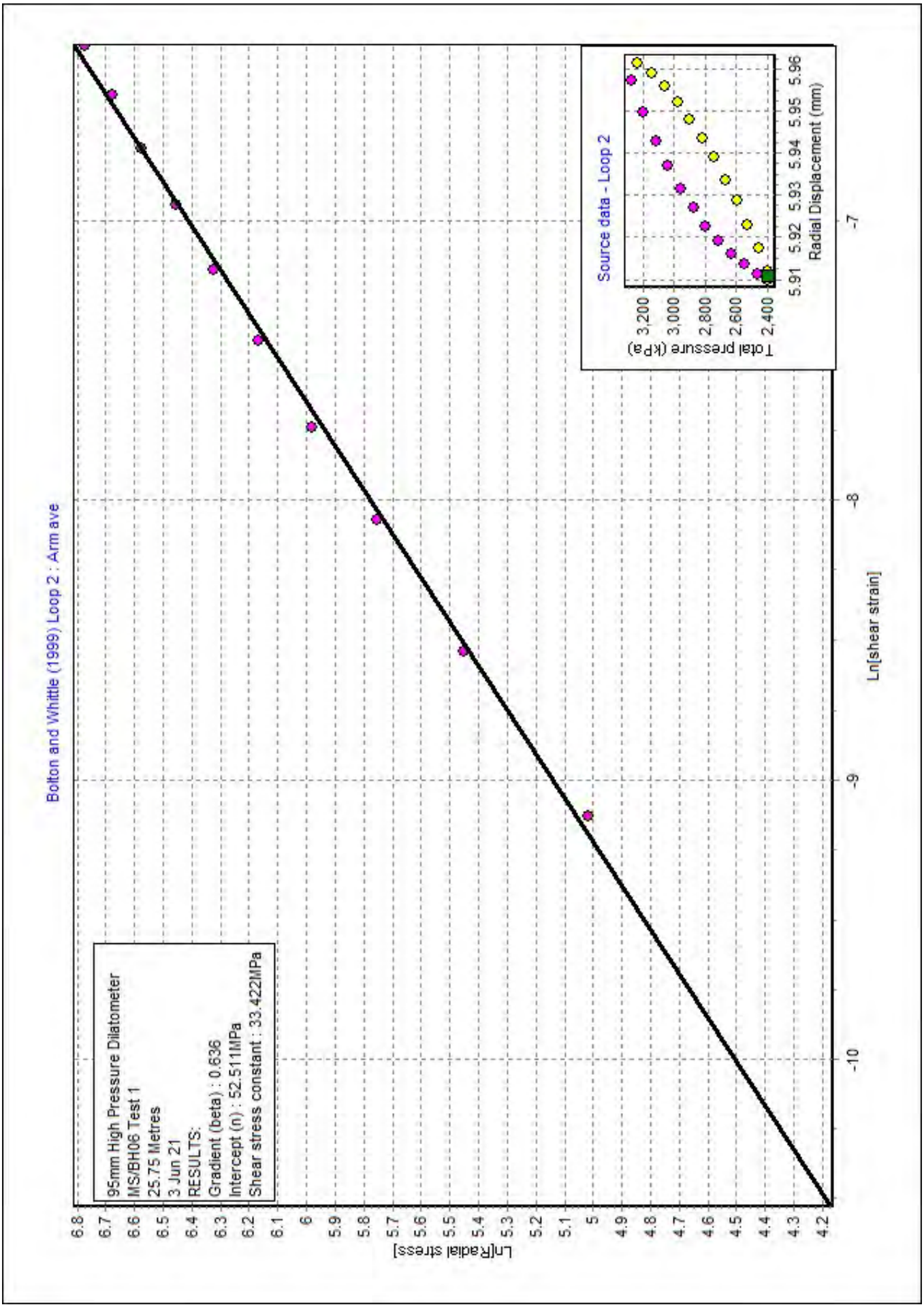
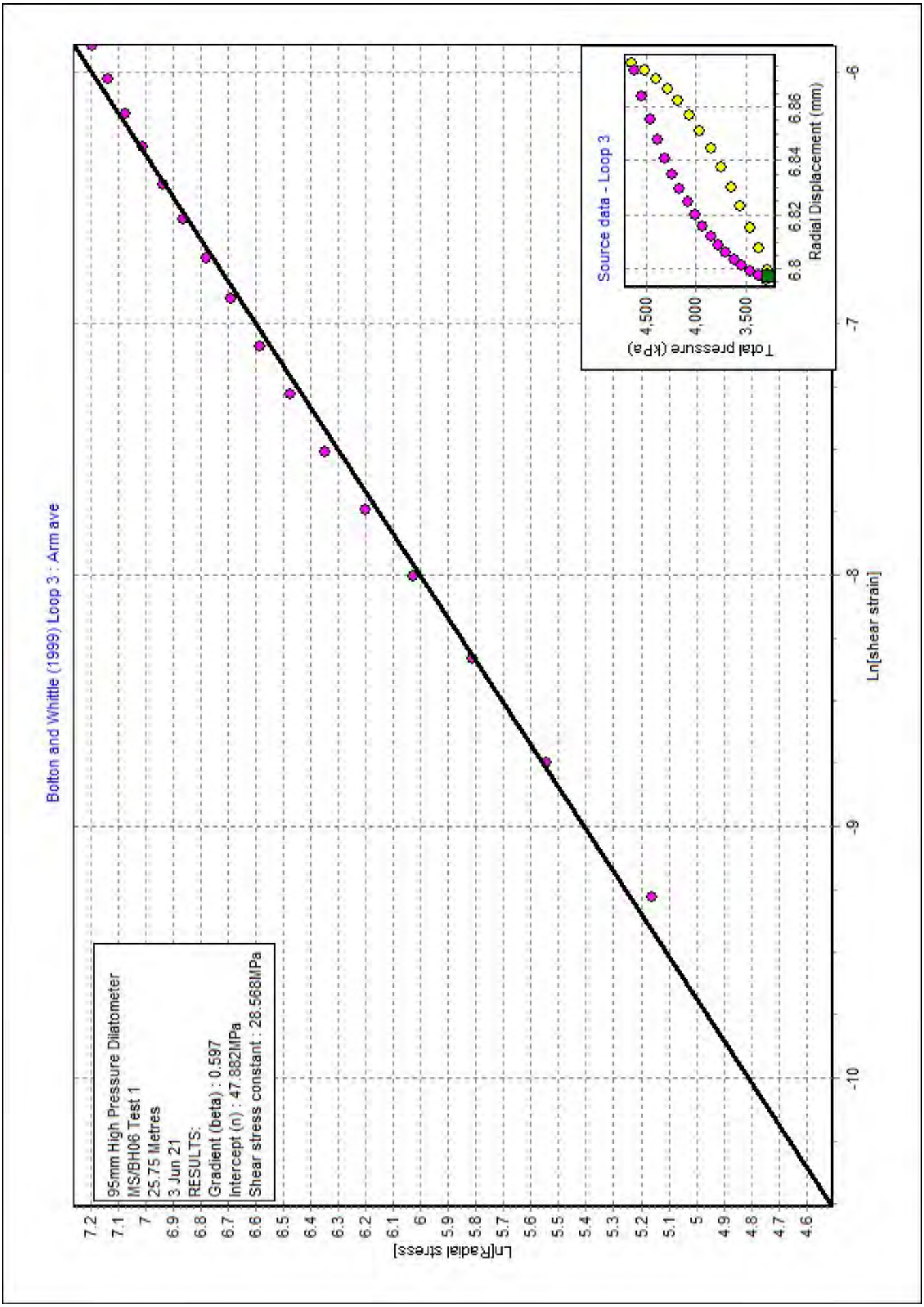
5.945
5.95
5.955
5.96
5.965
5.97
5.975

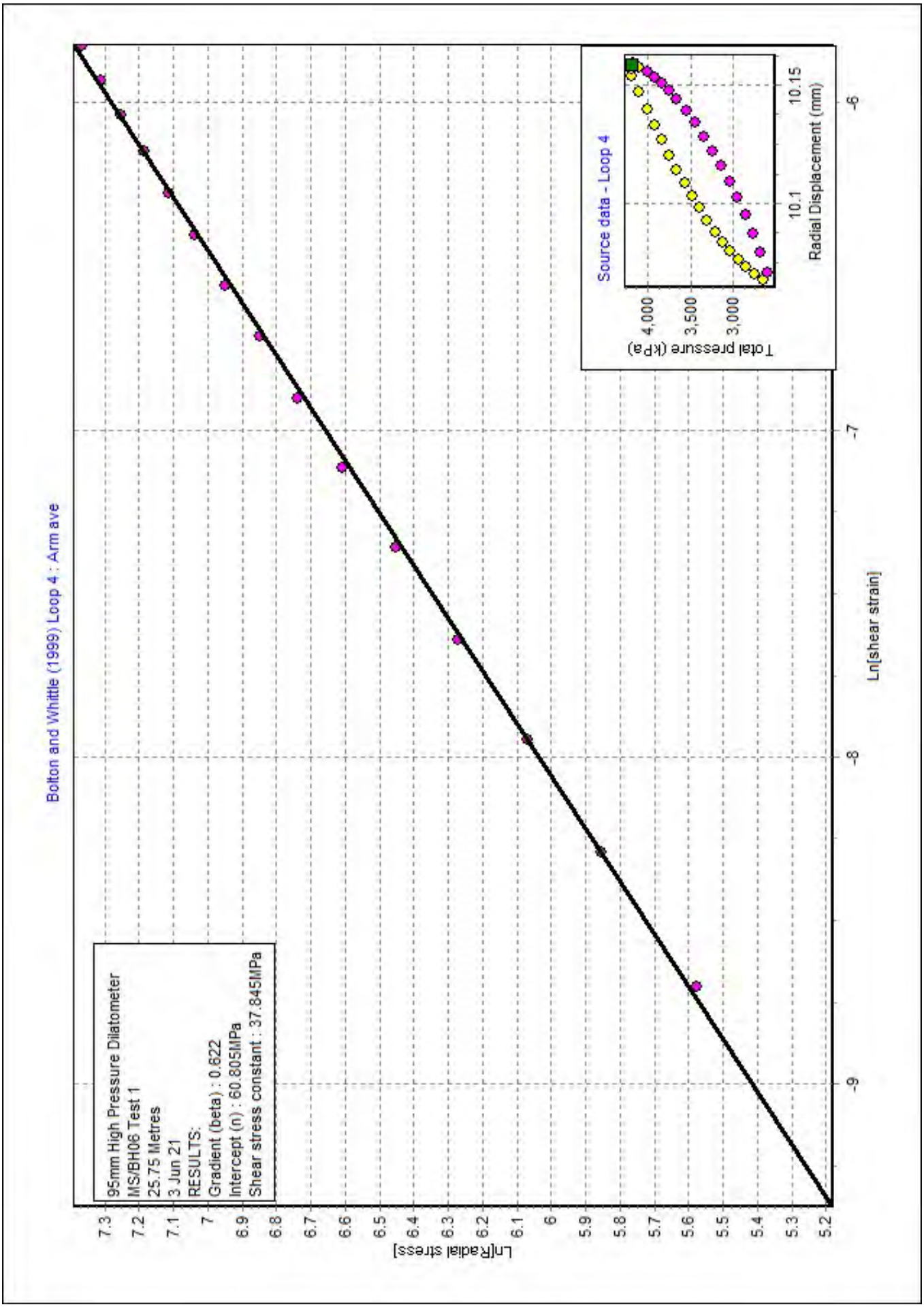

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 477.0MPa
Cycle mid-point:
Cavity strain : 3.163%
Total stress : 3961kPa
Size of cycle :
Shear strain : 0.287%
Total stress : 1369kPa
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Total pressure (kPa)
Radial Displacement (mm)

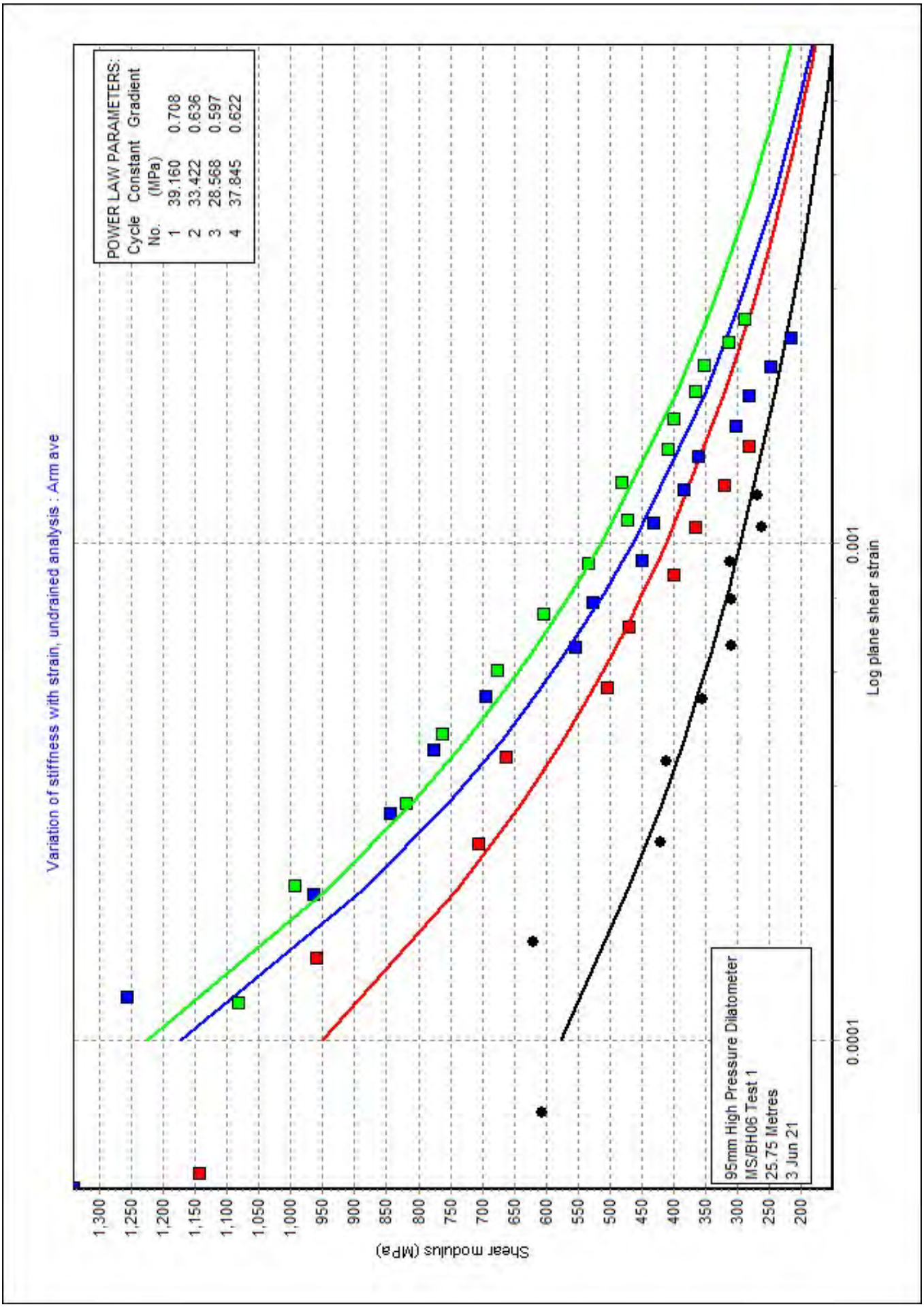

Shear modulus from unload/reload cycles Loop 4 : Arm ave
RESULTS:
Gur : 506.2MPa
Cycle mid-point:
Cavity strain : 9.274%
Total stress : 3401kPa
Size of cycle :
Shear strain : 0.306%
Total stress : 1551kPa
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
4,400
4,300
4,200
4,100
4,000
3,900
3,800
3,700
3,600
3,500
3,400
3,300
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
10.05
10.06
10.07
10.08
10.09
10.1
10.11
10.12
10.13
10.14
10.15
10.16
10.17
10.18

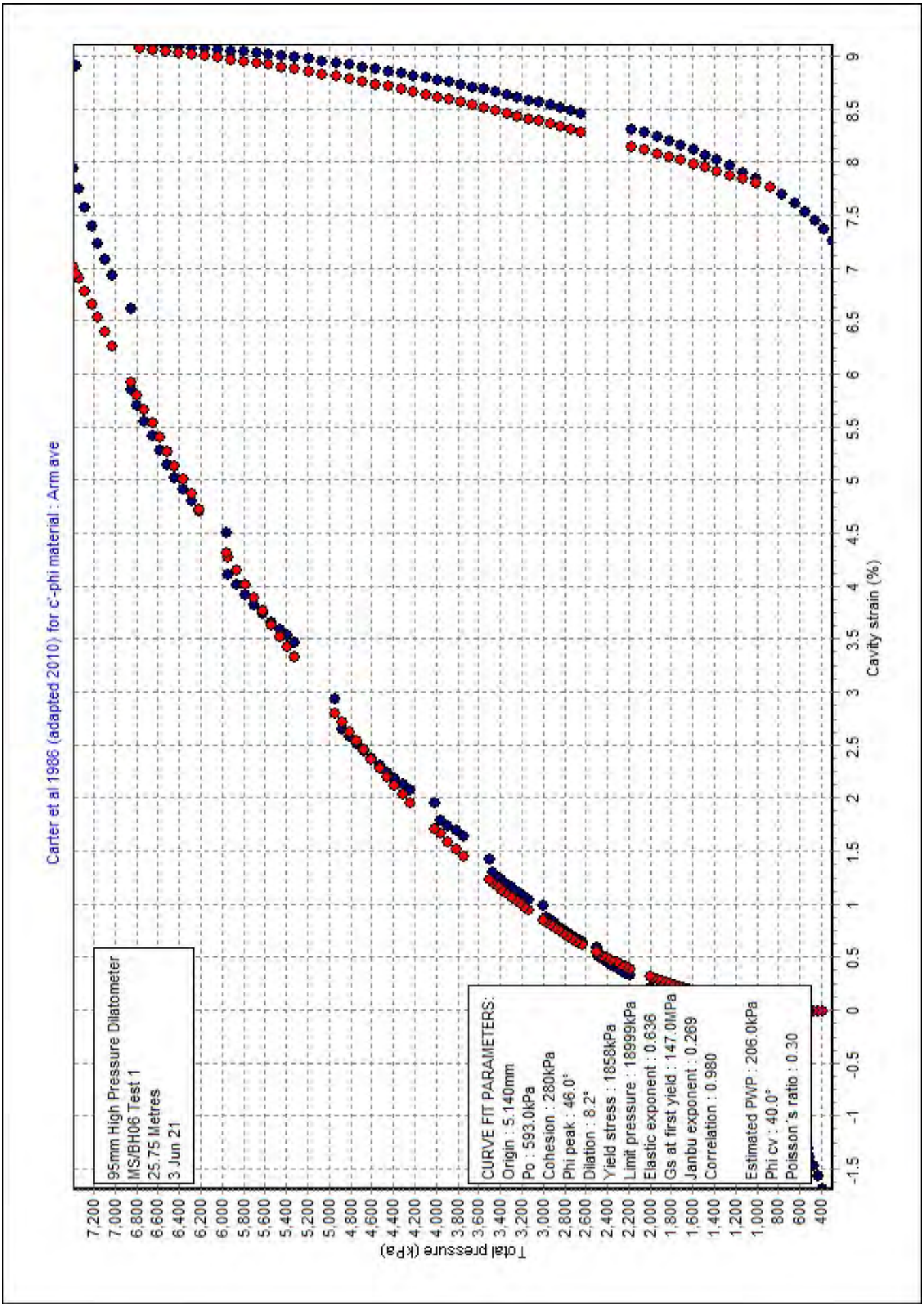

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Gradient (beta) : 0.708
Intercept (n) : 55.318MPa
Shear stress constant : 39.160MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

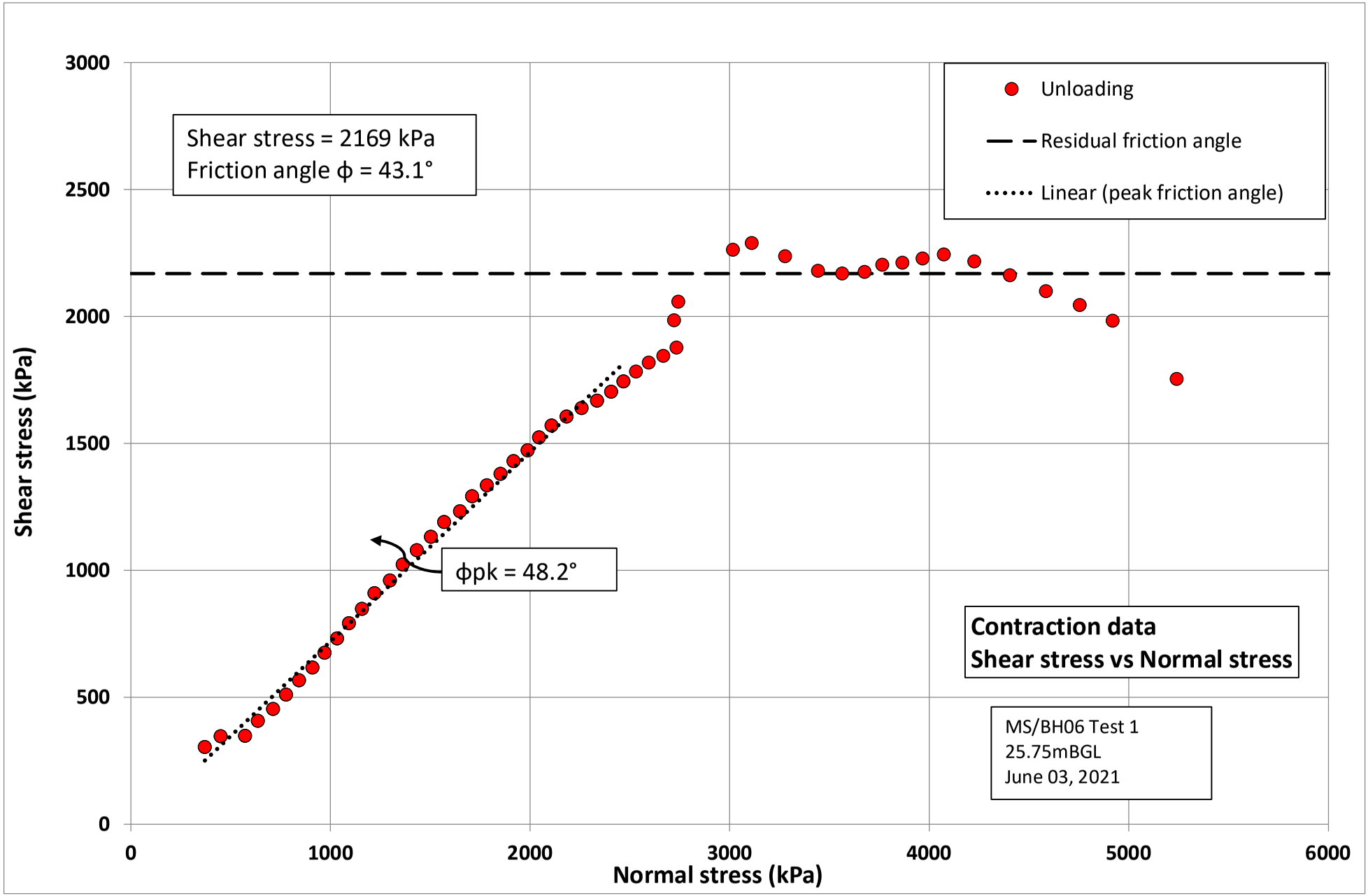

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Gradient (beta) : 0.636
Intercept (n) : 52.511MPa
Shear stress constant : 33.422MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

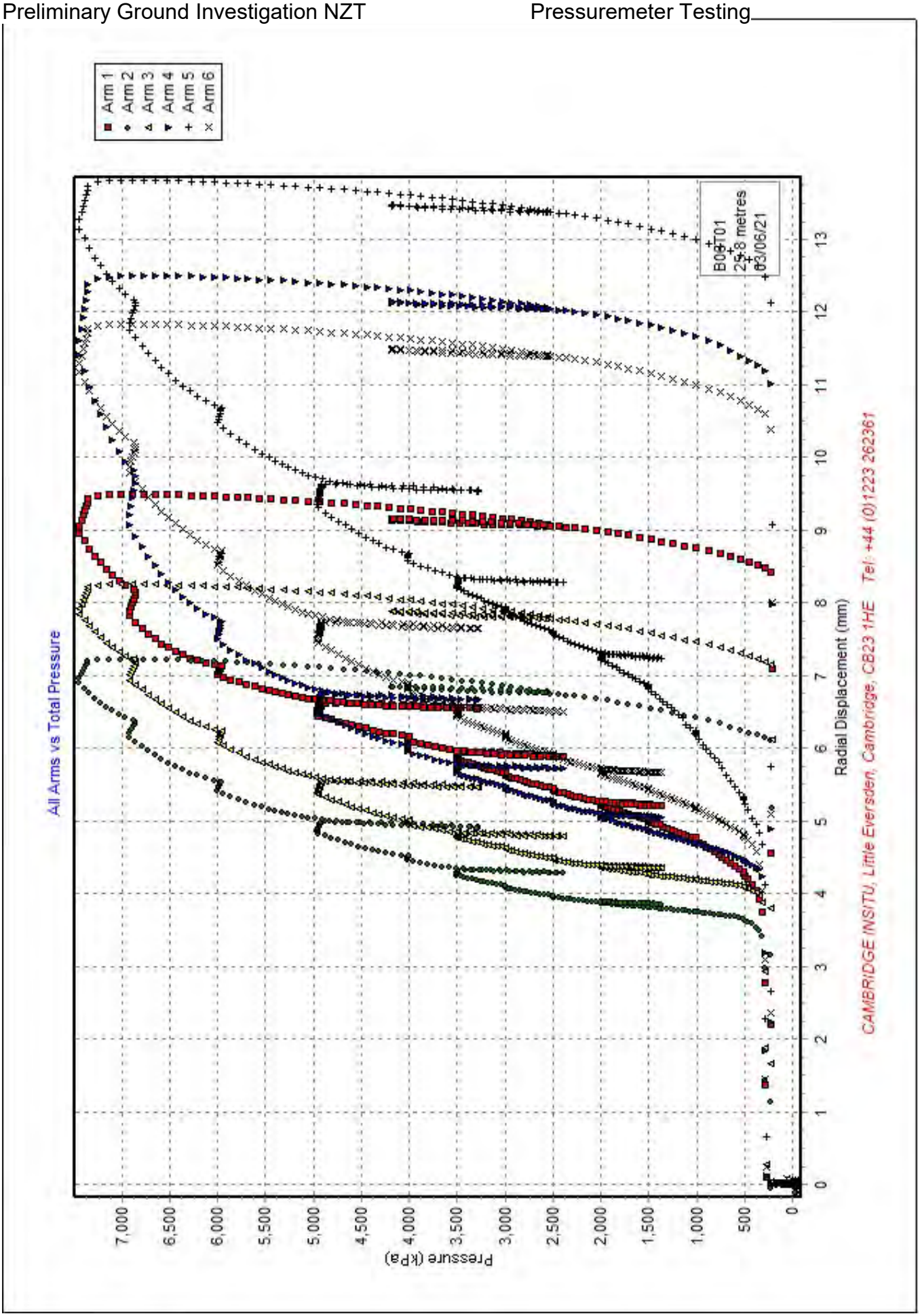

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Gradient (beta) : 0.597
Intercept (n) : 47.882MPa
Shear stress constant : 28.568MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

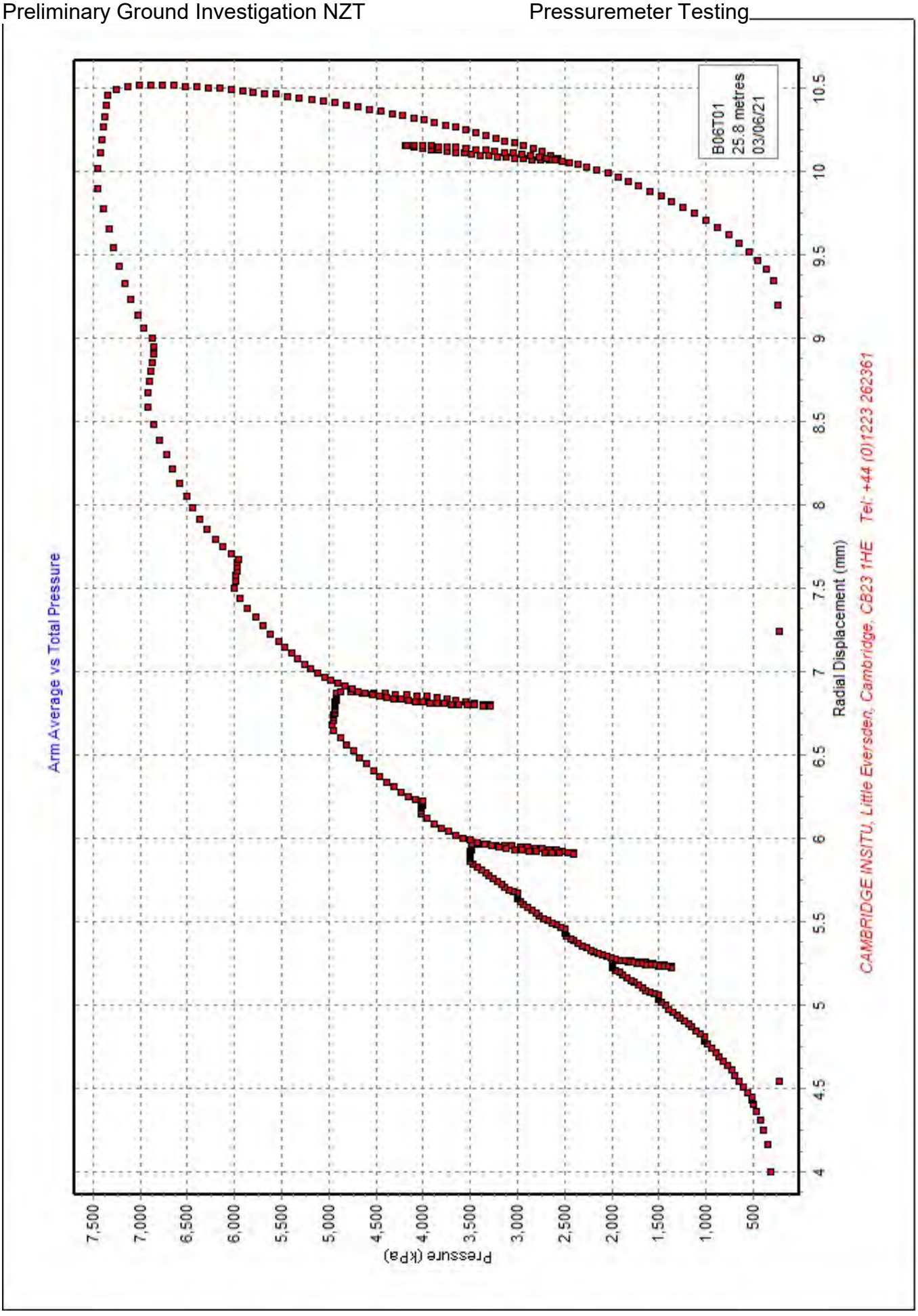

Bolton and Whittle (1999) Loop 4 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
RESULTS:
Gradient (beta) : 0.622
Intercept (n) : 60.805MPa
Shear stress constant : 37.845MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 4
Total pressure (kPa)
Radial Displacement (mm)

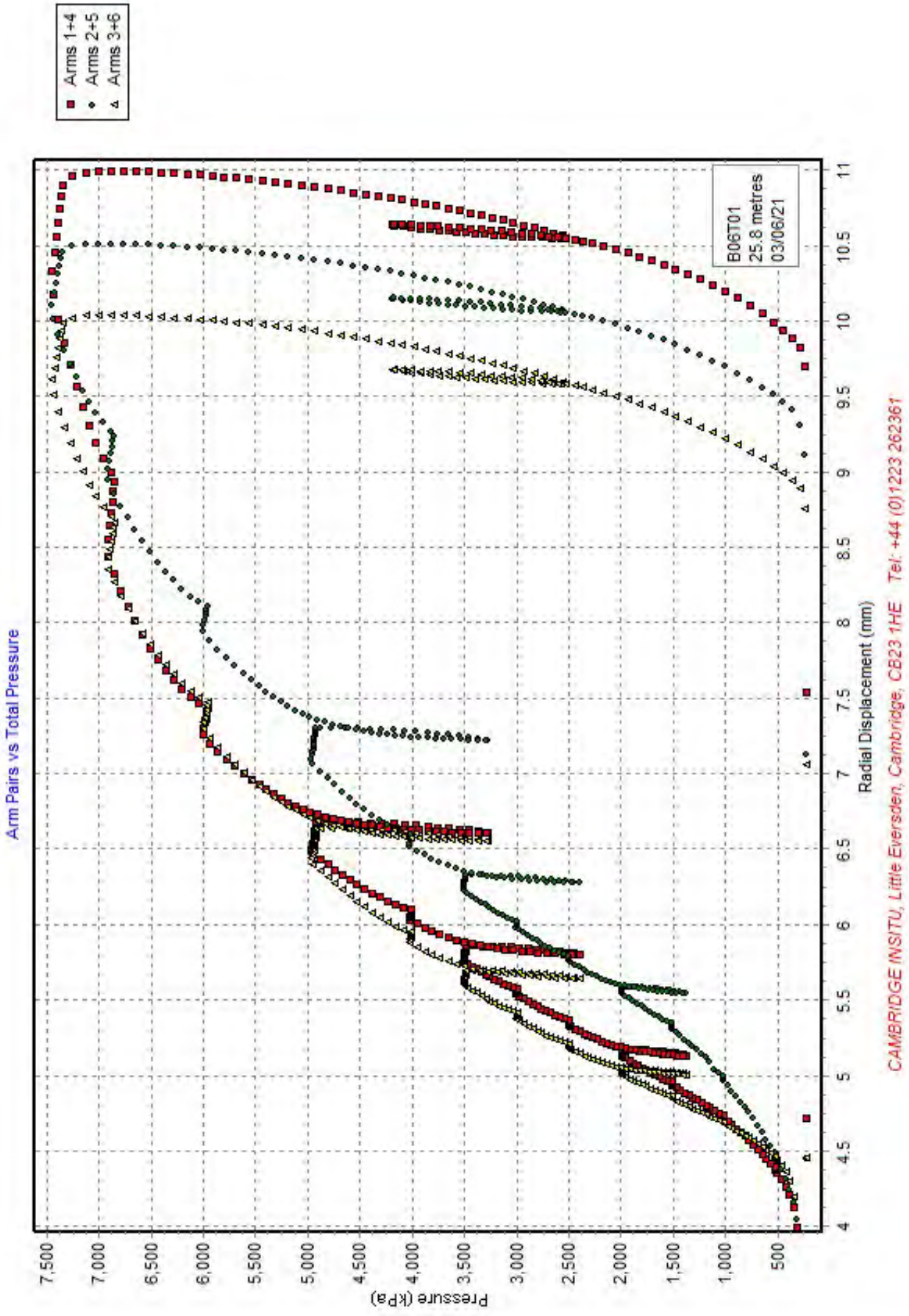

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 39.160 0.708
2 33.422 0.636
3 28.568 0.597
4 37.845 0.622
Shear modulus (MPa)
Log plane shear strain
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21

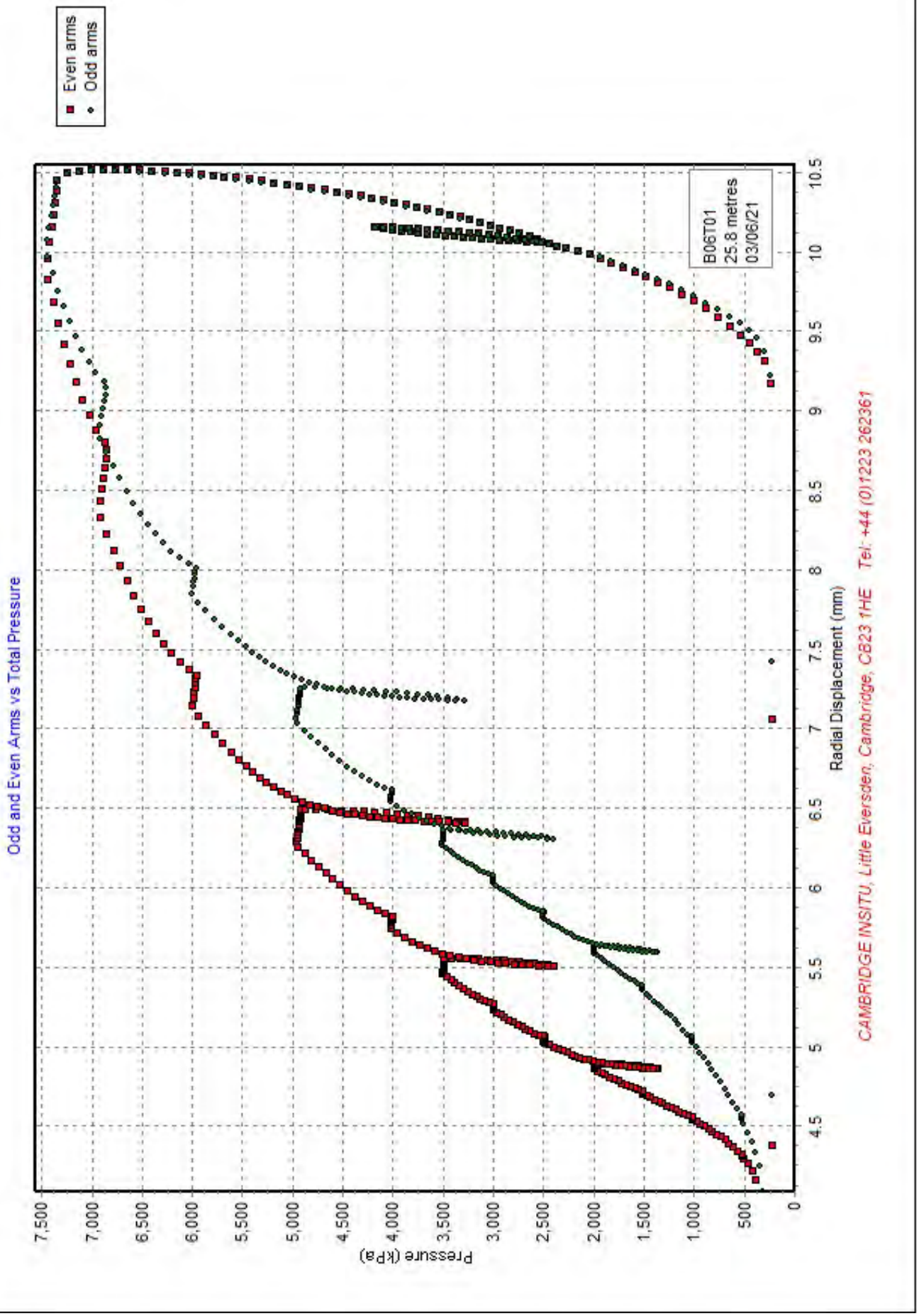

Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 1
25.75 Metres
3 Jun 21
CURVE FIT PARAMETERS:
Origin : 5.140mm
Po : 593.0kPa
Cohesion : 280kPa
Phi peak : 46.0°
Dilation : 8.2°
Yield stress : 1858kPa
Limit pressure : 18999kPa
Elastic exponent : 0.636
Gs at first yield : 147.0MPa
Janbu exponent : 0.269
Correlation : 0.980
Estimated PWP : 206.0kPa
Phi cv : 40.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


Shear stress = 2169 kPa
Friction angle ϕ = 43.1°
Unloading
Residual friction angle
Linear (peak friction angle)
ϕpk = 48.2°
Contraction data
Shear stress vs Normal stress
MS/BH06 Test 1
25.75mBGL
June 03, 2021
Shear stress (kPa)
Normal stress (kPa)
0
500
1000
1500
2000
2500
3000
0
1000
2000
3000
4000
5000
6000


Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
All Arms vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
B08T01
25.8 metres
03/06/21
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B06T01
25.8 metres
03/06/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arms 1+4
Arms 2+5
Arms 3+6
B06T01
25.8 metres
03/06/21
Arm Pairs vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
Odd and Even Arms vs Total Pressure
B06T01
25.8 metres
03/06/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH06 Test 2 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH06
Test name : MS/BH06 Test 2
Test date : 4 Jun 21
Test depth : 27.80 Metres
Water table : 4.78 Metres
Ambient PWP : 226.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 SDP/YB/RW on 7 Jun 21

Remarks: Excessive creep makes it difficult to curve fit last part of loading.

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=4.88"
Po from Marsland & Randolph (kPa) : "Arm ave=705.8"
Best estimate of Po (kPa) : "Arm ave=796.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=4834.9"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 40.0
Angle of internal friction (°) : "Arm ave=48.1"
Dilation angle (°) : "Arm ave=11.3"
Gradient of log-log plot : "Arm ave=0.510"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=40.4"
Dilation angle (°) : "Arm ave=0.5"
Gradient of log-log plot : "Arm ave=-3.625"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=244.0"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	912.7	0.277	2422	0.089	810
Arm ave	2	907.9	0.787	3999	0.154	1402
Arm ave	3	871.8	1.392	5168	0.207	1804
Arm ave	4	1158.9	5.279	4439	0.146	1699

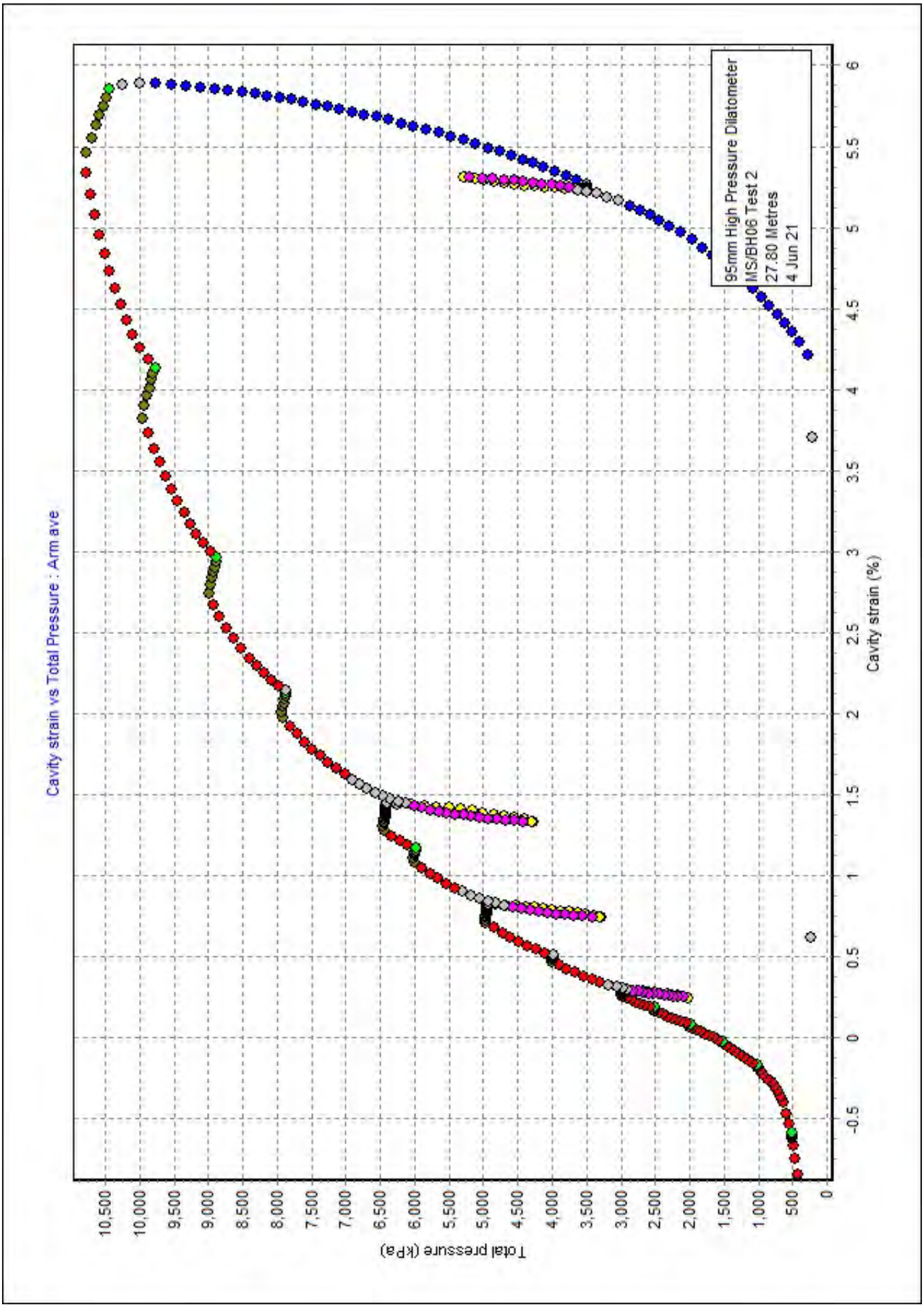
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

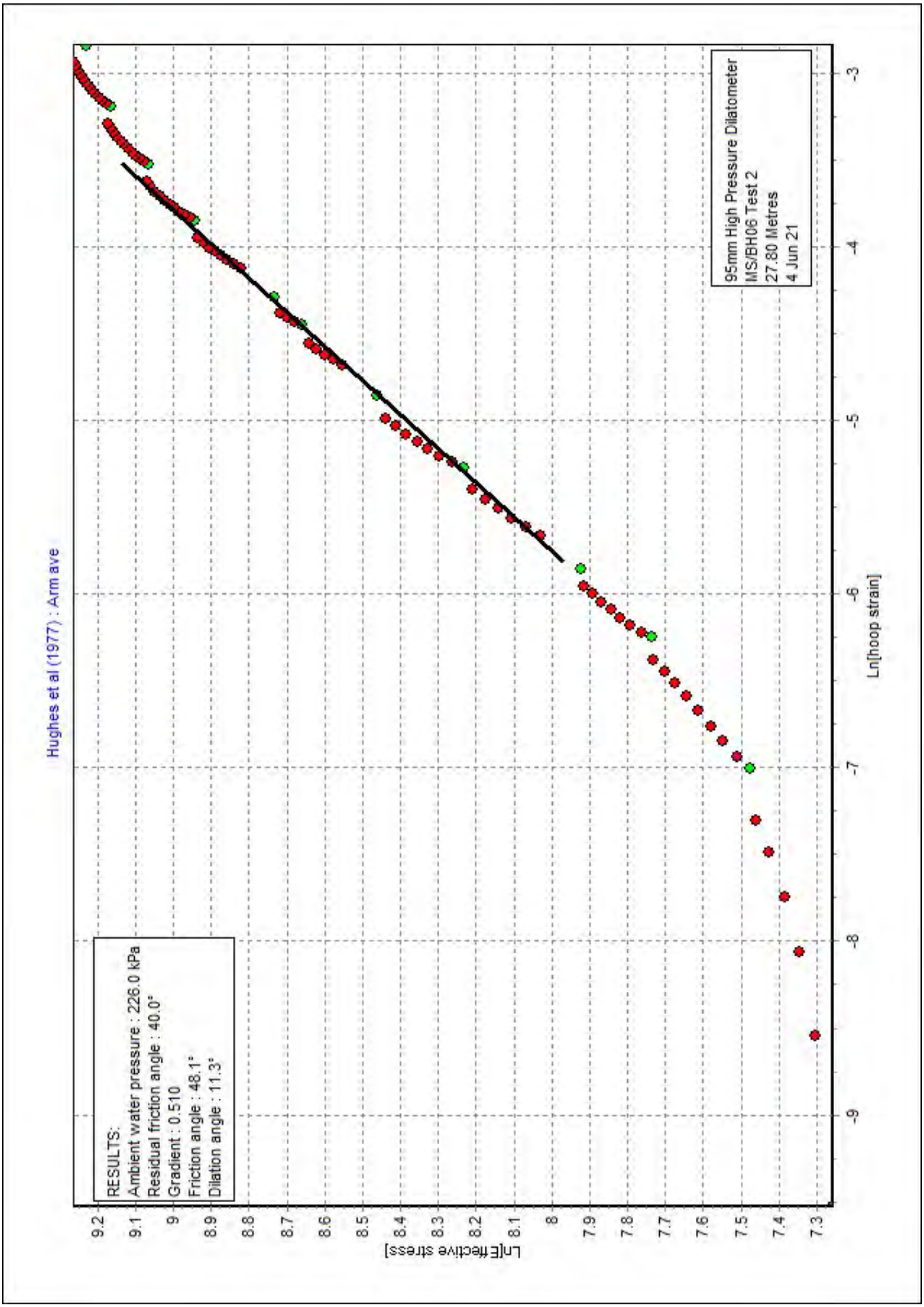
Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	217.893	172.440	0.791
Arm ave	2	104.372	68.882	0.660
Arm ave	3	121.553	81.582	0.671
Arm ave	4	183.624	131.052	0.714

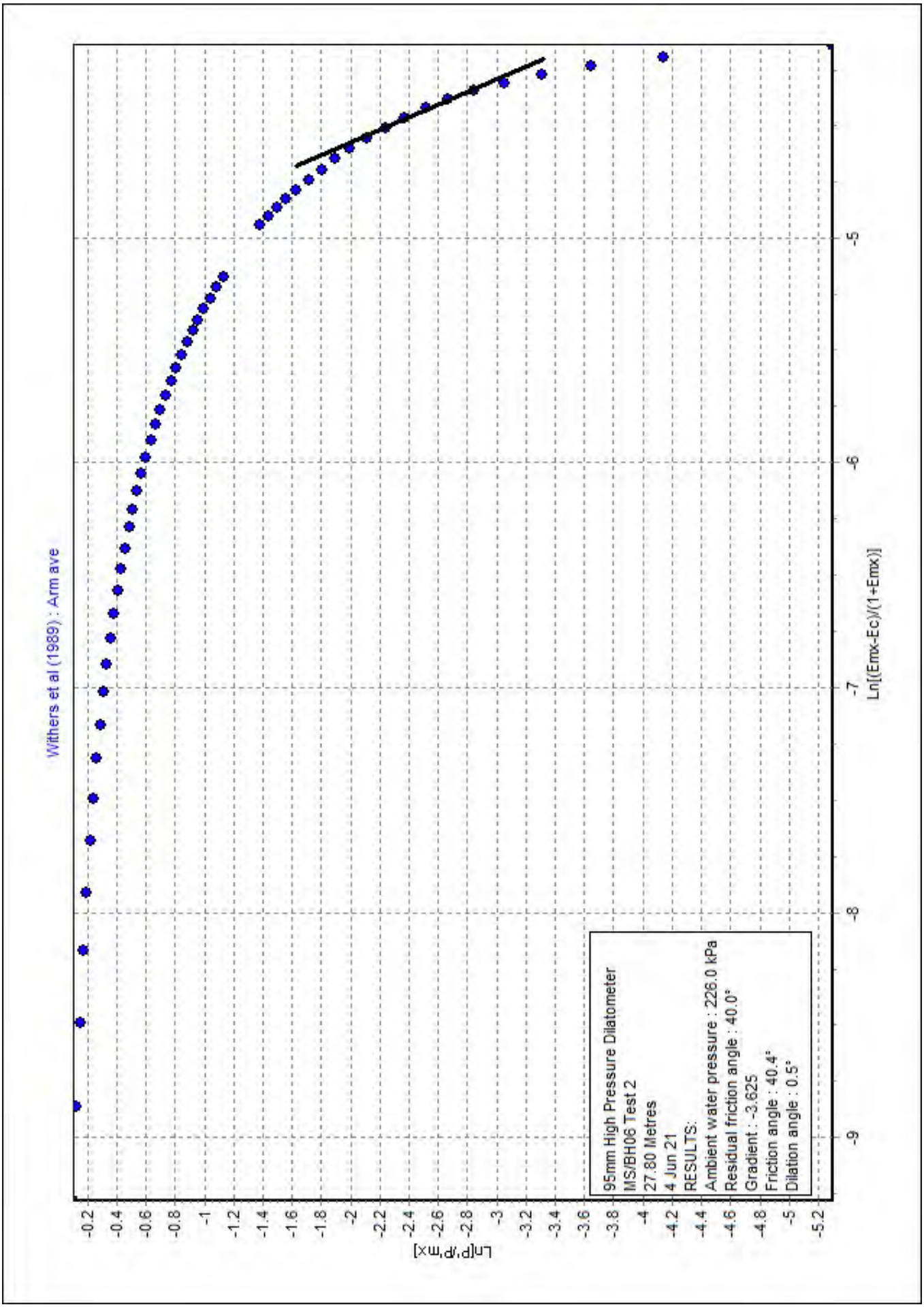
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 4.88
Po (kPa) : 796
Cohesion (kPa) : 85
Angle of peak friction (deg) : 48.1
Angle of peak dilation (deg) : 11.3

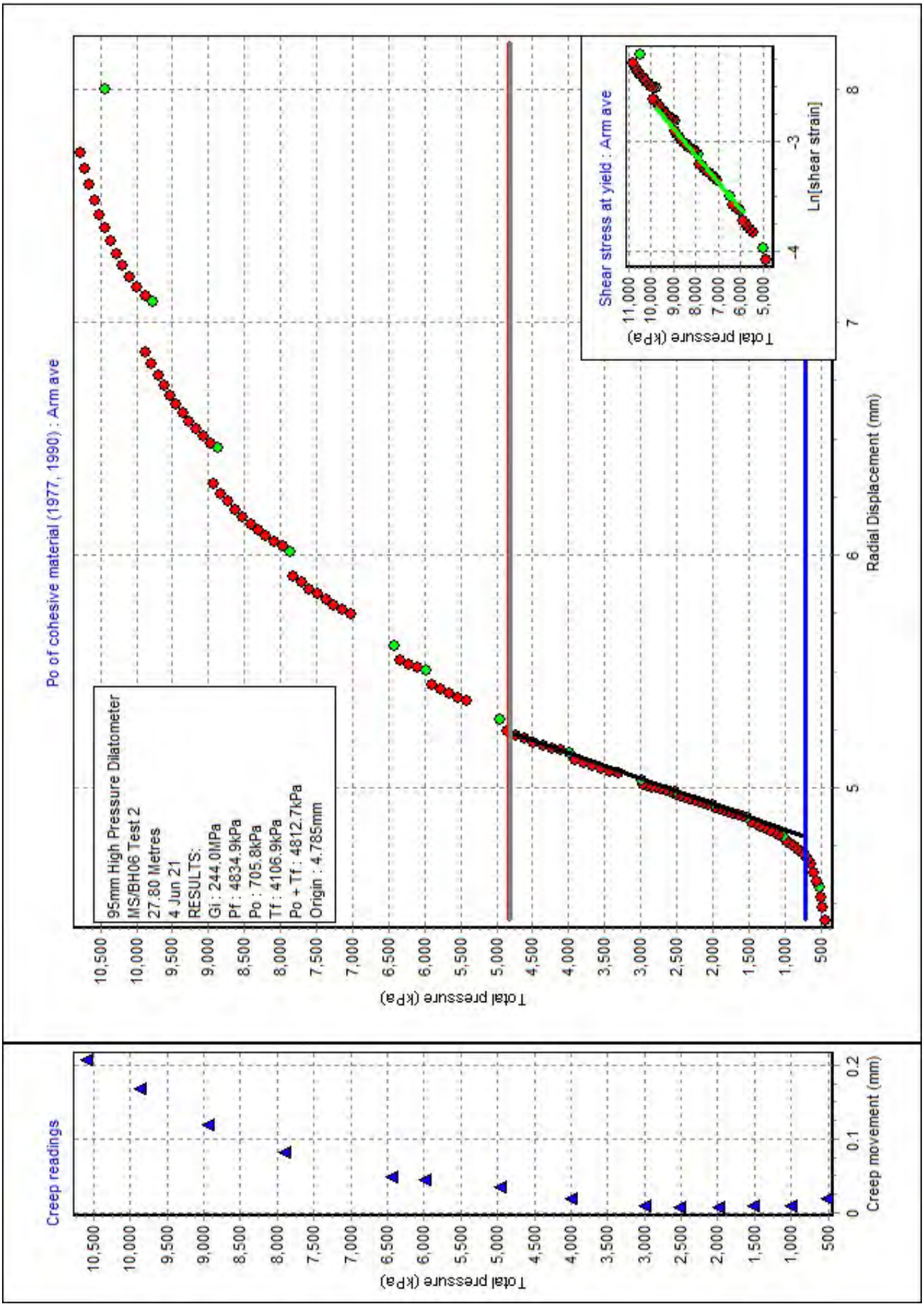
MS/BH06 Test 2 - SUMMARY OF RESULTS

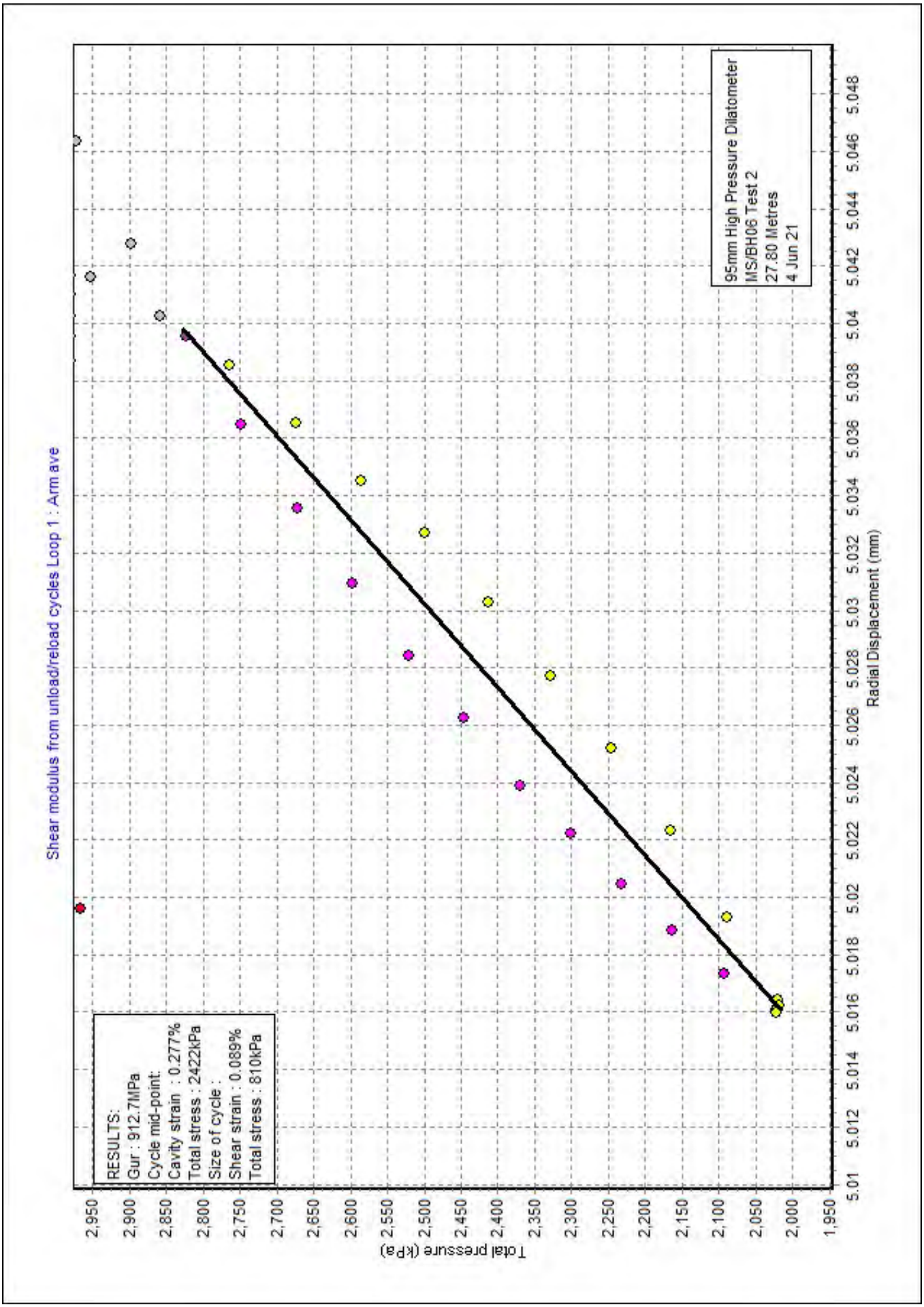
Total yield stress (kPa)	:	1979
Total limit stress (kPa)	:	37723
G at first yield (MPa)	:	467.1
Non-linear exponent	:	0.660
Janbu exponent	:	0.167
Correlation	:	0.559
Ambient pore water pressure (kPa)	:	226
Residual friction angle (deg)	:	40.0
Poisson's ratio	:	0.30

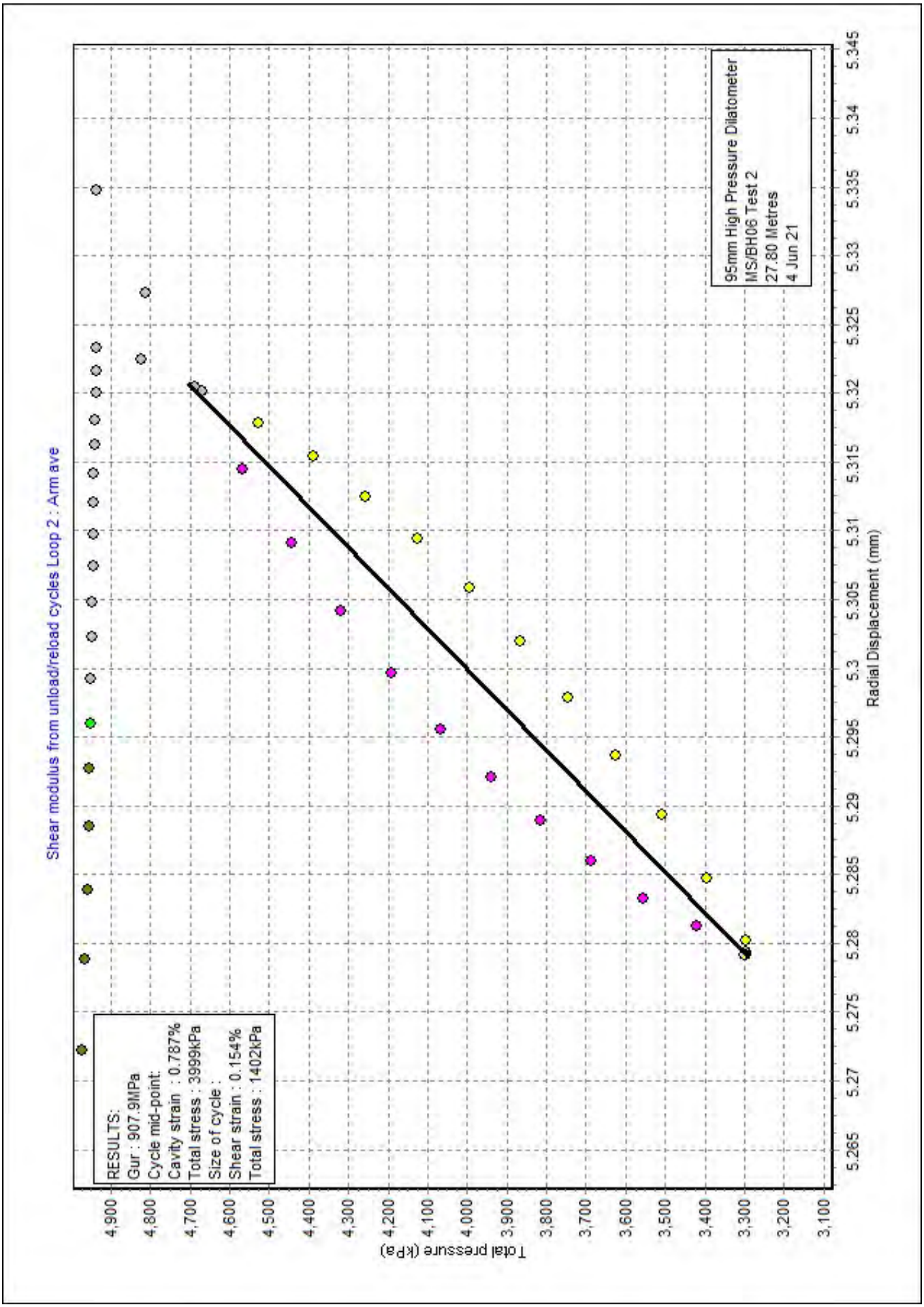

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Total pressure (kPa)
Cavity strain (%)
10,500
10,000
9,500
9,000
8,500
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6

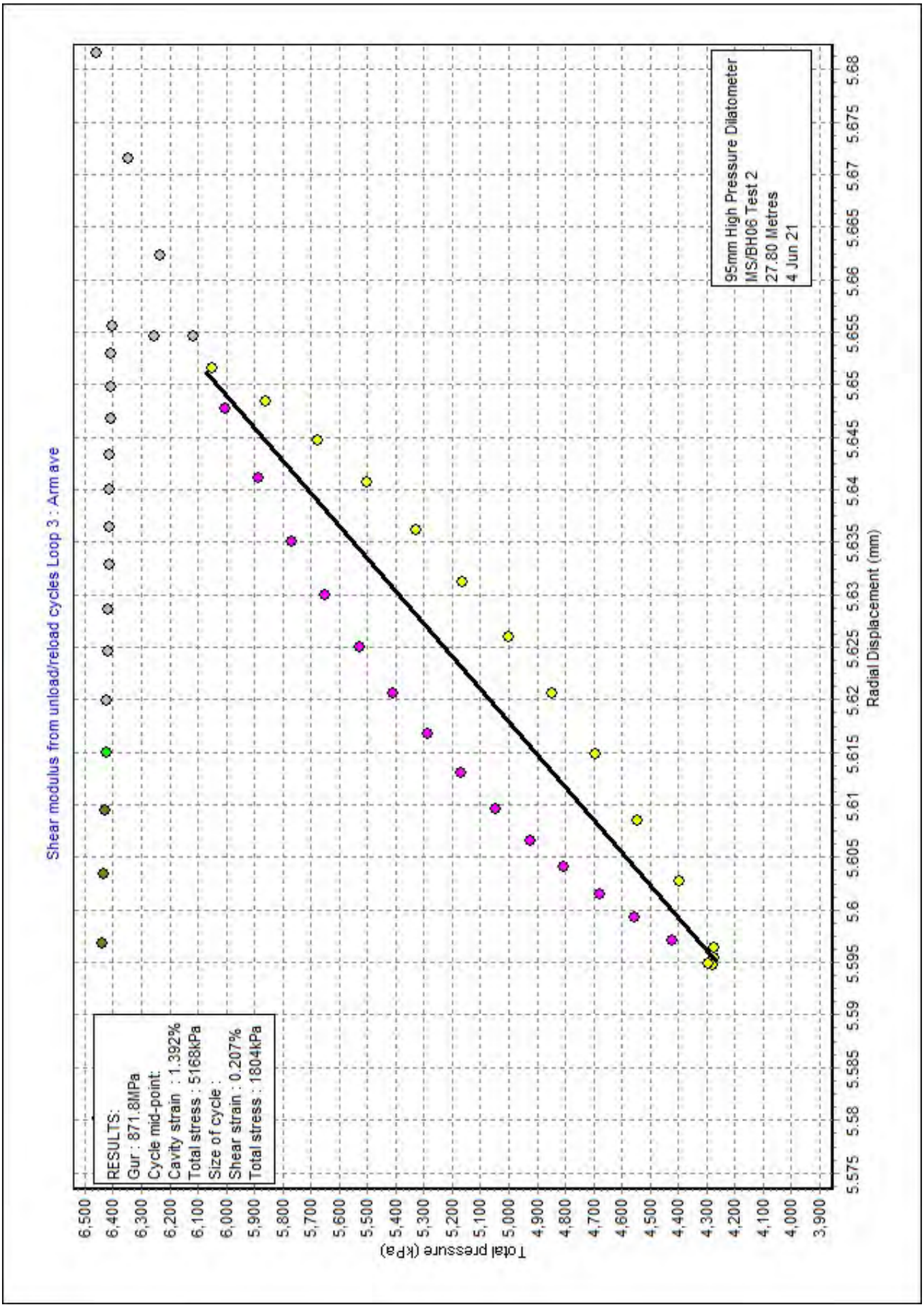

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 226.0 kPa
Residual friction angle : 40.0°
Gradient : 0.510
Friction angle : 48.1°
Dilation angle : 11.3°
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Ln[Effective stress]
Ln[hoop strain]
9.2
9.1
9
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8
7.9
7.8
7.7
7.6
7.5
7.4
7.3
-3
-4
-5
-6
-7
-8
-9

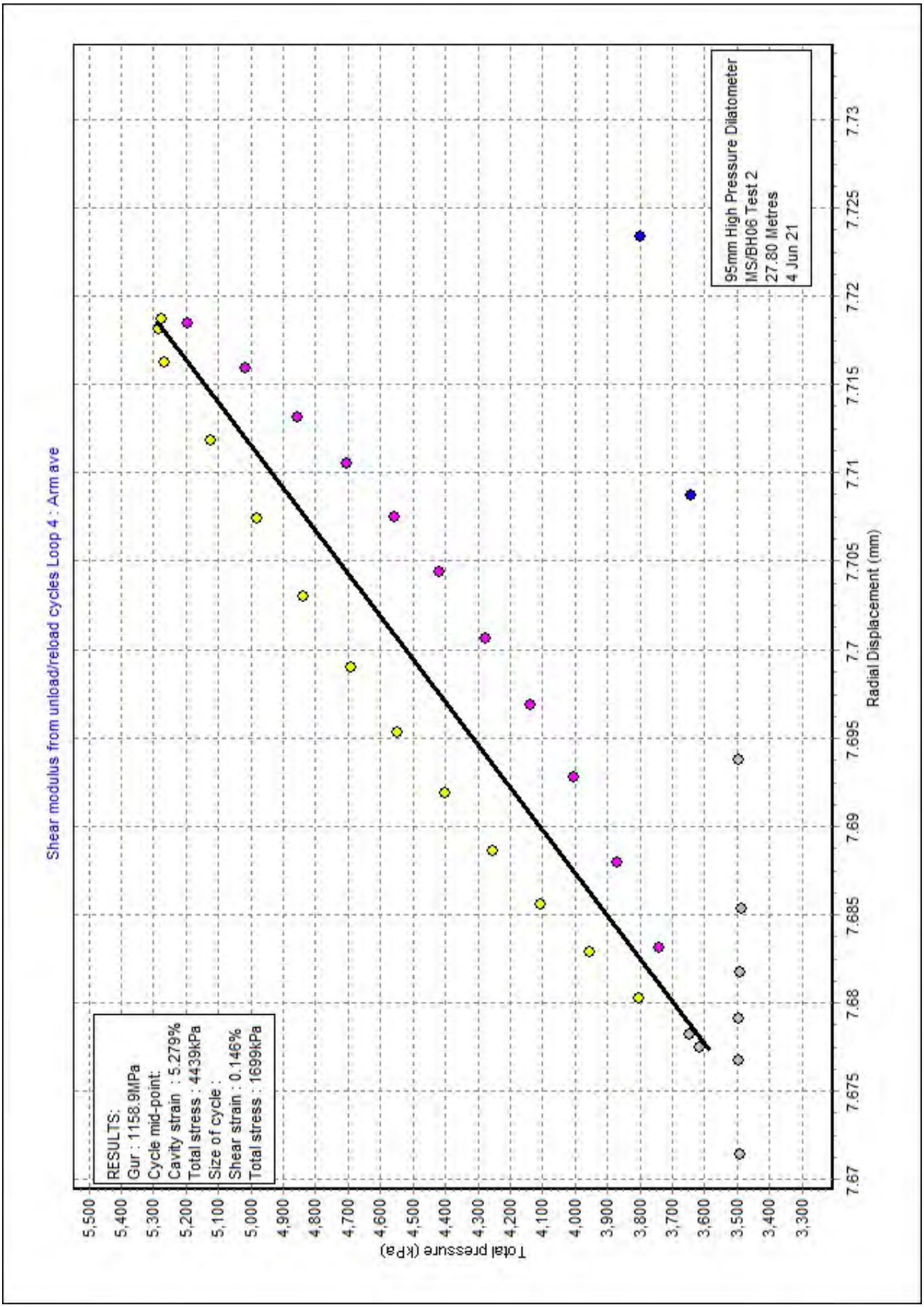

Withers et al (1989) : Arm ave
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Ambient water pressure : 226.0 kPa
Residual friction angle : 40.0°
Gradient : -3.625
Friction angle : 40.4°
Dilation angle : 0.5°

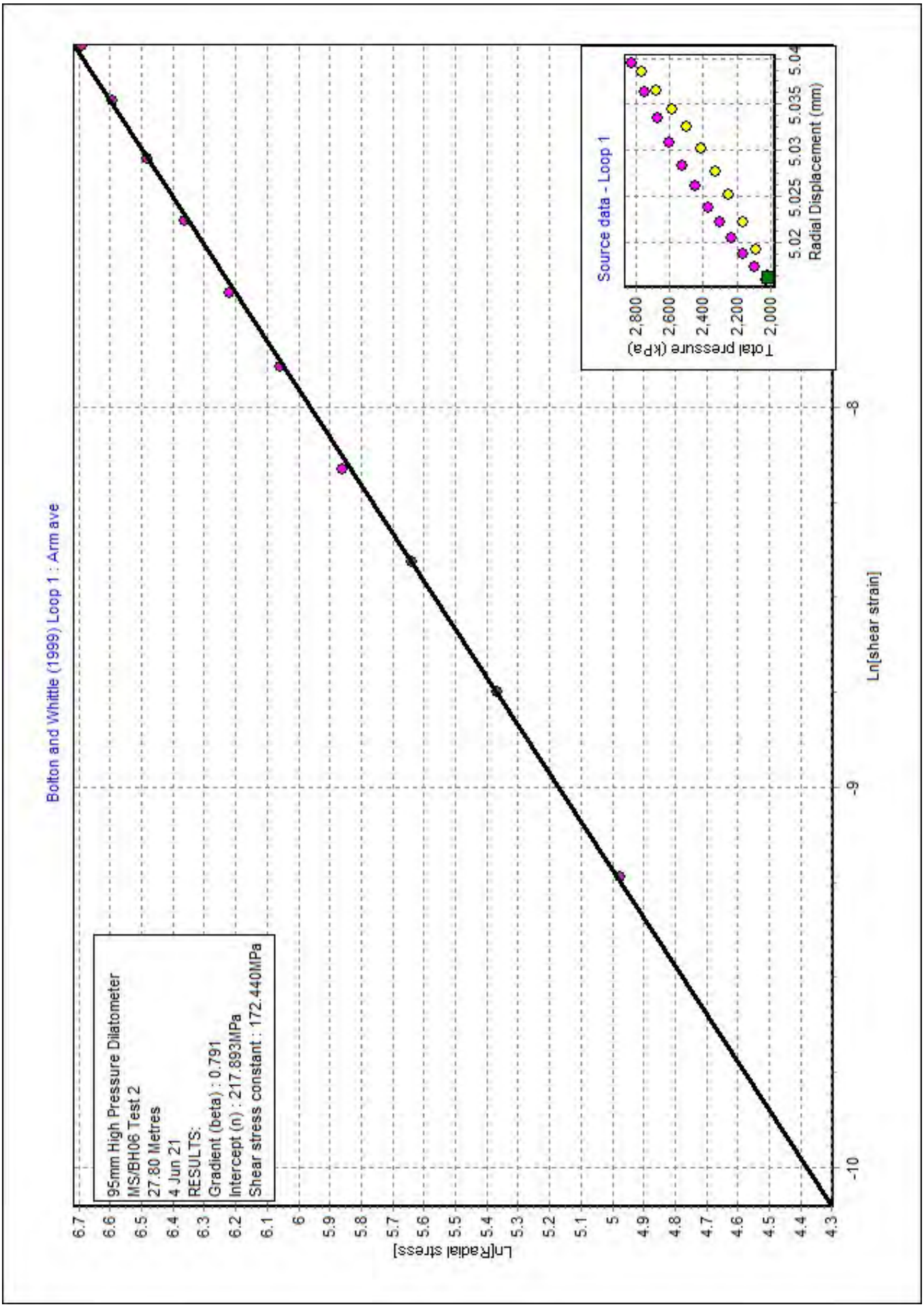

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Gi : 244.0MPa
Pf : 4834.9kPa
Po : 705.8kPa
Tf : 4106.9kPa
Po + Tf : 4812.7kPa
Origin : 4.785mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]
Creep readings
Total pressure (kPa)
Creep movement (mm)

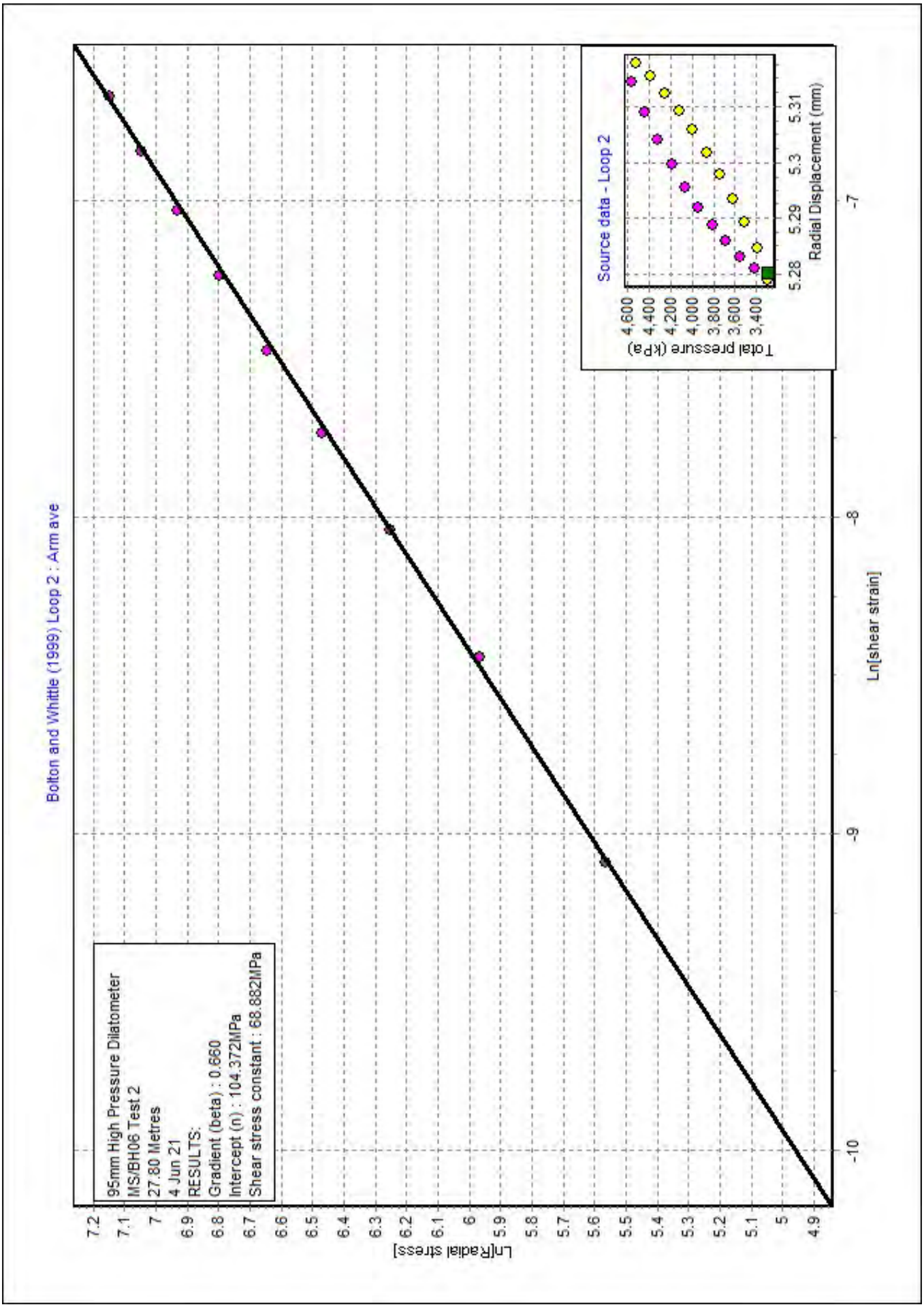

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 912.7MPa
Cycle mid-point:
Cavity strain : 0.277%
Total stress : 2422kPa
Size of cycle :
Shear strain : 0.089%
Total stress : 810kPa
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
2,950
2,900
2,850
2,800
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
1,950
5.01
5.012
5.014
5.016
5.018
5.02
5.022
5.024
5.026
5.028
5.03
5.032
5.034
5.036
5.038
5.04
5.042
5.044
5.046
5.048

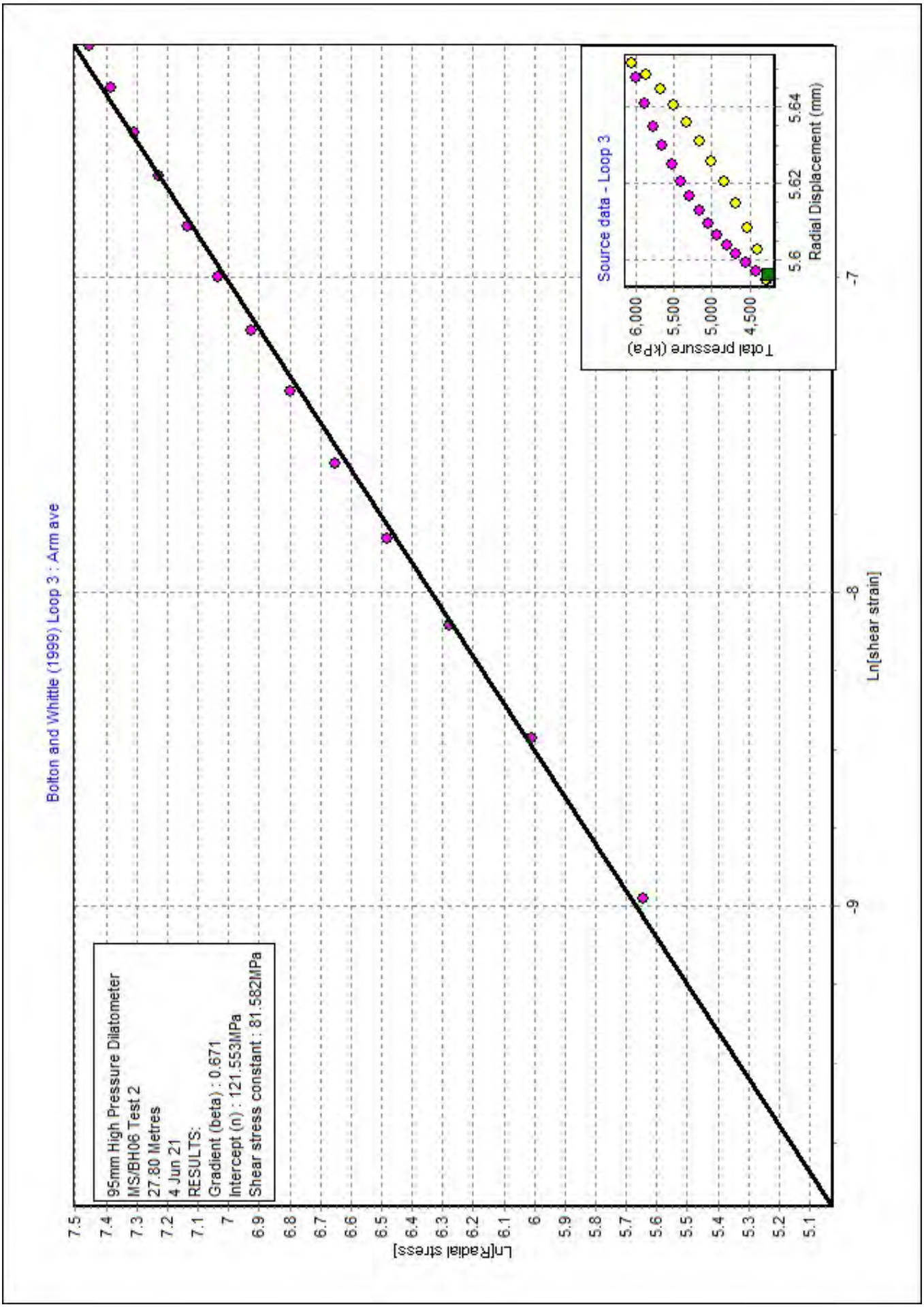

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 907.9MPa
Cycle mid-point:
Cavity strain : 0.787%
Total stress : 3999kPa
Size of cycle :
Shear strain : 0.154%
Total stress : 1402kPa
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
4,900
4,800
4,700
4,600
4,500
4,400
4,300
4,200
4,100
4,000
3,900
3,800
3,700
3,600
3,500
3,400
3,300
3,200
3,100
5.265
5.27
5.275
5.28
5.285
5.29
5.295
5.3
5.305
5.31
5.315
5.32
5.325
5.33
5.335
5.34
5.345

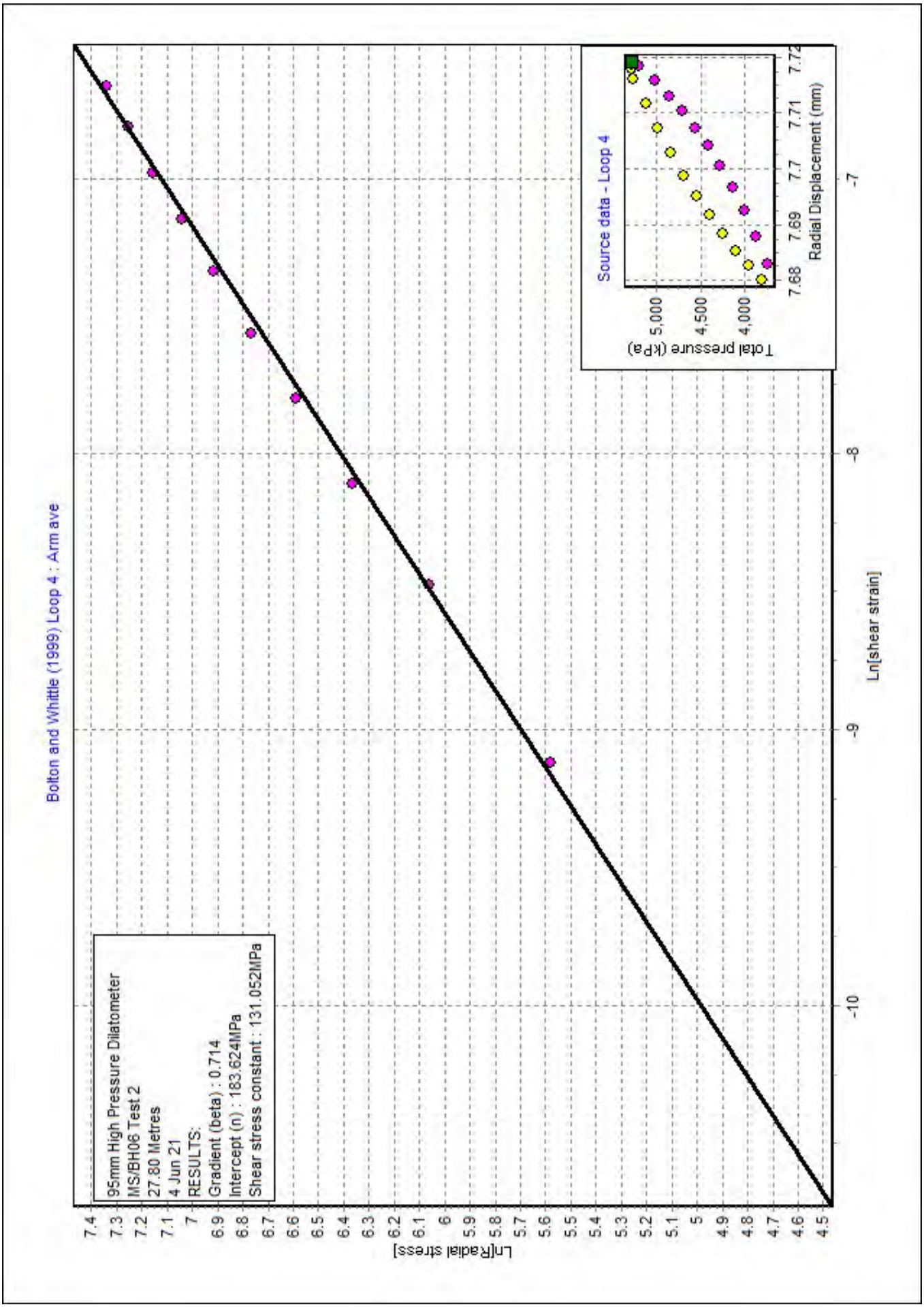

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 871.8MPa
Cycle mid-point:
Cavity strain : 1.392%
Total stress : 5168kPa
Size of cycle :
Shear strain : 0.207%
Total stress : 1804kPa
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Total pressure (kPa)
Radial Displacement (mm)

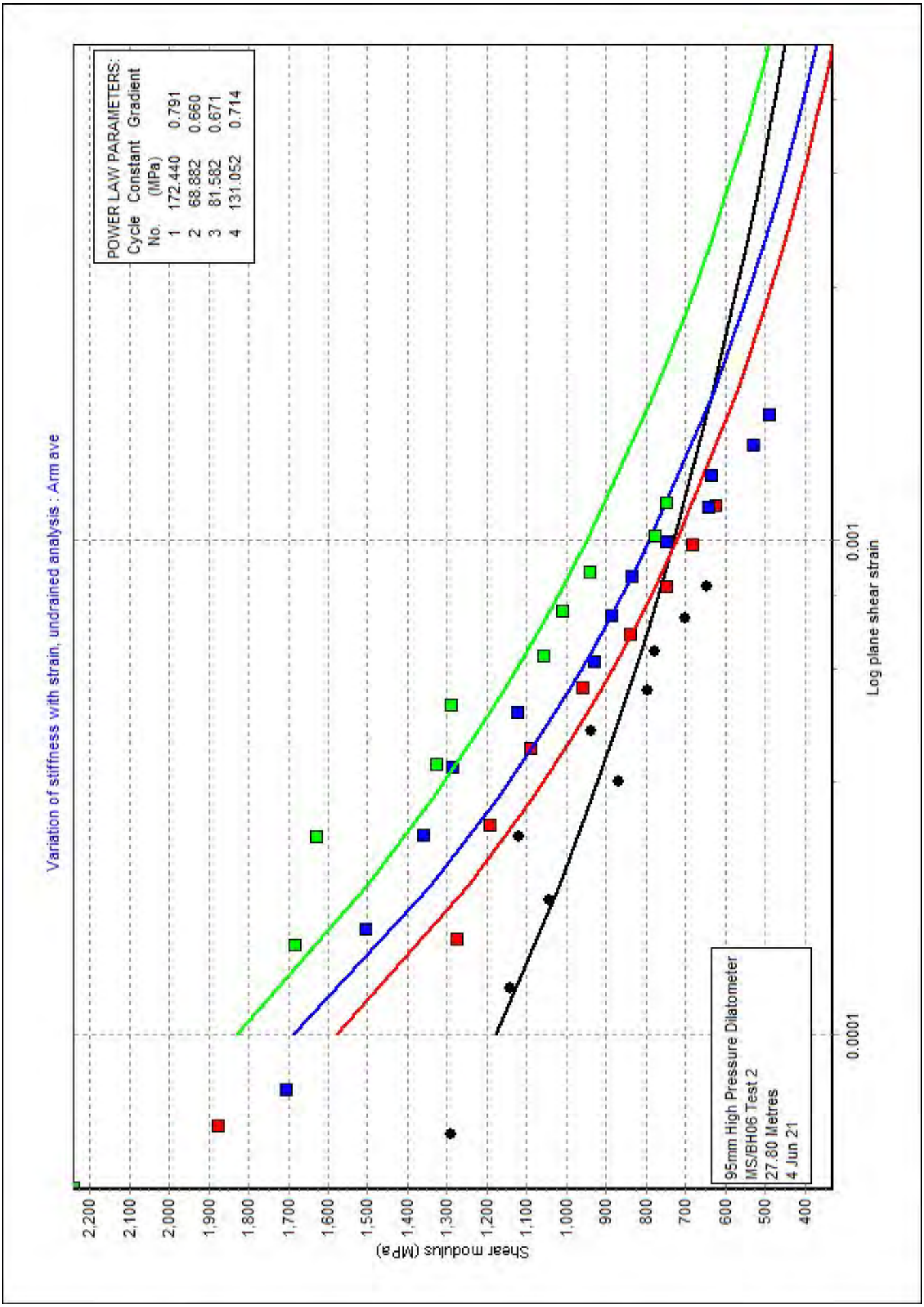

Shear modulus from unload/reload cycles Loop 4 : Arm ave
RESULTS:
Gur : 1158.9MPa
Cycle mid-point:
Cavity strain : 5.279%
Total stress : 4439kPa
Size of cycle :
Shear strain : 0.146%
Total stress : 1699kPa
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
5,500
5,400
5,300
5,200
5,100
5,000
4,900
4,800
4,700
4,600
4,500
4,400
4,300
4,200
4,100
4,000
3,900
3,800
3,700
3,600
3,500
3,400
3,300
7.67
7.675
7.68
7.685
7.69
7.695
7.7
7.705
7.71
7.715
7.72
7.725
7.73

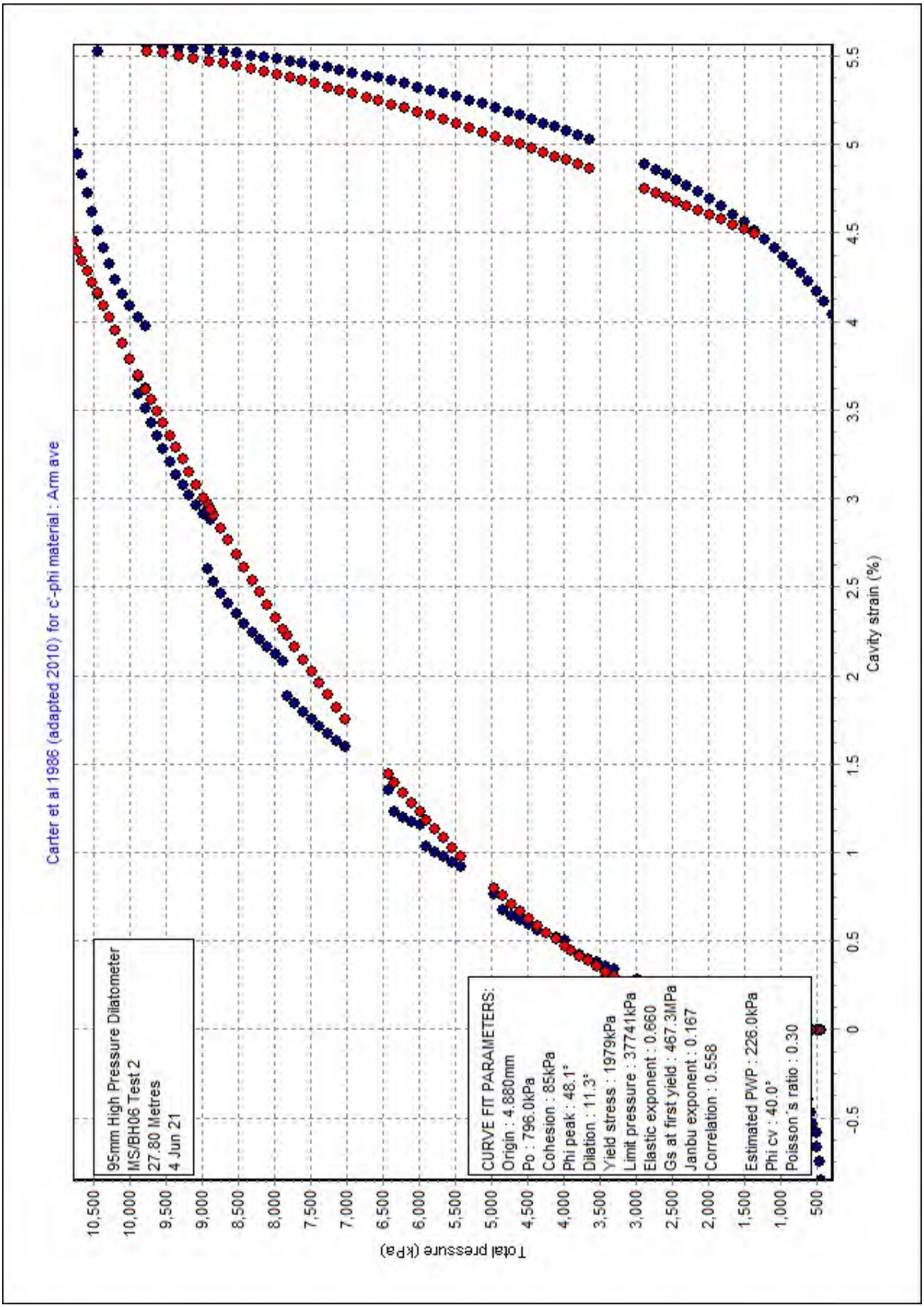

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Gradient (beta) : 0.791
Intercept (n) : 217.893MPa
Shear stress constant : 172.440MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

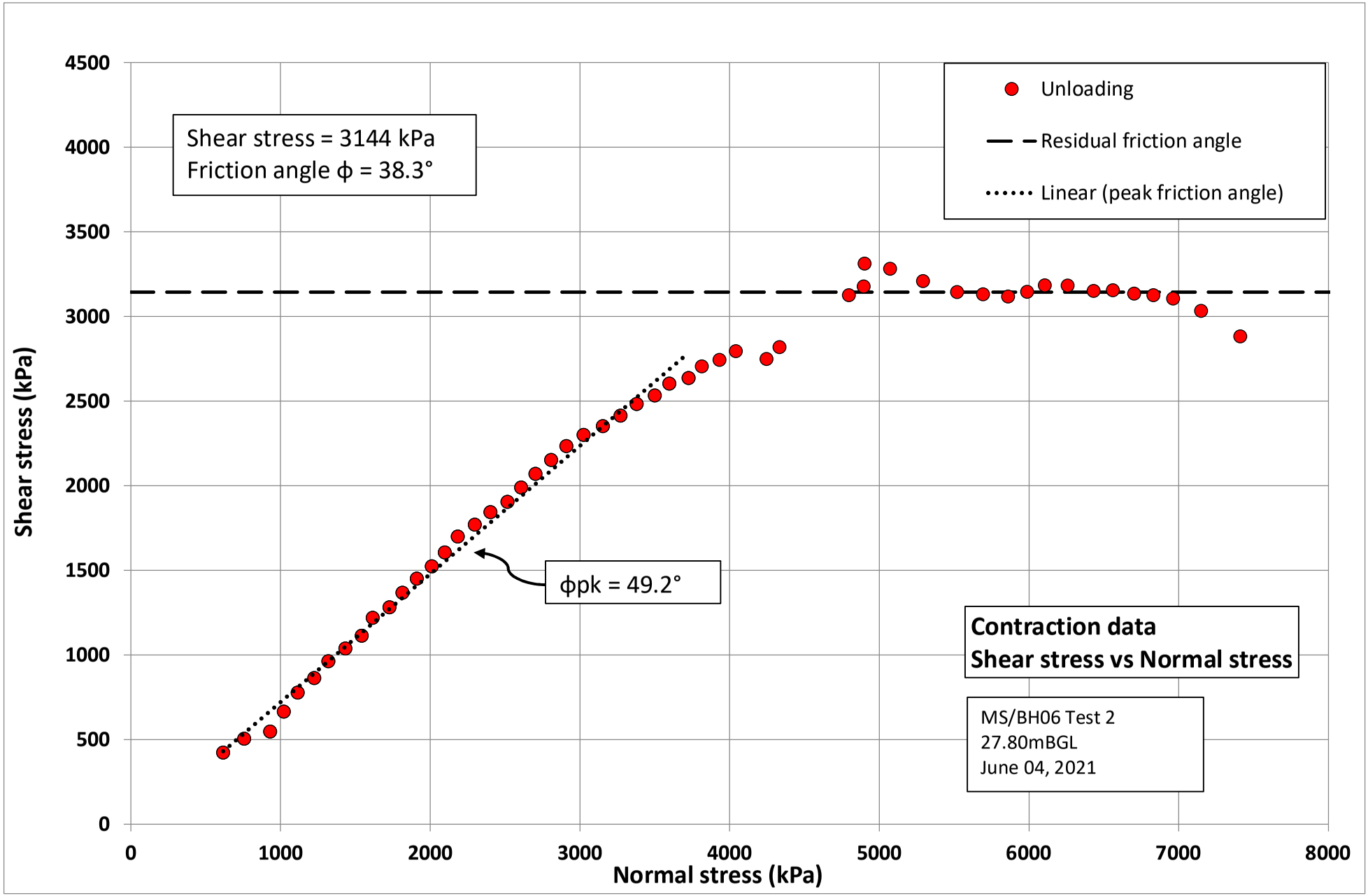

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Gradient (beta) : 0.660
Intercept (n) : 104.372MPa
Shear stress constant : 68.882MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

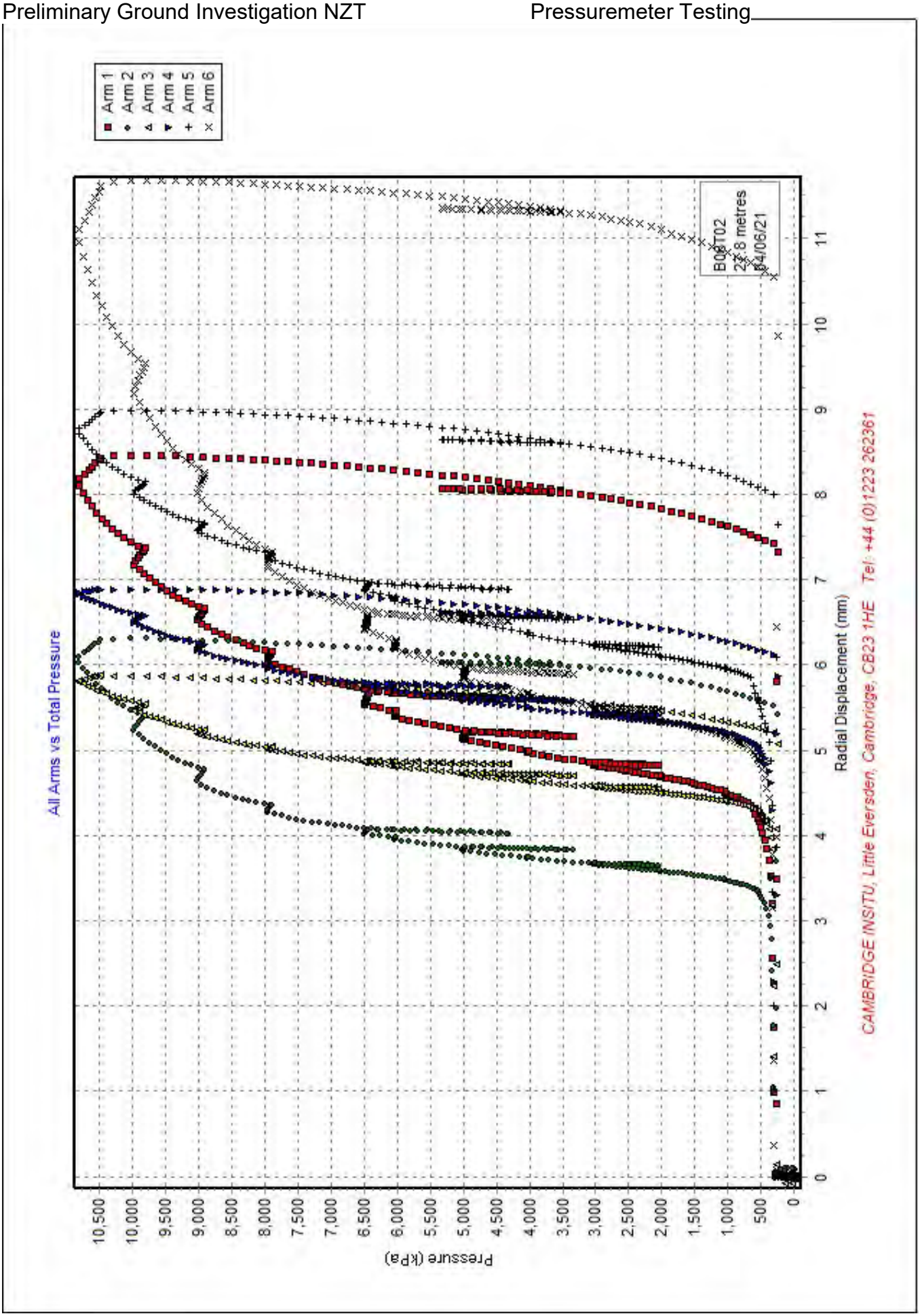

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Gradient (beta) : 0.671
Intercept (n) : 121.553MPa
Shear stress constant : 81.582MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

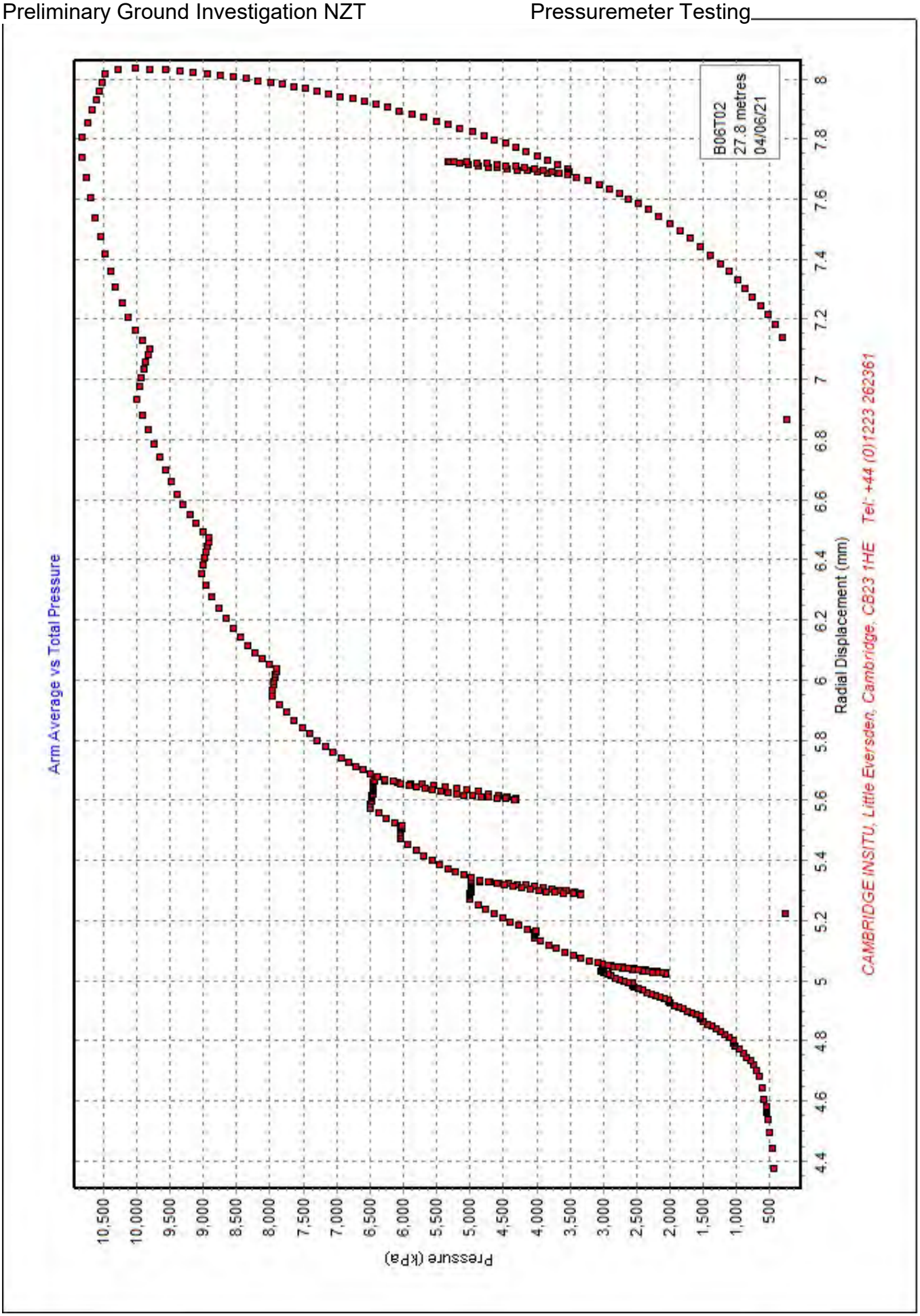

Bolton and Whittle (1999) Loop 4 : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
RESULTS:
Gradient (beta) : 0.714
Intercept (n) : 183.624MPa
Shear stress constant : 131.052MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 4
Total pressure (kPa)
Radial Displacement (mm)

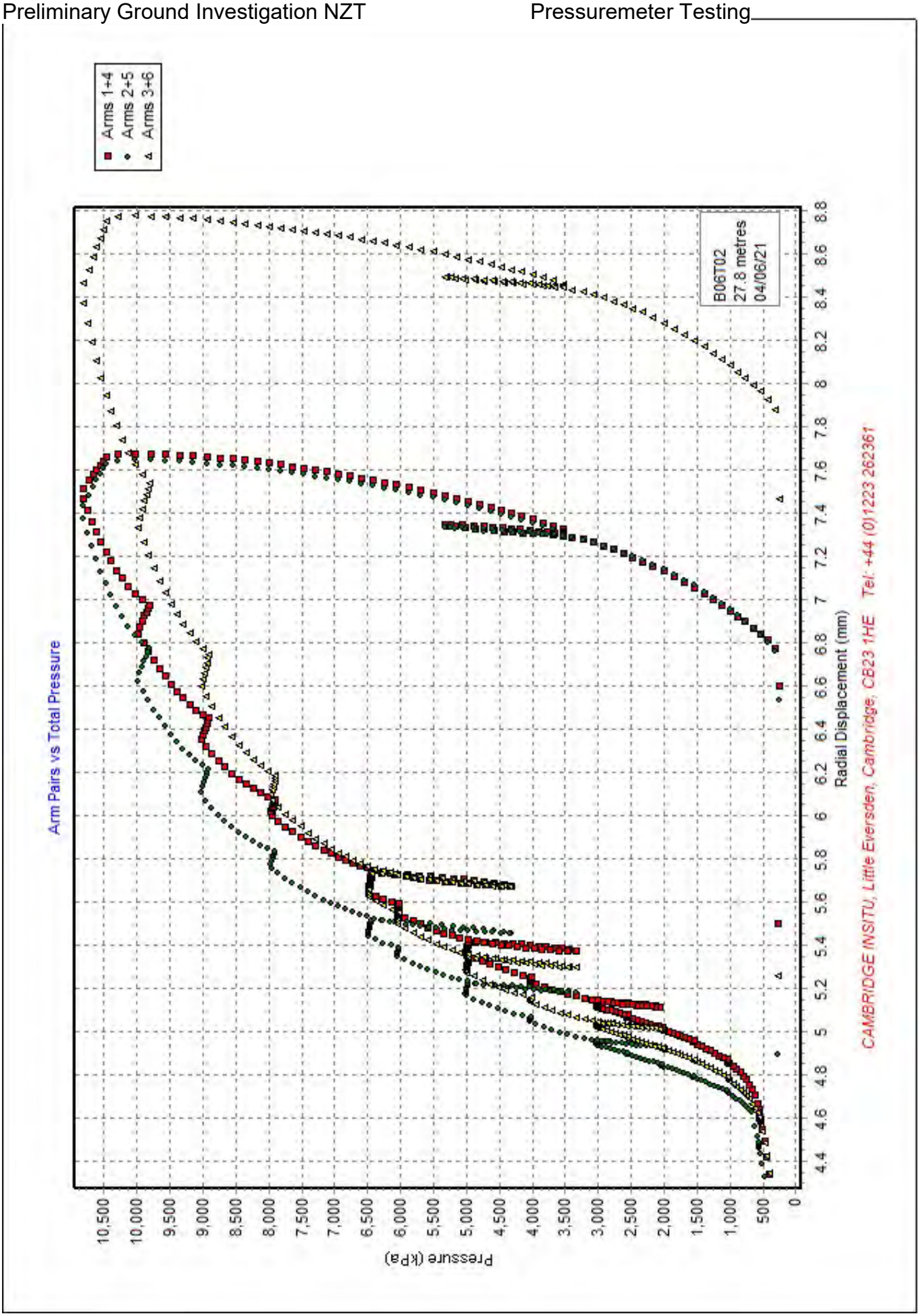

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 172.440 0.791
2 68.882 0.660
3 81.582 0.671
4 131.052 0.714
Shear modulus (MPa)
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
0.0001
0.001
Log plane shear strain
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21

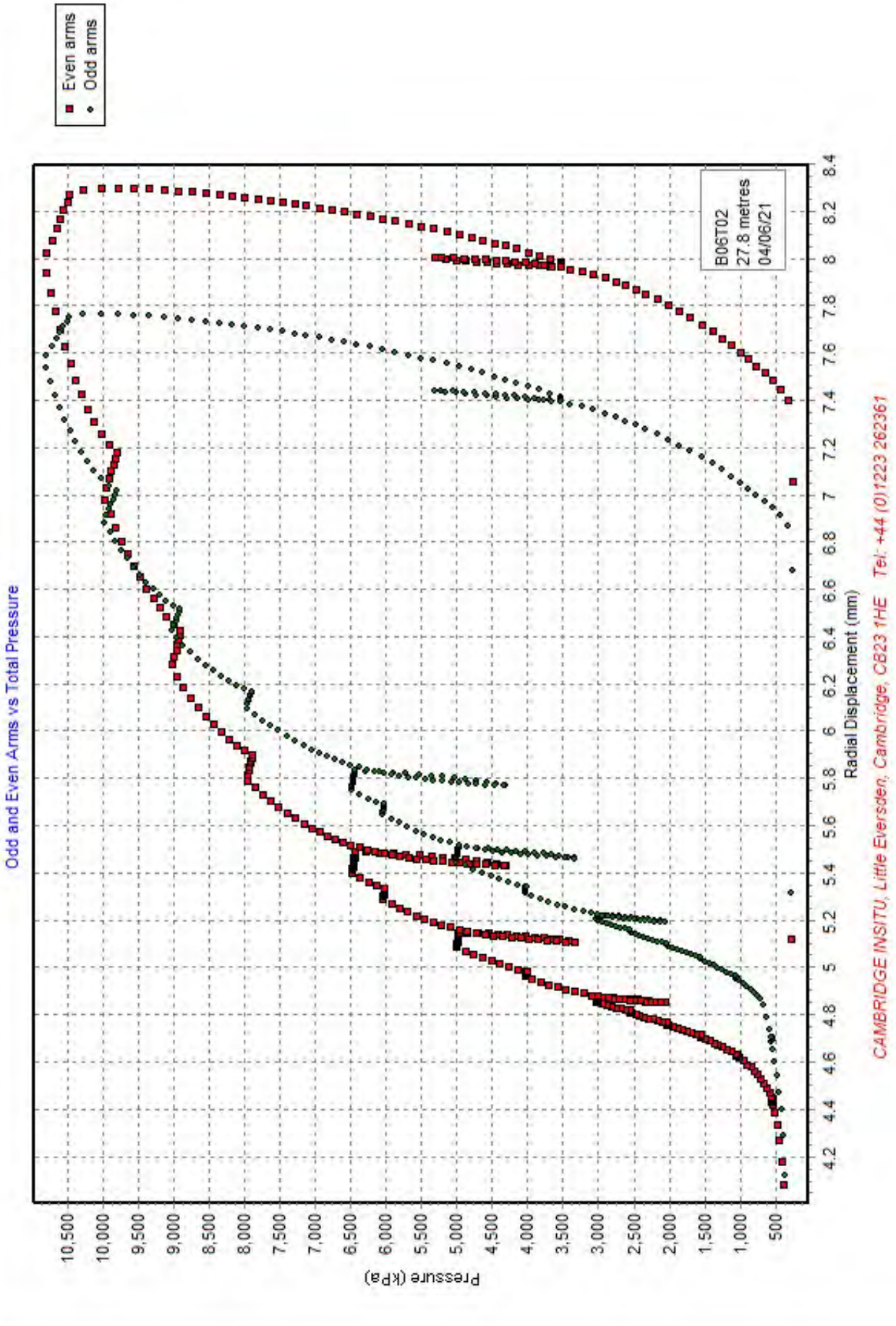

Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH06 Test 2
27.80 Metres
4 Jun 21
CURVE FIT PARAMETERS:
Origin : 4.880mm
Po : 796.0kPa
Cohesion : 85kPa
Phi peak : 48.1°
Dilation : 11.3°
Yield stress : 1979kPa
Limit pressure : 37741kPa
Elastic exponent : 0.660
Gs at first yield : 467.3MPa
Janbu exponent : 0.167
Correlation : 0.558
Estimated PWP : 226.0kPa
Phi cv : 40.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


Shear stress = 3144 kPa
Friction angle ϕ = 38.3°
Unloading
Residual friction angle
Linear (peak friction angle)
ϕpk = 49.2°
Contraction data
Shear stress vs Normal stress
MS/BH06 Test 2
27.80mBGL
June 04, 2021
Shear stress (kPa)
Normal stress (kPa)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
0
1000
2000
3000
4000
5000
6000
7000
8000


Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
All Arms vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
BOST02
2.8 metres
04/06/21
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B06T02
27.8 metres
04/06/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arms 1+4
Arms 2+5
Arms 3+6
B06T02
27.8 metres
04/06/21
Arm Pairs vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
Odd and Even Arms vs Total Pressure
B06T02
27.8 metres
04/06/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH07 Test 1 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]

Project	:	4339
Site	:	Preliminary Ground Investigation NZT
Borehole	:	MS/BH07
Test name	:	MS/BH07 Test 1
Test date	:	6 Jul 21
Test depth	:	25.20 Metres
Water table	:	4.19 Metres
Ambient PWP	:	206.0 kPa
Material	:	Mudstone
Probe	:	95mm High Pressure Dilatometer
Diameter	:	97.0 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 YB/RW on 21 Jul 21

Remarks: Burst at 3.7MPa.

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm)	:	"Arm ave=2.27"
Po from Marsland & Randolph (kPa)	:	"Arm ave=474.5"
Best estimate of Po (kPa)	:	"Arm ave=440.0"

[UNDRAINED STRENGTH PARAMETERS]

Undrained yield stress (kPa)	:	"Arm ave=1549.0"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]

Constant volume friction angle (°)	:	38.0
Angle of internal friction (°)	:	"Arm ave=38.5"
Dilation angle (°)	:	"Arm ave=0.6"
Gradient of log-log plot	:	"Arm ave=0.388"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=65.3"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	248.6	0.239	1095	0.171	425
Arm ave	2	256.7	0.764	1450	0.219	563
Arm ave	3	266.3	2.362	2162	0.281	750

[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	40.936	29.143	0.712
Arm ave	2	32.125	21.027	0.655
Arm ave	3	23.076	13.331	0.578

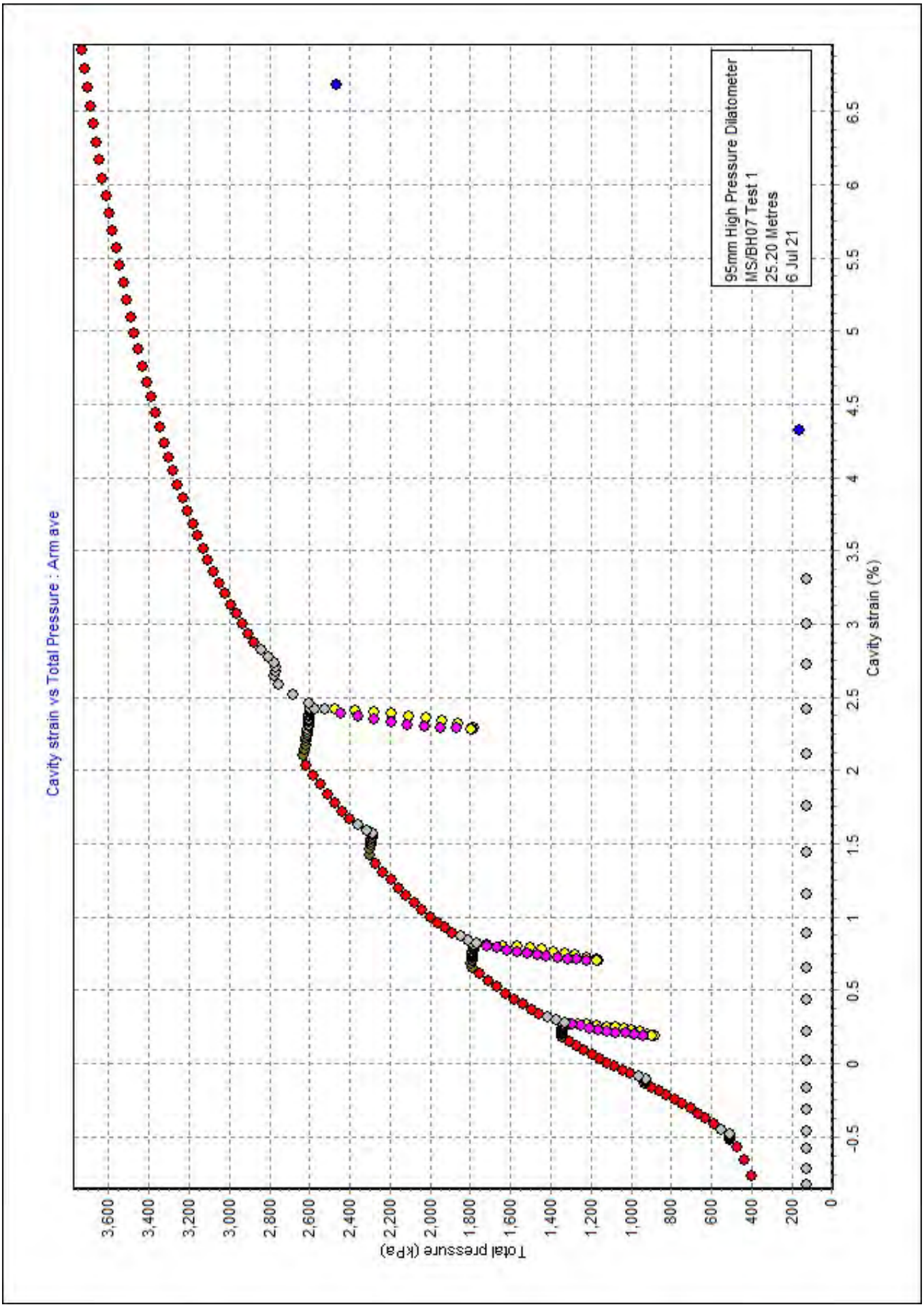
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}

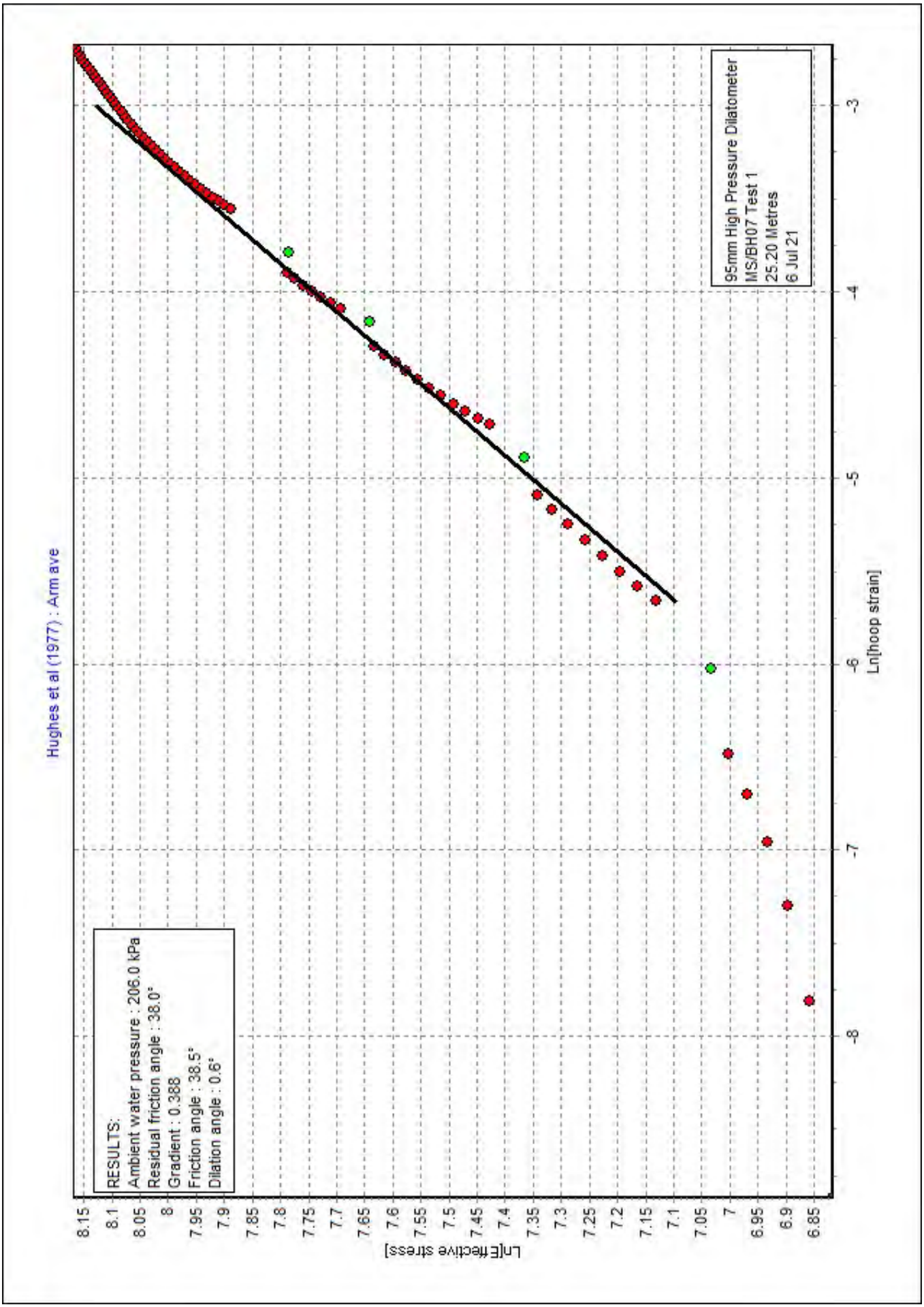
Strain Origin (mm)	:	2.27
Po (kPa)	:	440
Cohesion (kPa)	:	33
Angle of peak friction (deg)	:	38.5
Angle of peak dilation (deg)	:	0.6
Total yield stress (kPa)	:	984
Total limit stress (kPa)	:	8296
G at first yield (MPa)	:	163.5
Non-linear exponent	:	0.578
Janbu exponent	:	0.072
Correlation	:	0.987

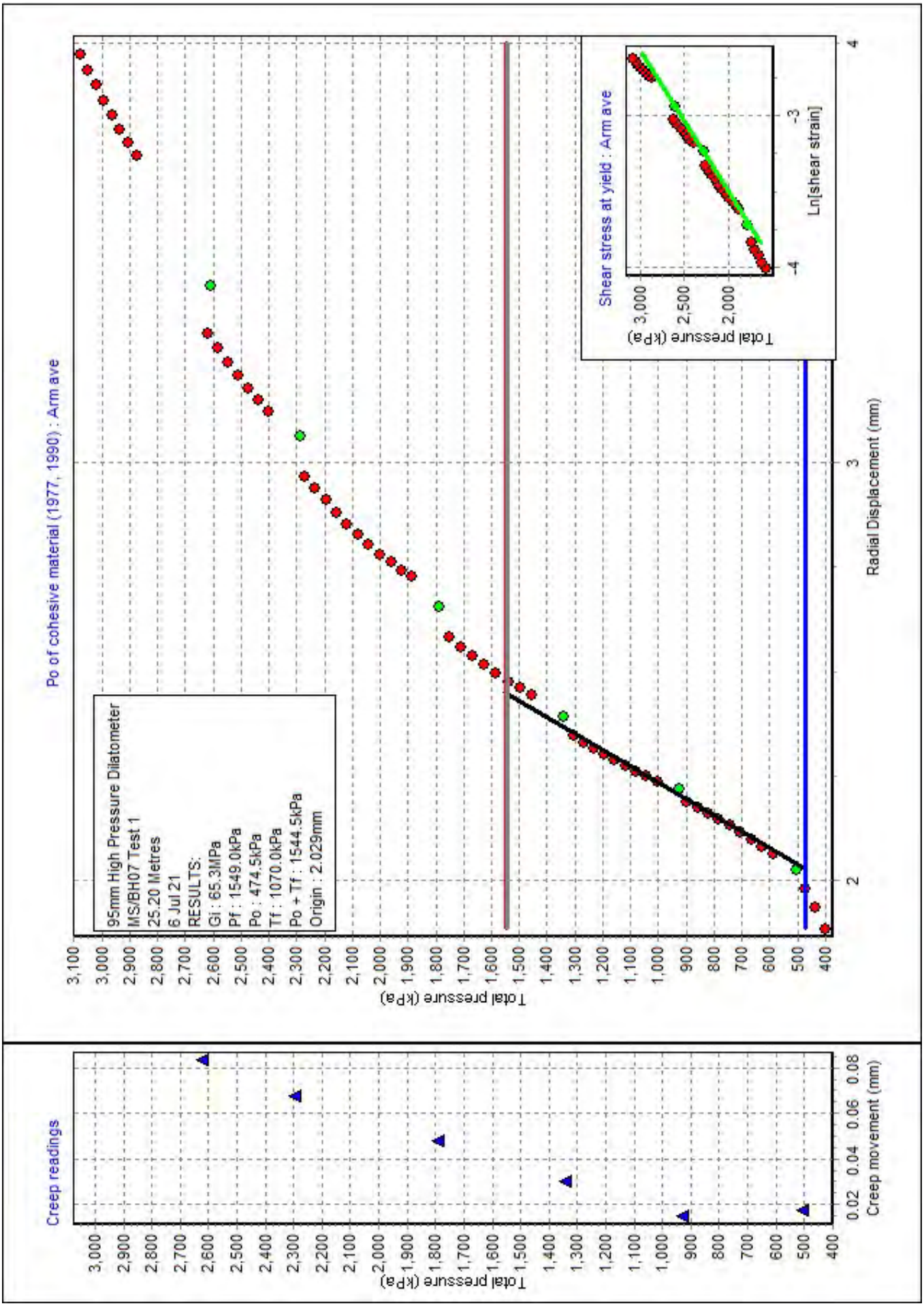
Ambient pore water pressure (kPa)	:	206

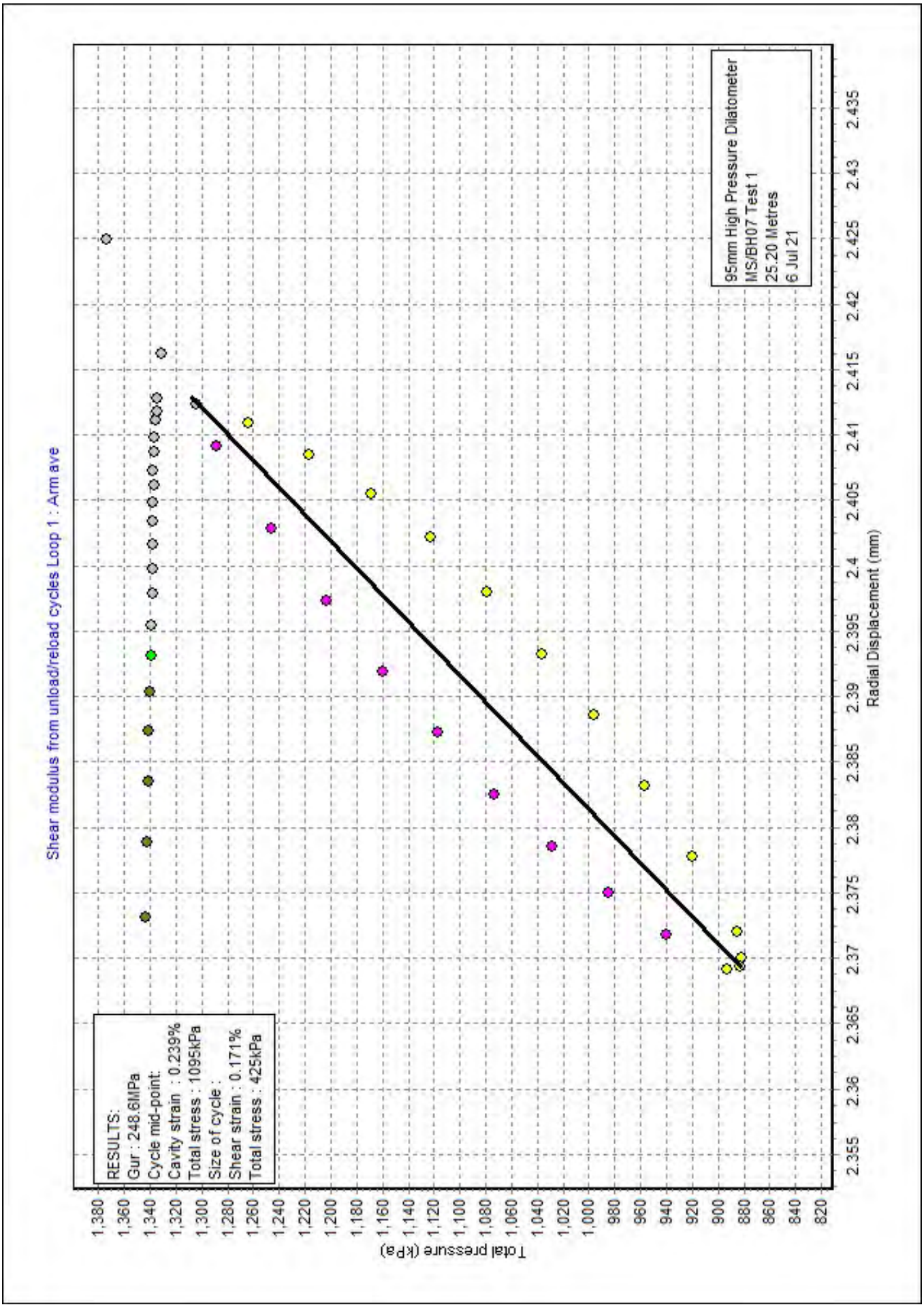
MS/BH07 Test 1 - SUMMARY OF RESULTS

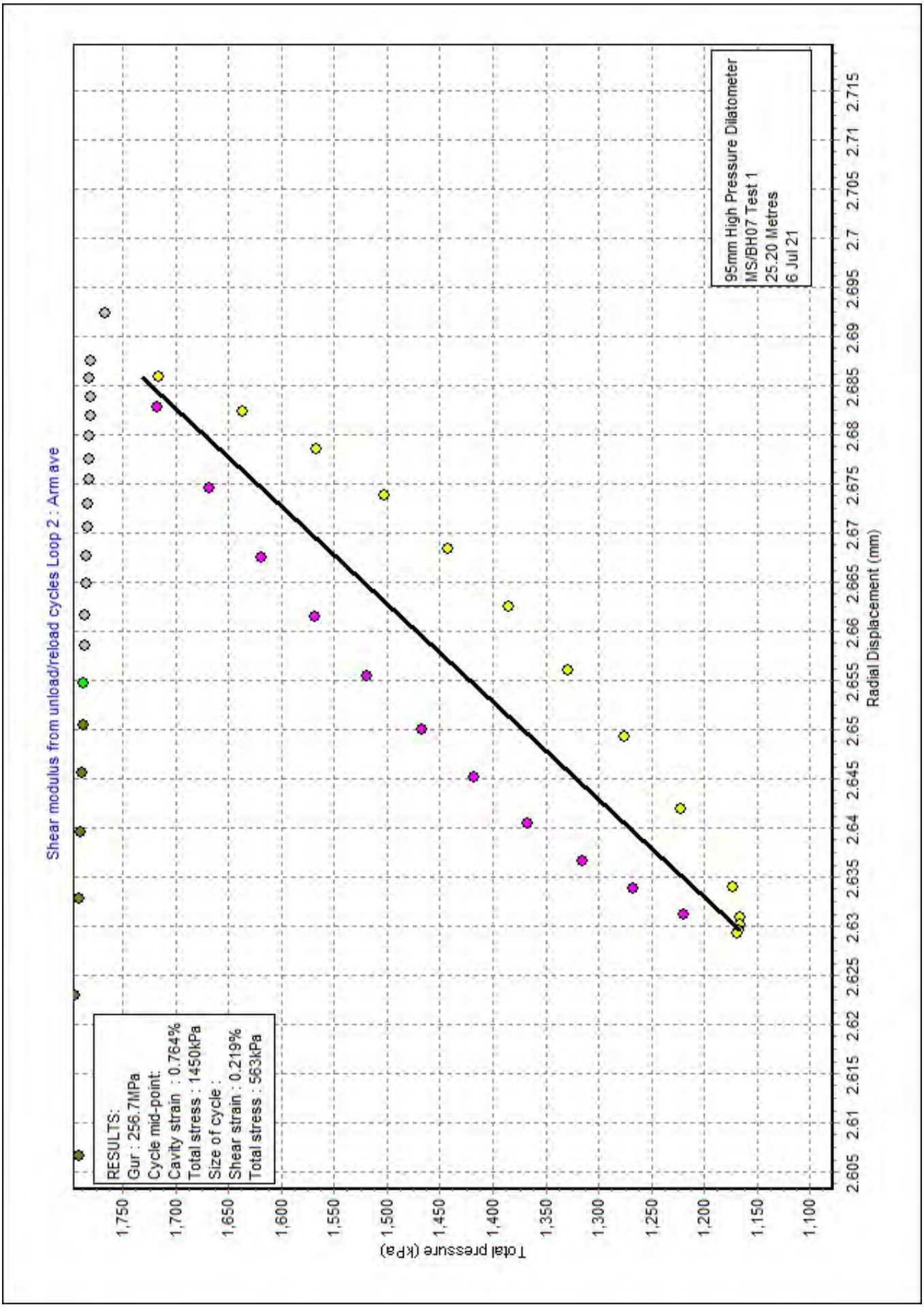
Residual friction angle (deg)	:	38.0
Poisson's ratio	:	0.30

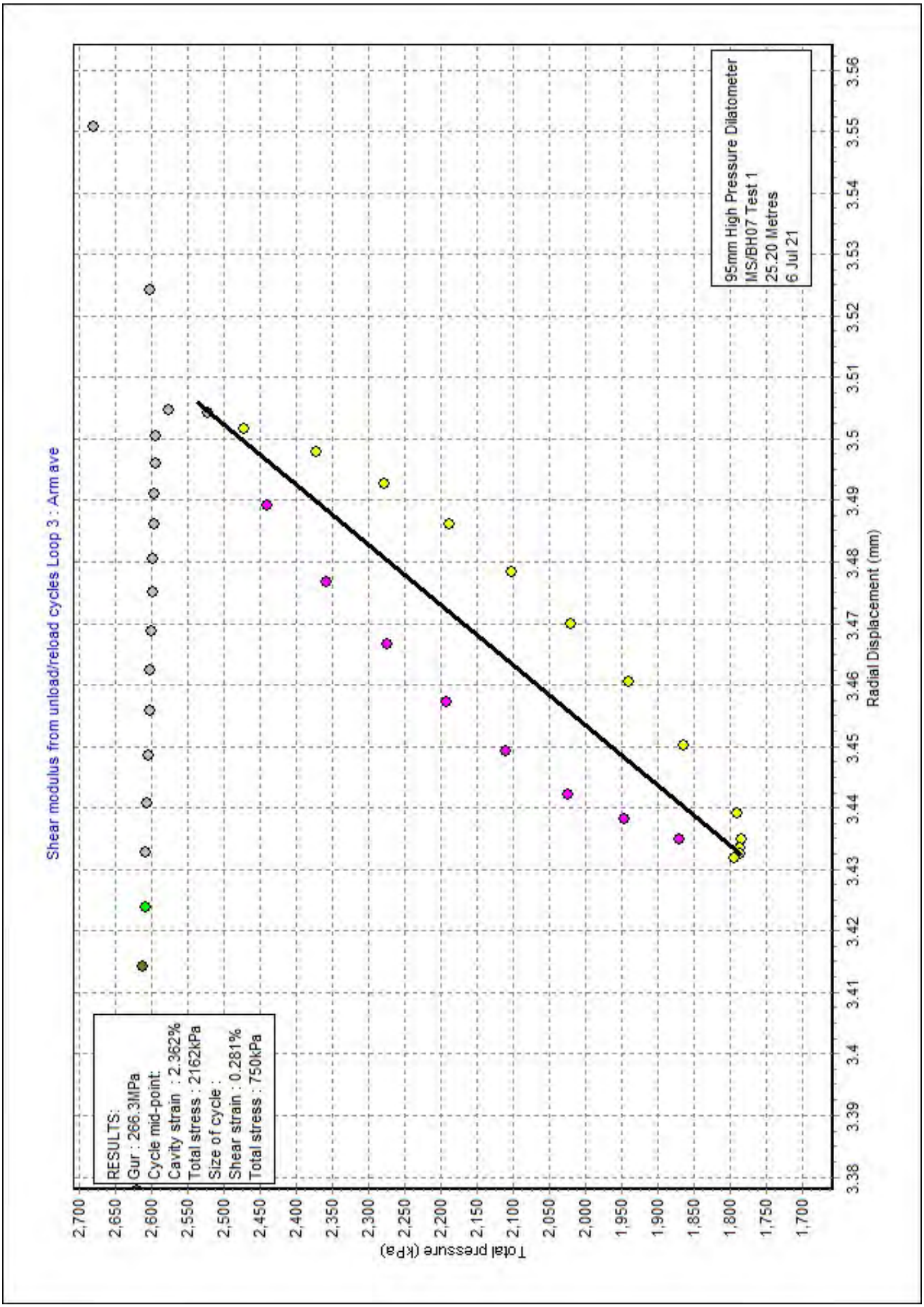

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
Total pressure (kPa)
Cavity strain (%)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
2,600
2,800
3,000
3,200
3,400
3,600
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5

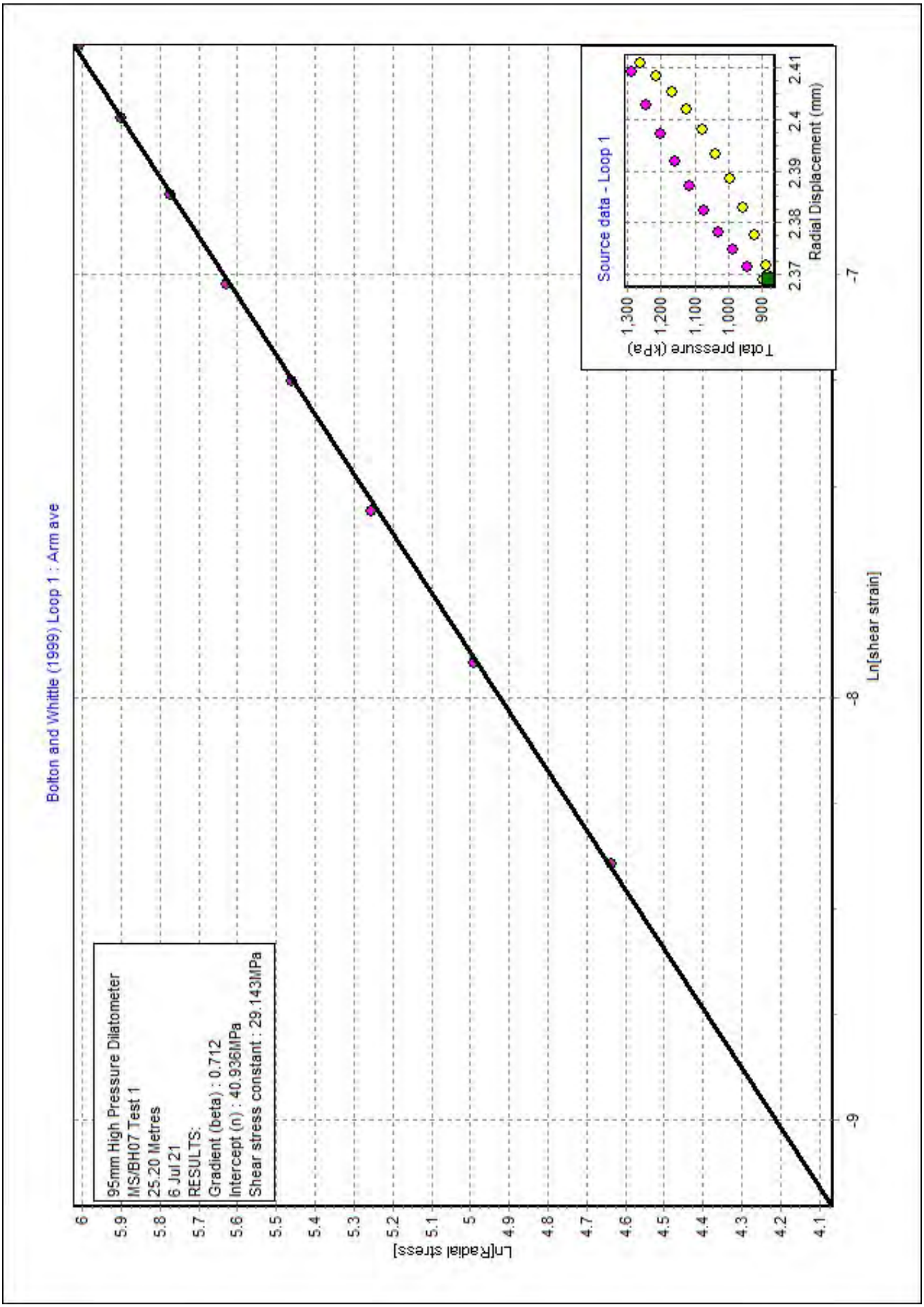

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 206.0 kPa
Residual friction angle : 38.0°
Gradient : 0.388
Friction angle : 38.5°
Dilation angle : 0.6°
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
Ln[Effective stress]
Ln[hoop strain]
8.15
8.1
8.05
8
7.95
7.9
7.85
7.8
7.75
7.7
7.65
7.6
7.55
7.5
7.45
7.4
7.35
7.3
7.25
7.2
7.15
7.1
7.05
7
6.95
6.9
6.85
-3
-4
-5
-6
-7
-8

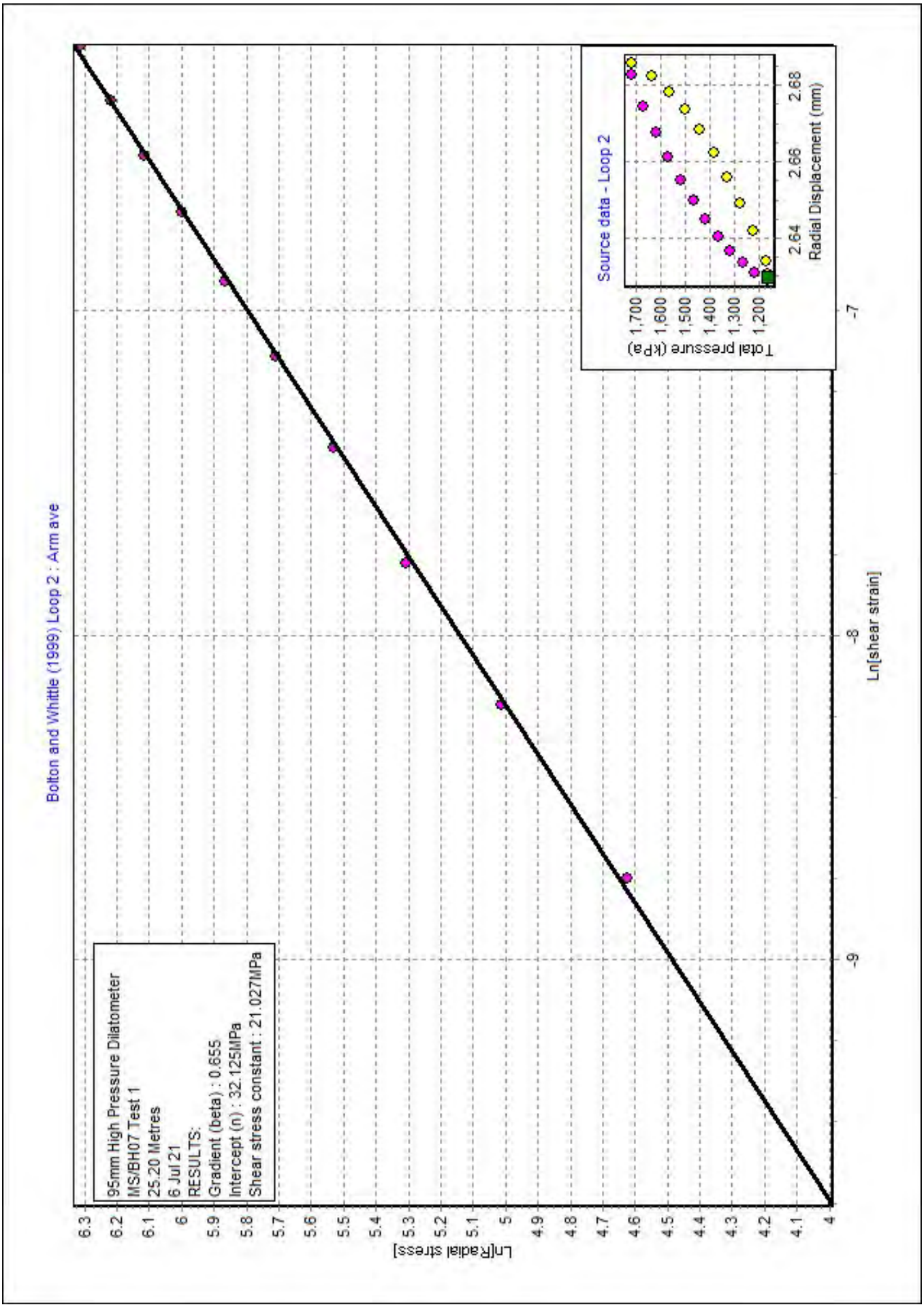

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
RESULTS:
Gi : 65.3MPa
Pf : 1549.0kPa
Po : 474.5kPa
Tf : 1070.0kPa
Po + Tf : 1544.5kPa
Origin : 2.029mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]
Creep readings
Total pressure (kPa)
Creep movement (mm)

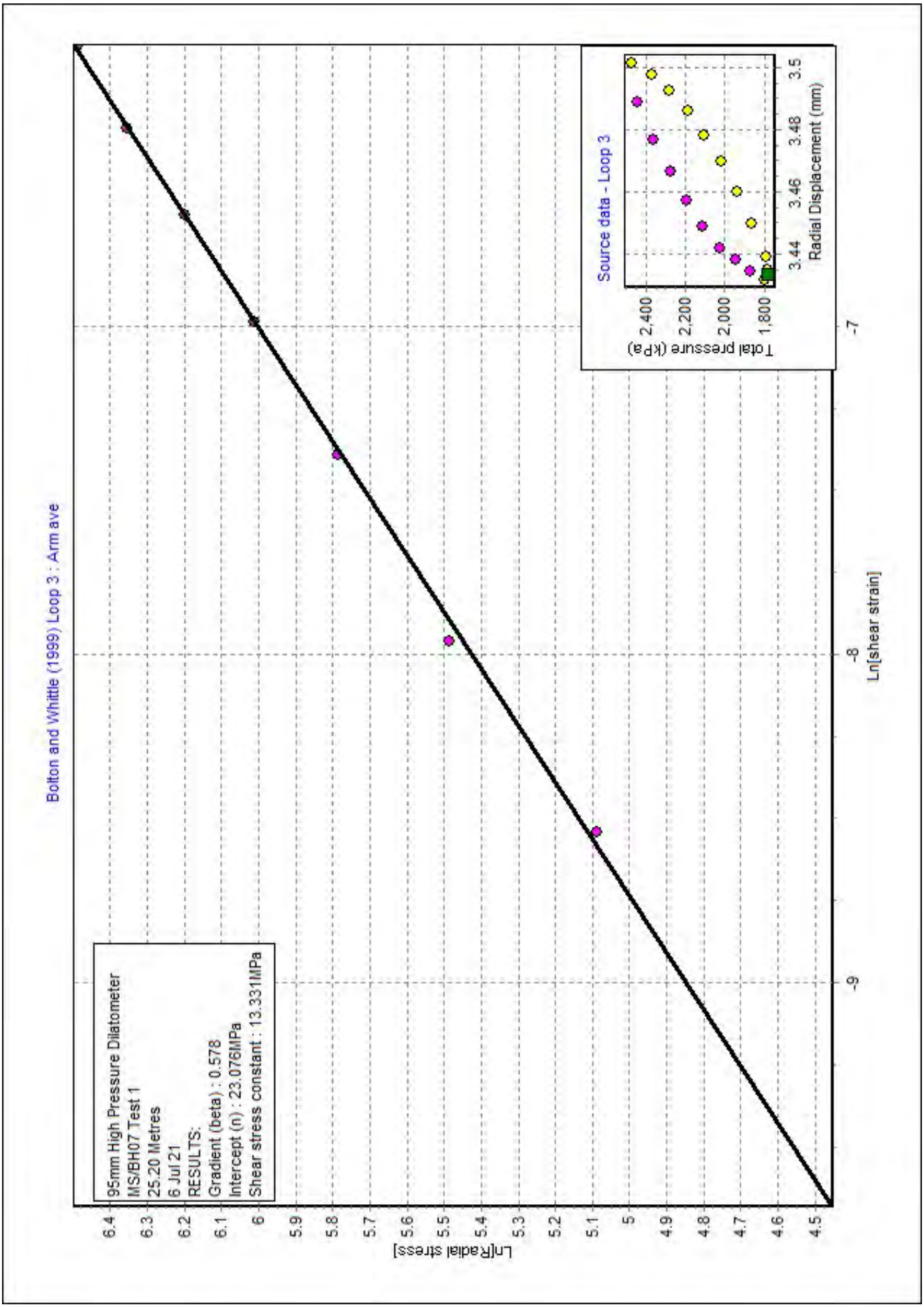

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 248.6MPa
Cycle mid-point:
Cavity strain : 0.239%
Total stress : 1095kPa
Size of cycle :
Shear strain : 0.171%
Total stress : 425kPa
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

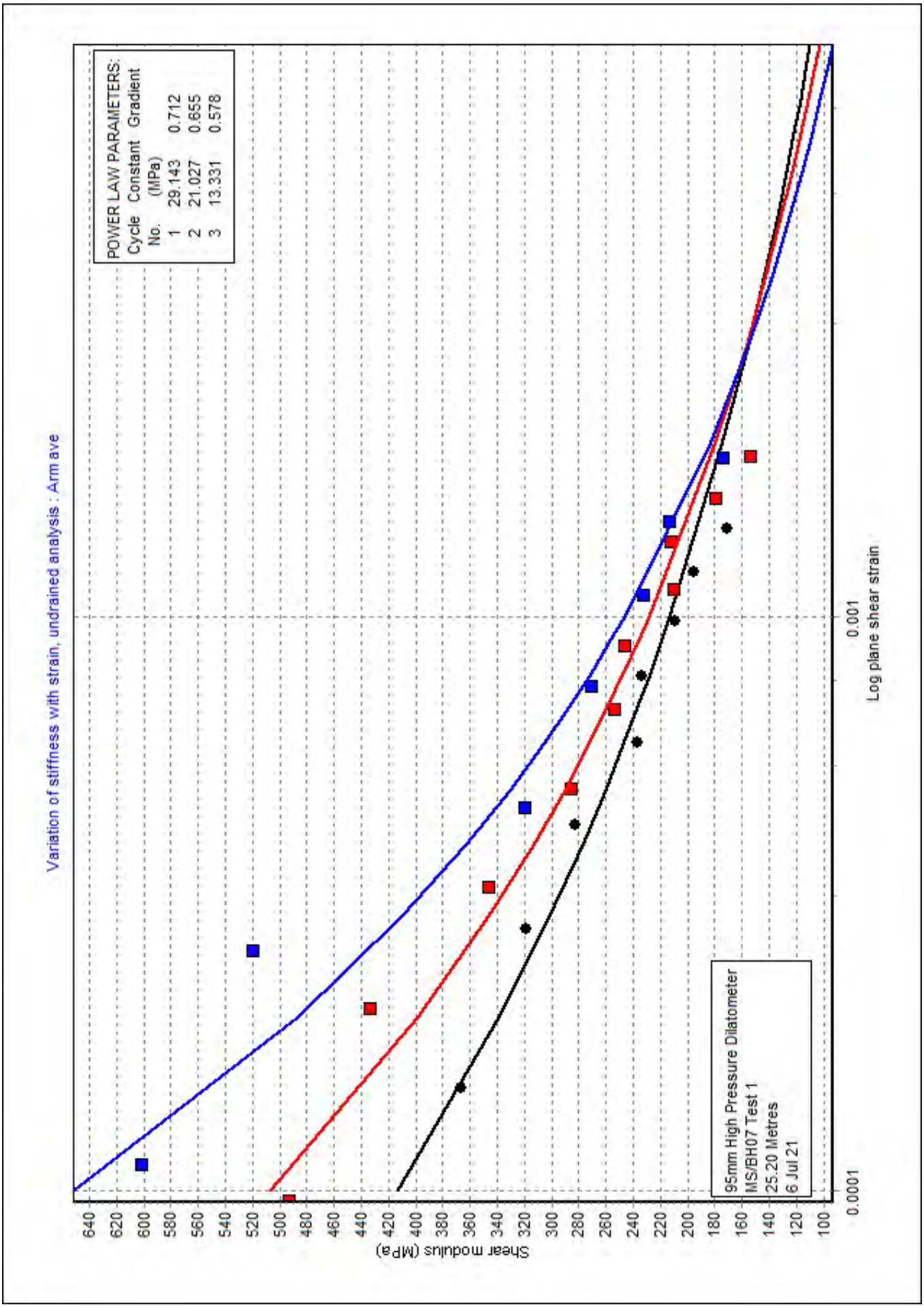

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 256.7MPa
Cycle mid-point:
Cavity strain : 0.764%
Total stress : 1450kPa
Size of cycle :
Shear strain : 0.219%
Total stress : 563kPa
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
1,750
1,700
1,650
1,600
1,550
1,500
1,450
1,400
1,350
1,300
1,250
1,200
1,150
1,100
2.605
2.61
2.615
2.62
2.625
2.63
2.635
2.64
2.645
2.65
2.655
2.66
2.665
2.67
2.675
2.68
2.685
2.69
2.695
2.7
2.705
2.71
2.715

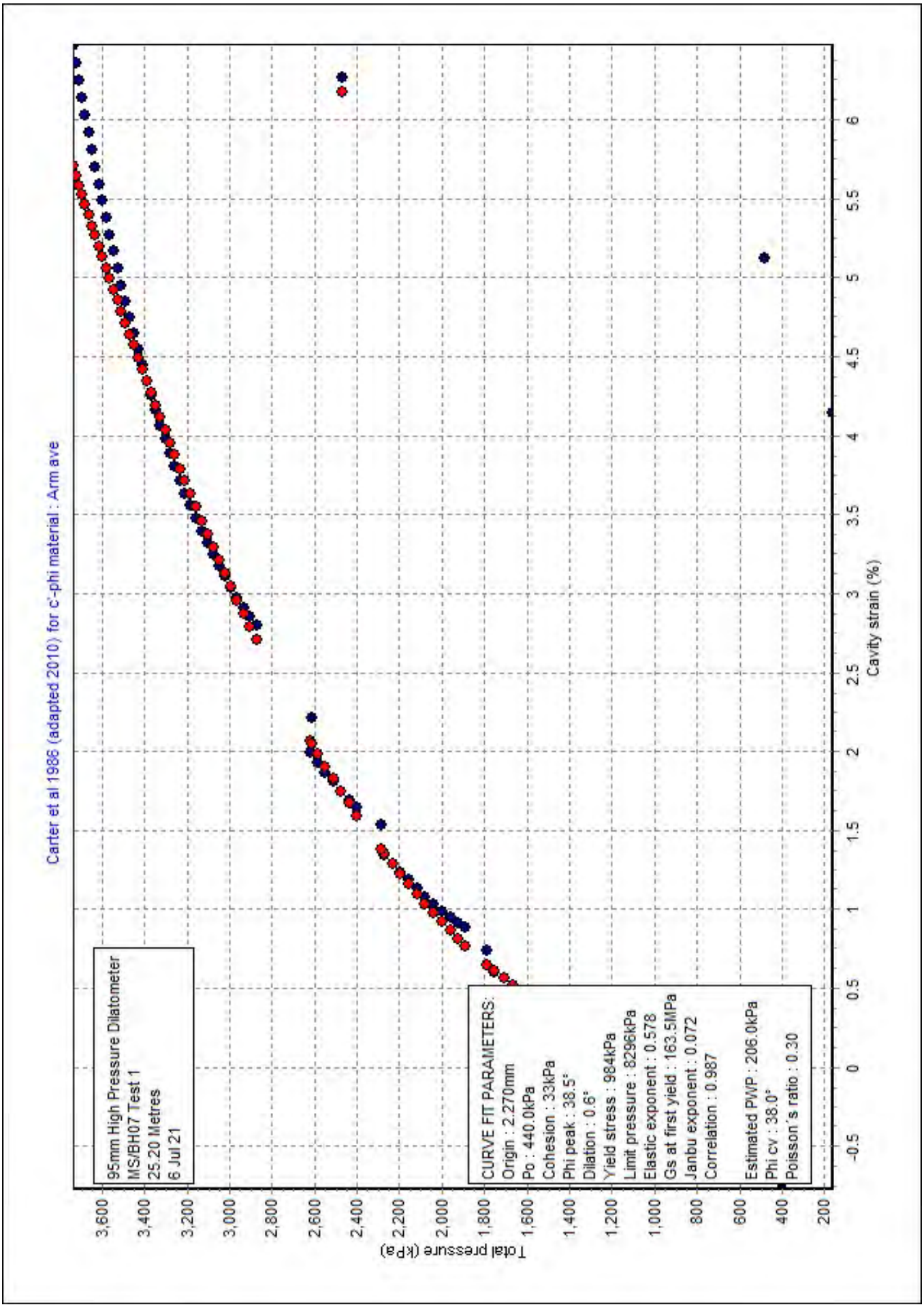

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 266.3MPa
Cycle mid-point:
Cavity strain : 2.362%
Total stress : 2162kPa
Size of cycle :
Shear strain : 0.281%
Total stress : 750kPa
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

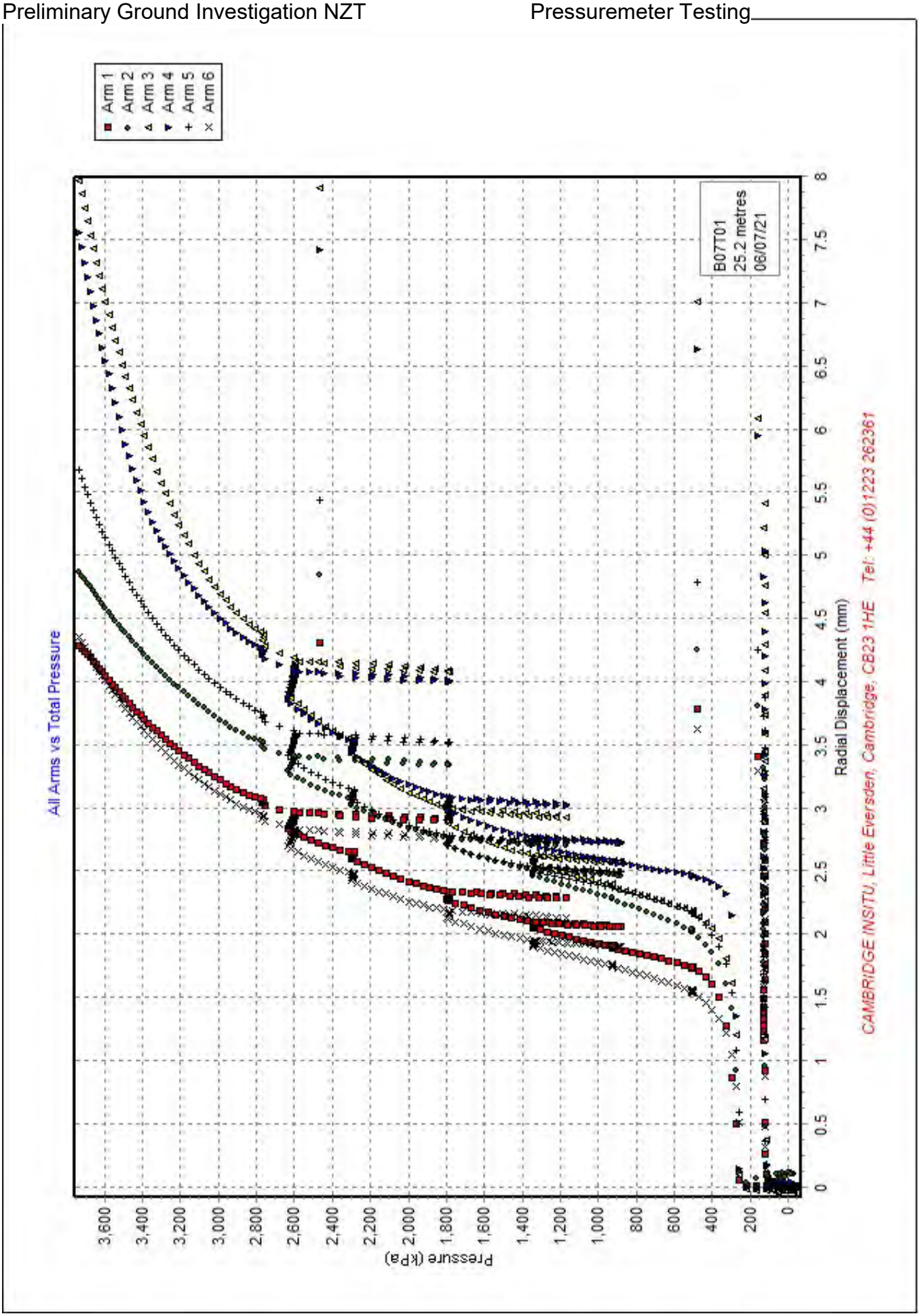

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
RESULTS:
Gradient (beta) : 0.712
Intercept (n) : 40.936MPa
Shear stress constant : 29.143MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

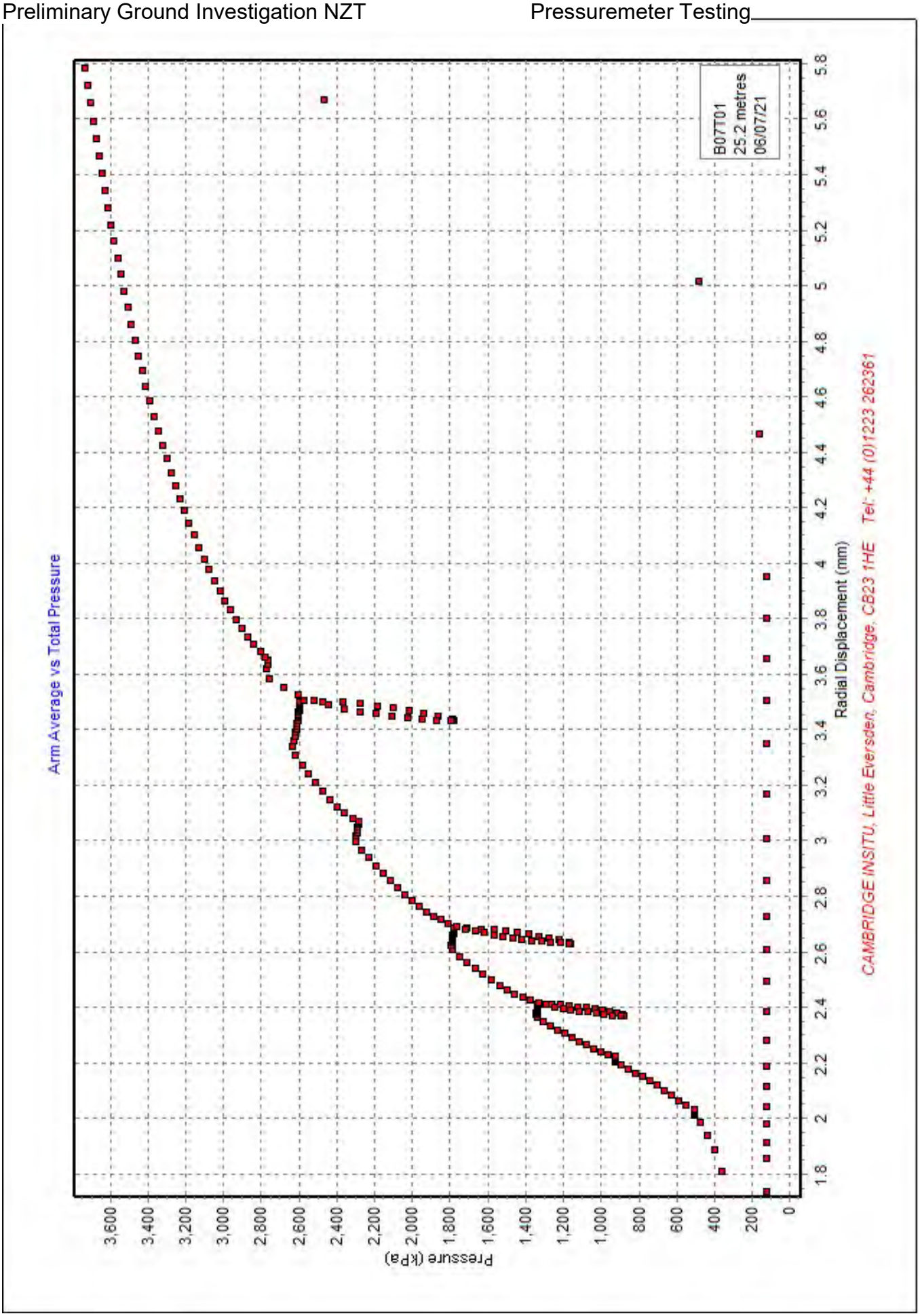

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
RESULTS:
Gradient (beta) : 0.655
Intercept (n) : 32.125MPa
Shear stress constant : 21.027MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

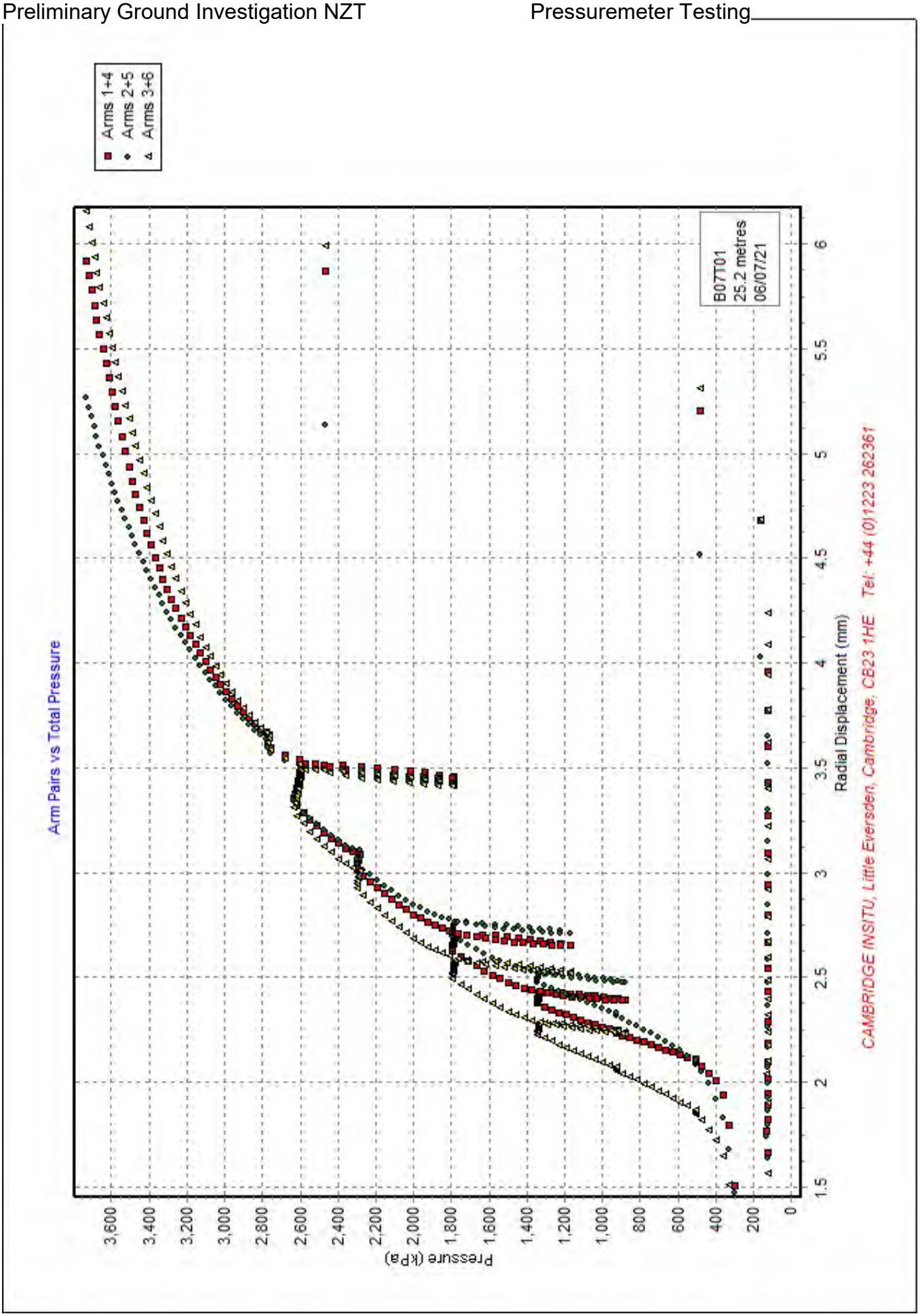

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
RESULTS:
Gradient (beta) : 0.578
Intercept (n) : 23.076MPa
Shear stress constant : 13.331MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

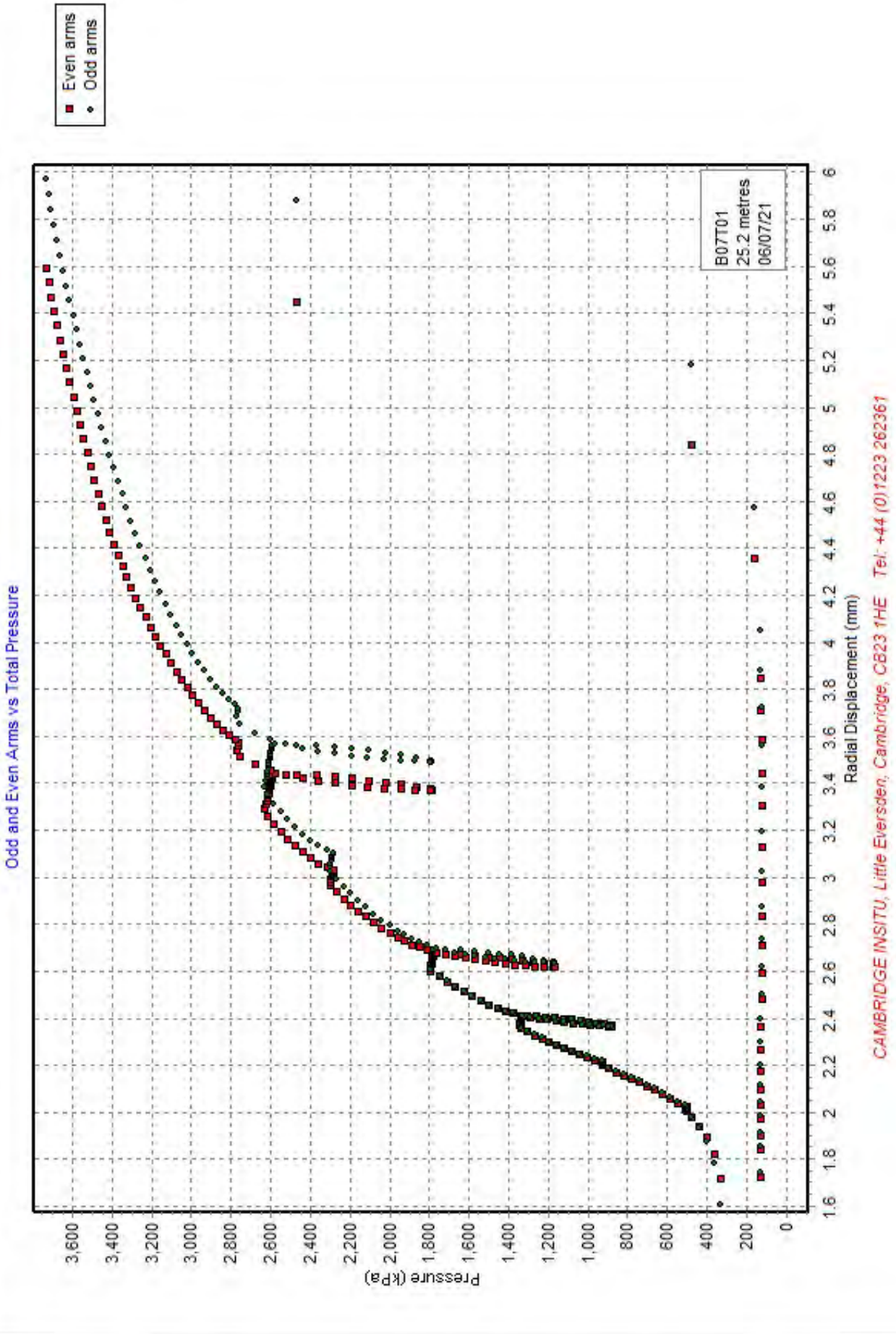

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 29.143 0.712
2 21.027 0.655
3 13.331 0.578
Shear modulus (MPa)
Log plane shear strain
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21


Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 1
25.20 Metres
6 Jul 21
CURVE FIT PARAMETERS:
Origin : 2.270mm
Po : 440.0kPa
Cohesion : 33kPa
Phi peak : 38.5°
Dilation : 0.6°
Yield stress : 984kPa
Limit pressure : 8296kPa
Elastic exponent : 0.578
Gs at first yield : 163.5MPa
Janbu exponent : 0.072
Correlation : 0.987
Estimated PWP : 206.0kPa
Phi cv : 38.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


All Arms vs Total Pressure
Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
B07T01
25.2 metres
06/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B07T01
25.2 metres
06/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arms 1+4
Arms 2+5
Arms 3+6
Arm Pairs vs Total Pressure
B07T01
25.2 metres
06/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
Odd and Even Arms vs Total Pressure
B07T01
25.2 metres
06/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH07 Test 2 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH07
Test name : MS/BH07 Test 2
Test date : 7 Jul 21
Test depth : 27.40 Metres
Water table : 4.19 Metres
Ambient PWP : 228.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 YB/RW on 28 Jul 21

Remarks: Structure of material breaks down after 3rd cycle and latter stages of test cannot be modelled.

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=3.97"
Po from Marsland & Randolph (kPa) : "Arm ave=475.9"
Best estimate of Po (kPa) : "Arm ave=614.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=3616.4"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 38.0
Angle of internal friction (°) : "Arm ave=46.7"
Dilation angle (°) : "Arm ave=11.8"
Gradient of log-log plot : "Arm ave=0.507"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=38.4"
Dilation angle (°) : "Arm ave=0.6"
Gradient of log-log plot : "Arm ave=-3.234"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=96.5"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	322.3	-0.561	872	0.084	271
Arm ave	2	471.7	-0.243	1198	0.075	354
Arm ave	3	623.9	0.502	2243	0.125	778
Arm ave	4	550.0	1.836	3885	0.266	1468
Arm ave	5	509.1	3.679	5122	0.377	1921
Arm ave	6	488.6	9.259	3634	0.404	1979

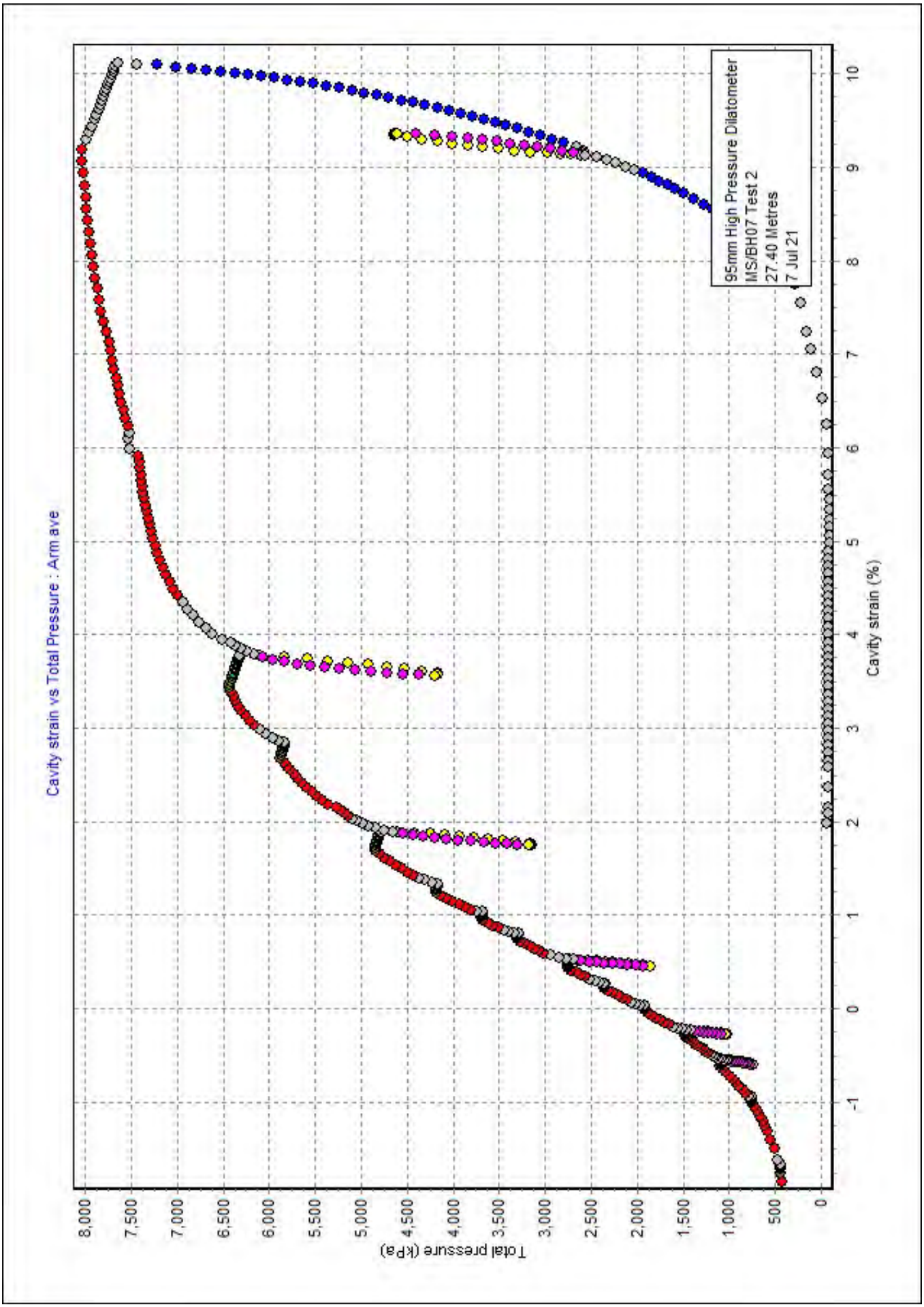
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

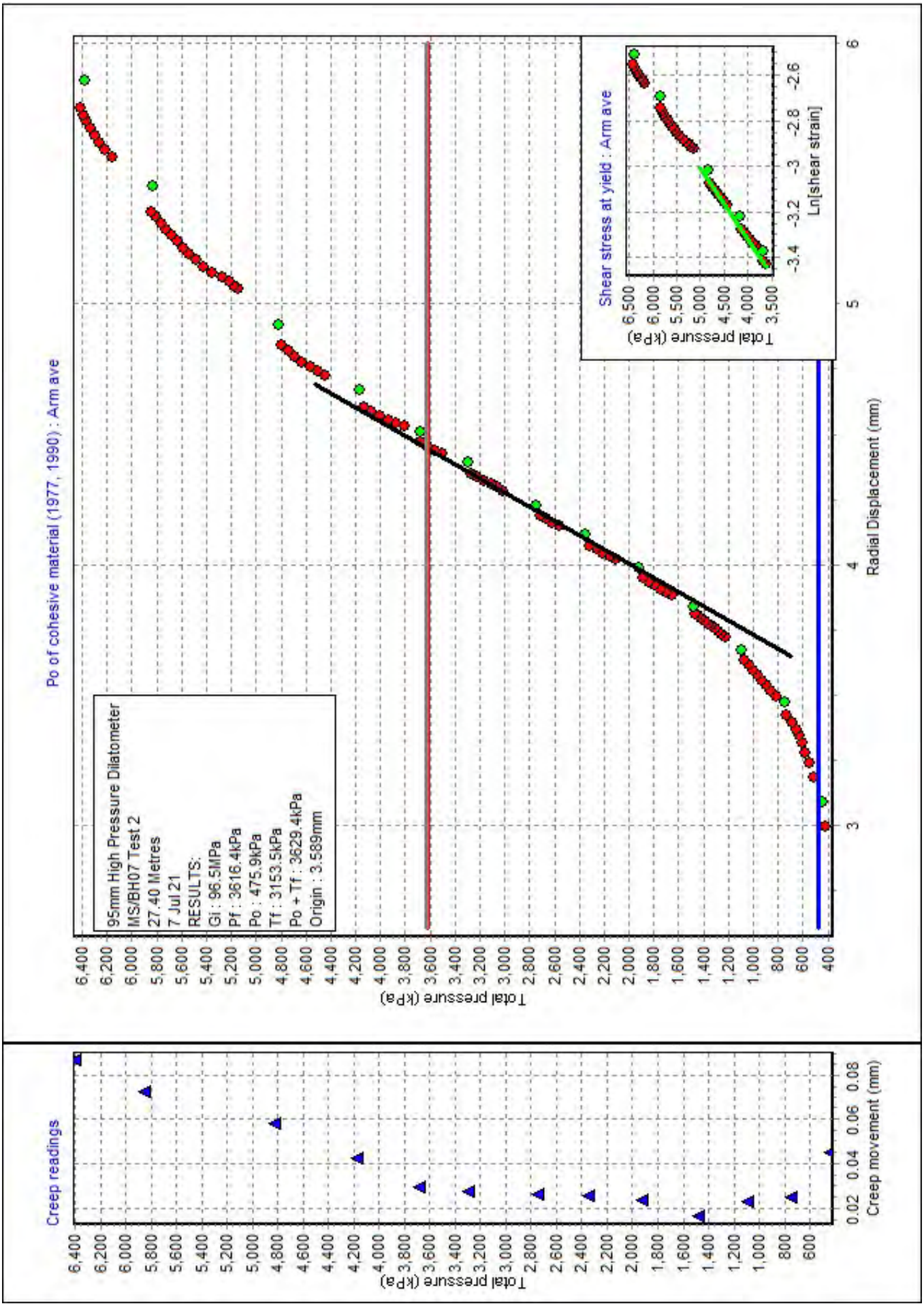
Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	136.280	119.772	0.879
Arm ave	2	167.031	142.266	0.852
Arm ave	3	150.145	117.232	0.781
Arm ave	4	83.541	56.096	0.671
Arm ave	5	71.088	45.274	0.637
Arm ave	6	83.290	55.751	0.669

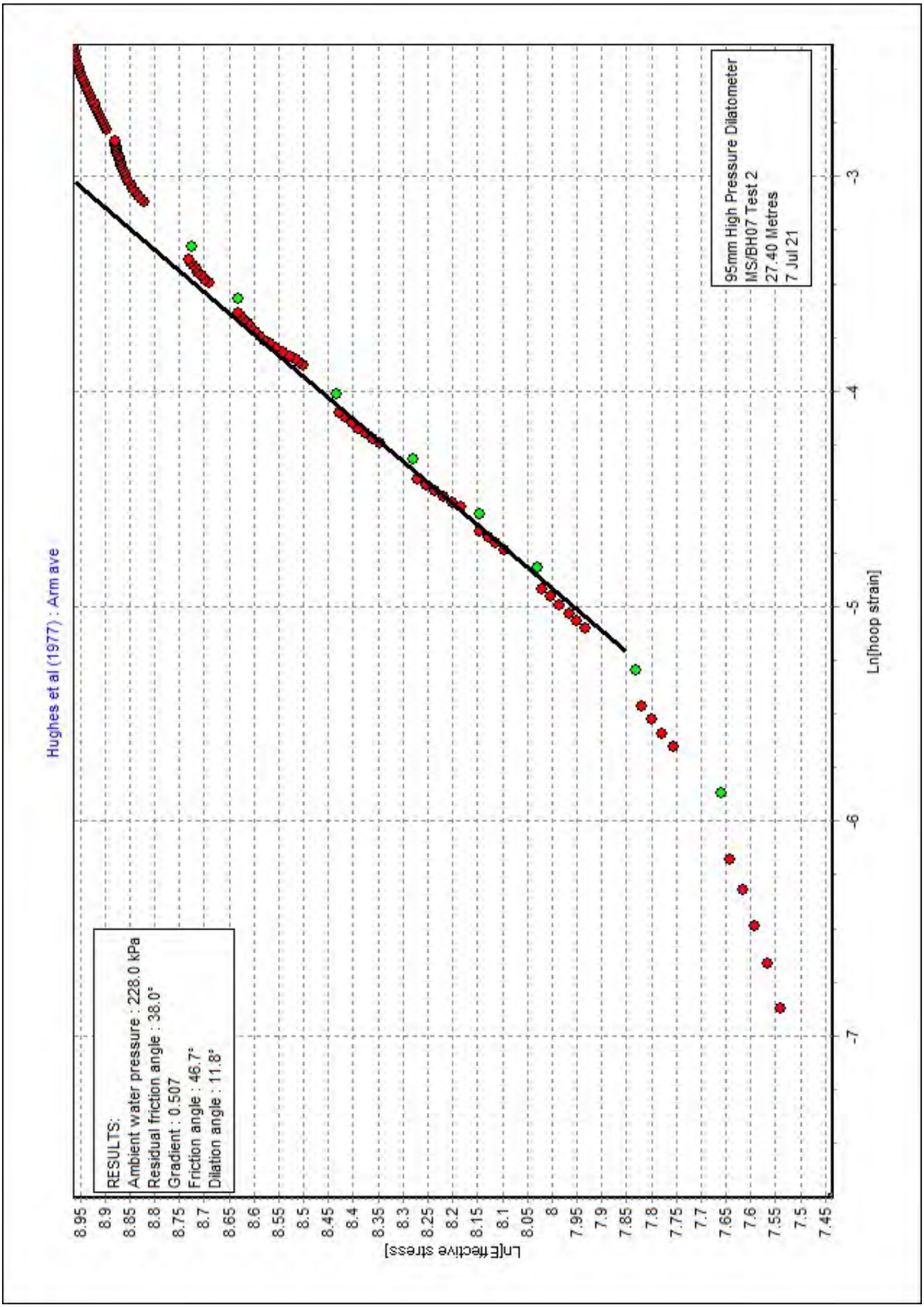
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 3.97

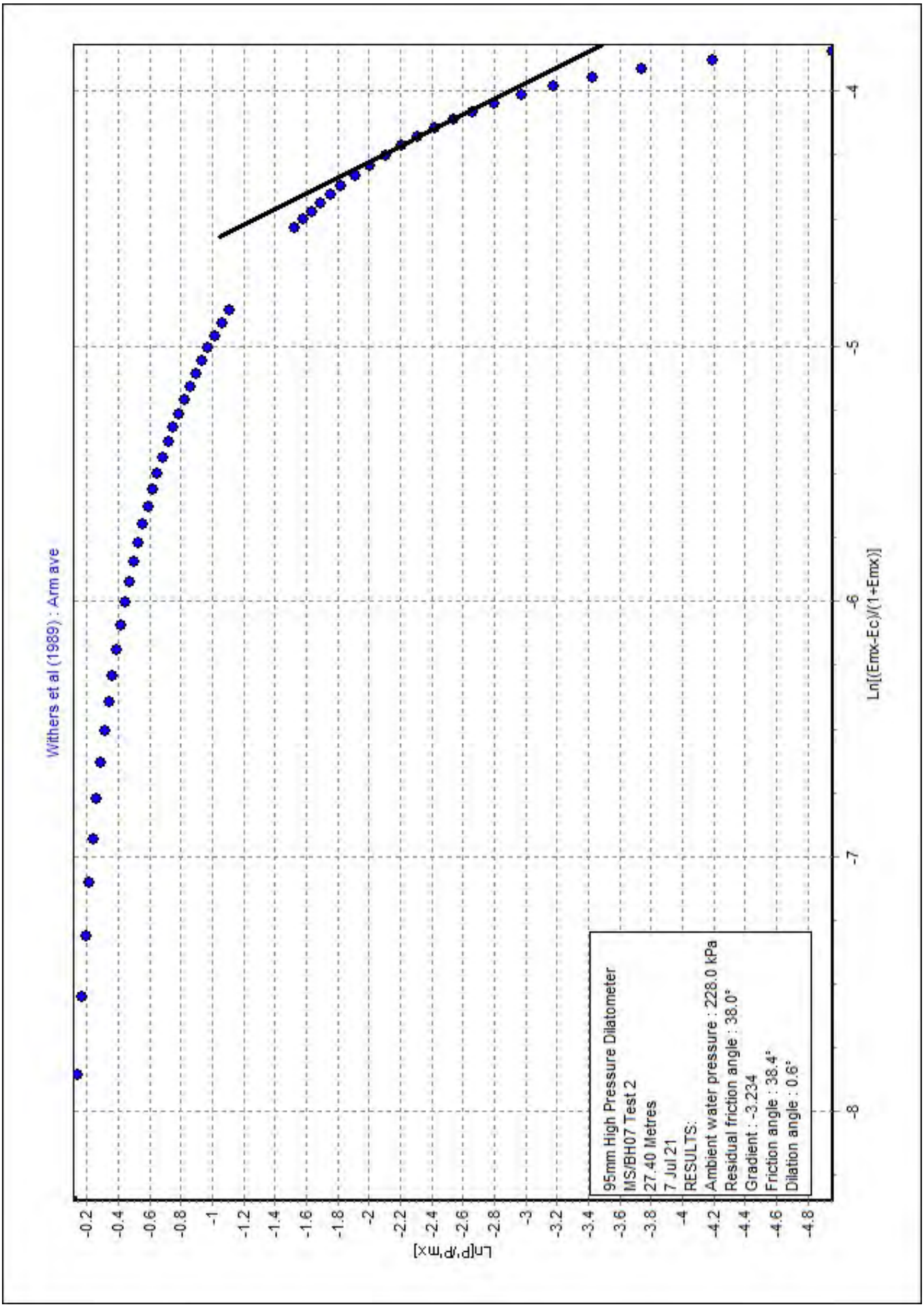
MS/BH07 Test 2 - SUMMARY OF RESULTS

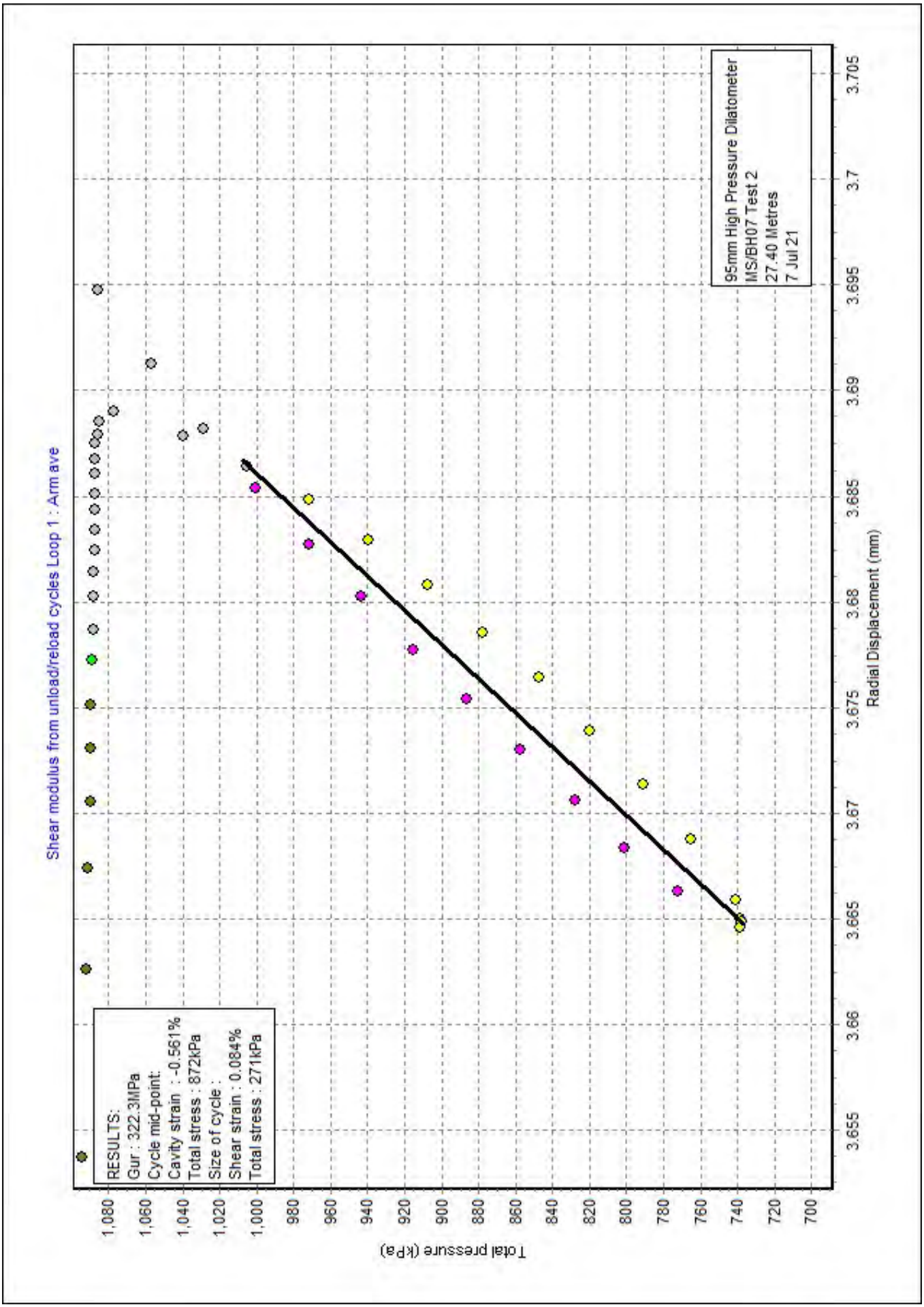
Po (kPa)	:	614
Cohesion (kPa)	:	73
Angle of peak friction (deg)	:	46.7
Angle of peak dilation (deg)	:	11.8
Total yield stress (kPa)	:	1502
Total limit stress (kPa)	:	25814
G at first yield (MPa)	:	305.0
Non-linear exponent	:	0.637
Janbu exponent	:	0.169
Correlation	:	0.643
Ambient pore water pressure (kPa)	:	228
Residual friction angle (deg)	:	38.0
Poisson's ratio	:	0.30

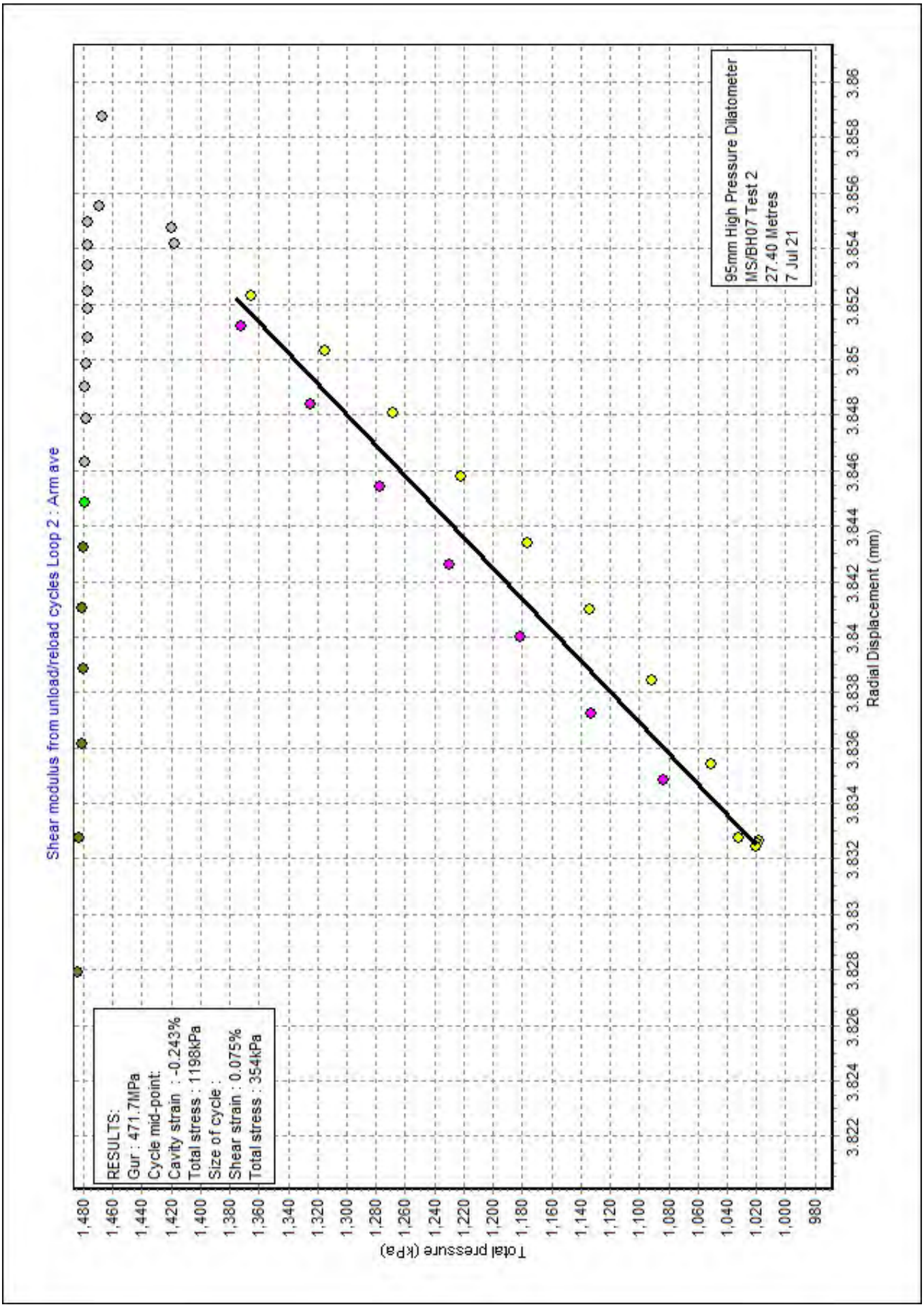

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Cavity strain (%)
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
-1
0
1
2
3
4
5
6
7
8
9
10

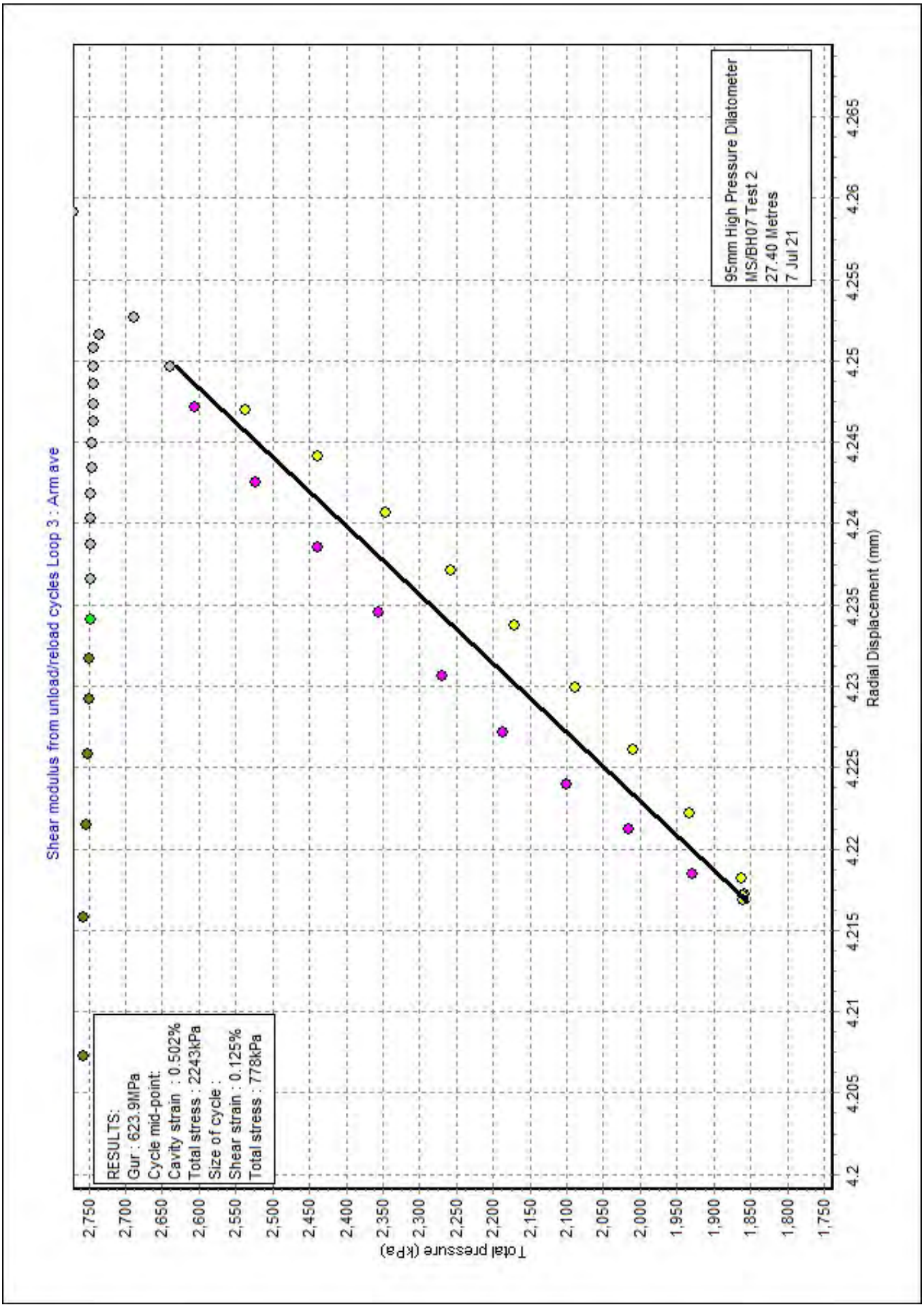

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gi : 96.5MPa
Pf : 3616.4kPa
Po : 475.9kPa
Tf : 3153.5kPa
Po + Tf : 3629.4kPa
Origin : 3.589mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Ln[shear strain]
Creep readings
Creep movement (mm)

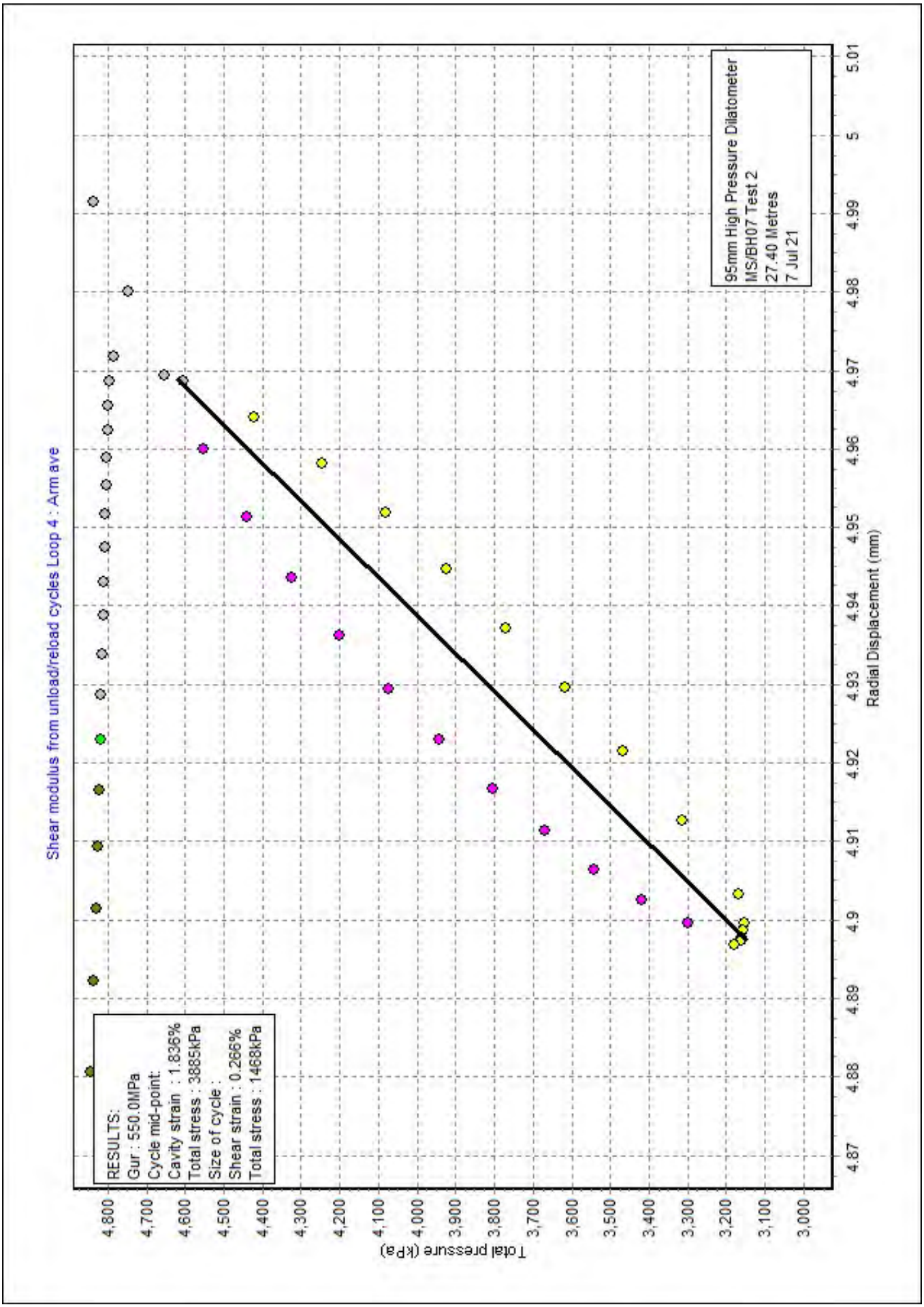

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 228.0 kPa
Residual friction angle : 38.0°
Gradient : 0.507
Friction angle : 46.7°
Dilation angle : 11.8°
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Ln[Effective stress]
Ln[hoop strain]

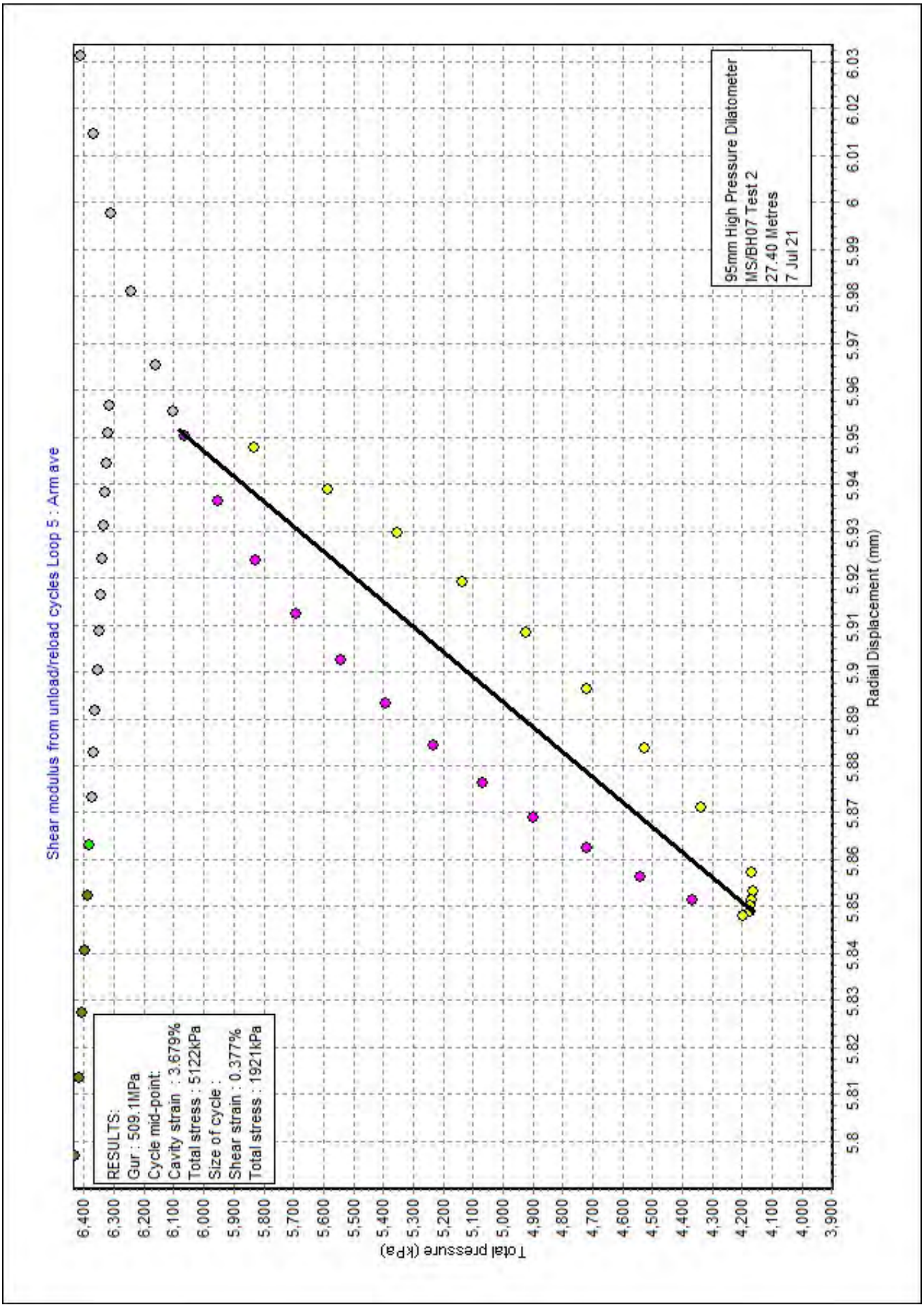

Withers et al (1989) : Arm ave
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Ambient water pressure : 228.0 kPa
Residual friction angle : 38.0°
Gradient : -3.234
Friction angle : 38.4°
Dilation angle : 0.6°

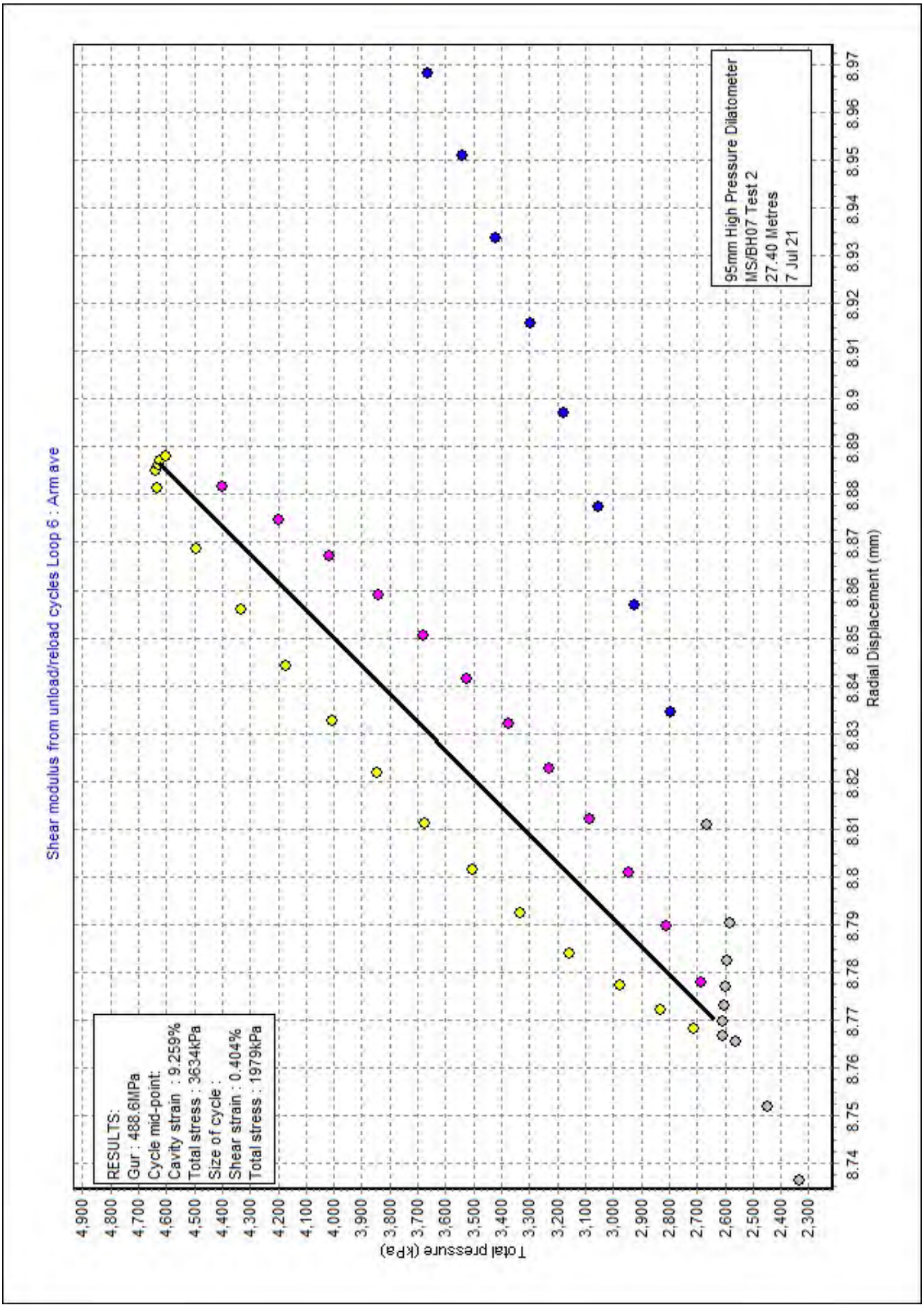

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 322.3MPa
Cycle mid-point:
Cavity strain : -0.561%
Total stress : 872kPa
Size of cycle :
Shear strain : 0.084%
Total stress : 271kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
1,080
1,060
1,040
1,020
1,000
980
960
940
920
900
880
860
840
820
800
780
760
740
720
700
3.655
3.66
3.665
3.67
3.675
3.68
3.685
3.69
3.695
3.7
3.705

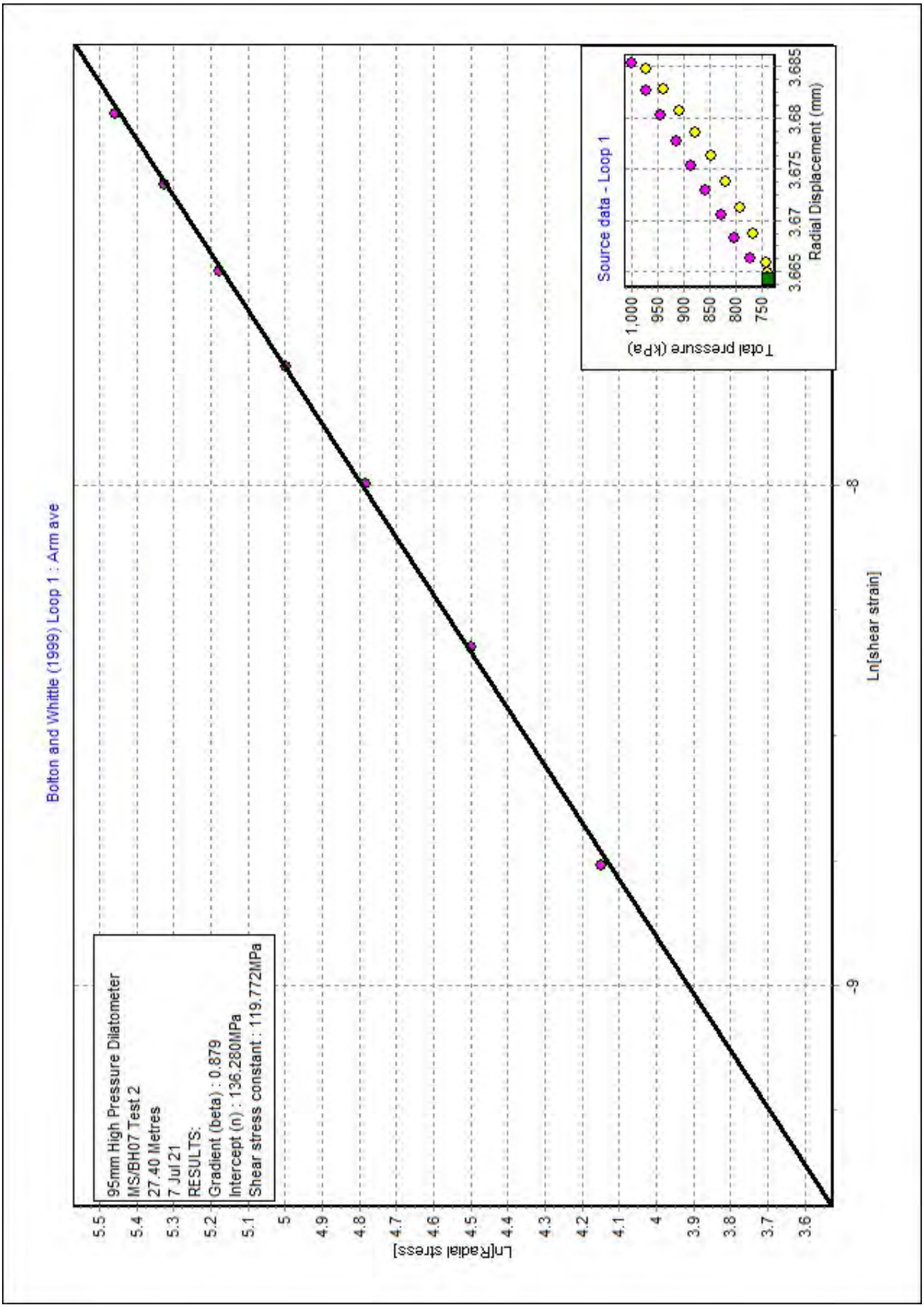

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 471.7MPa
Cycle mid-point:
Cavity strain : -0.243%
Total stress : 1198kPa
Size of cycle :
Shear strain : 0.075%
Total stress : 354kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

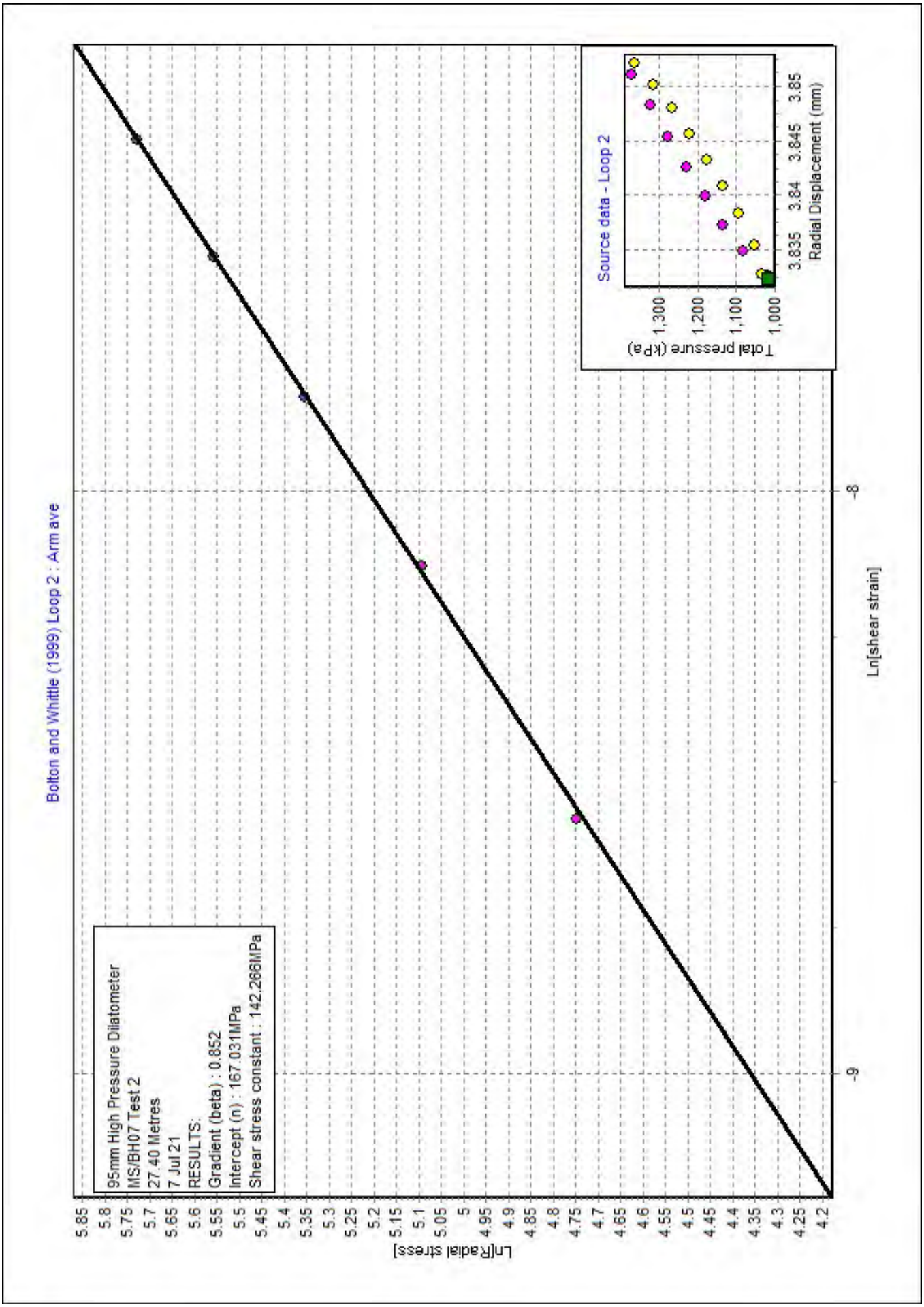

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 623.9MPa
Cycle mid-point:
Cavity strain : 0.502%
Total stress : 2243kPa
Size of cycle :
Shear strain : 0.125%
Total stress : 778kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
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
1,950
1,900
1,850
1,800
1,750
4.2
4.205
4.21
4.215
4.22
4.225
4.23
4.235
4.24
4.245
4.25
4.255
4.26
4.265

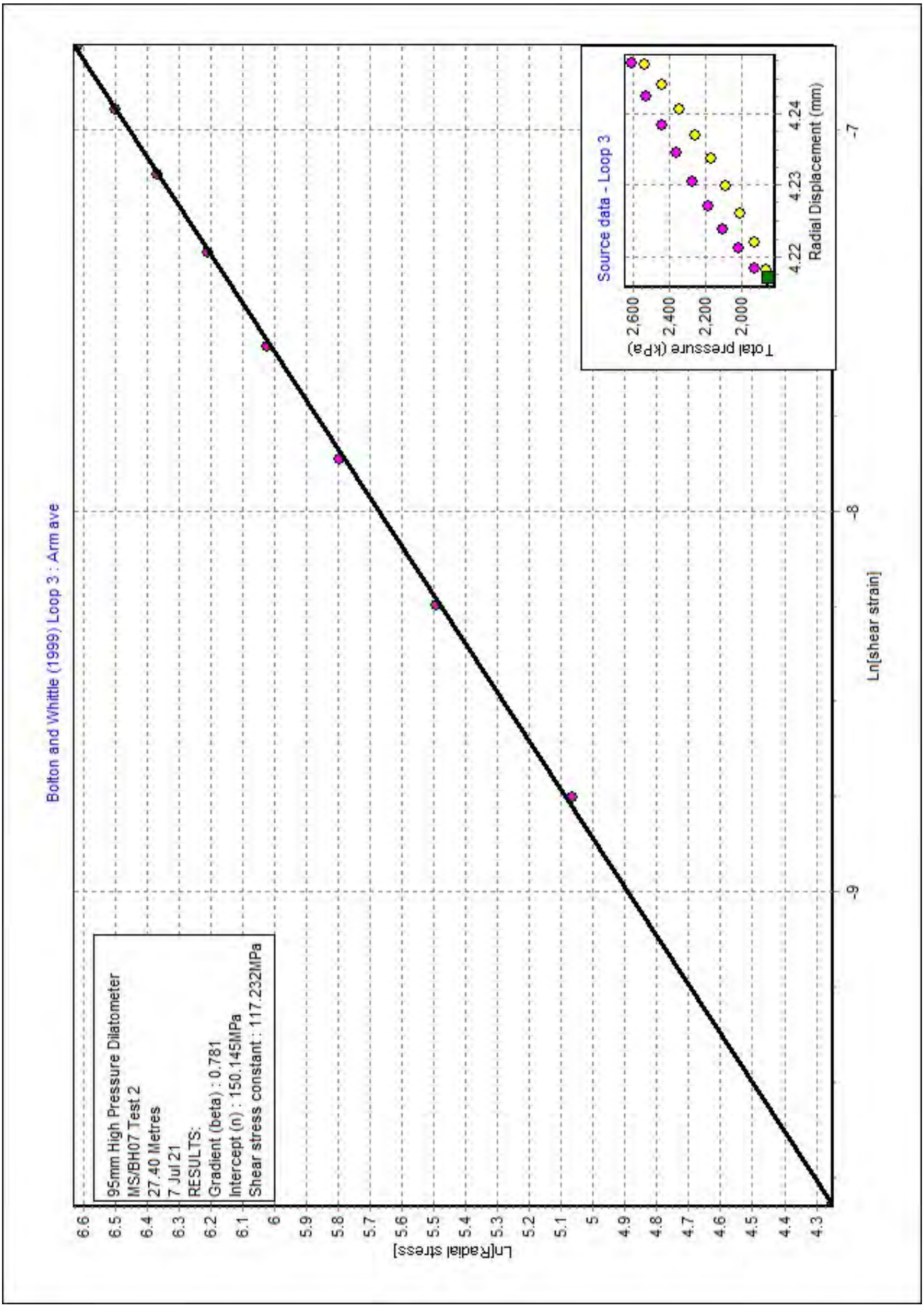

Shear modulus from unload/reload cycles Loop 4 : Arm ave
RESULTS:
Gur : 550.0MPa
Cycle mid-point:
Cavity strain : 1.836%
Total stress : 3885kPa
Size of cycle :
Shear strain : 0.266%
Total stress : 1468kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
4,800
4,700
4,600
4,500
4,400
4,300
4,200
4,100
4,000
3,900
3,800
3,700
3,600
3,500
3,400
3,300
3,200
3,100
3,000
4.87
4.88
4.89
4.9
4.91
4.92
4.93
4.94
4.95
4.96
4.97
4.98
4.99
5
5.01

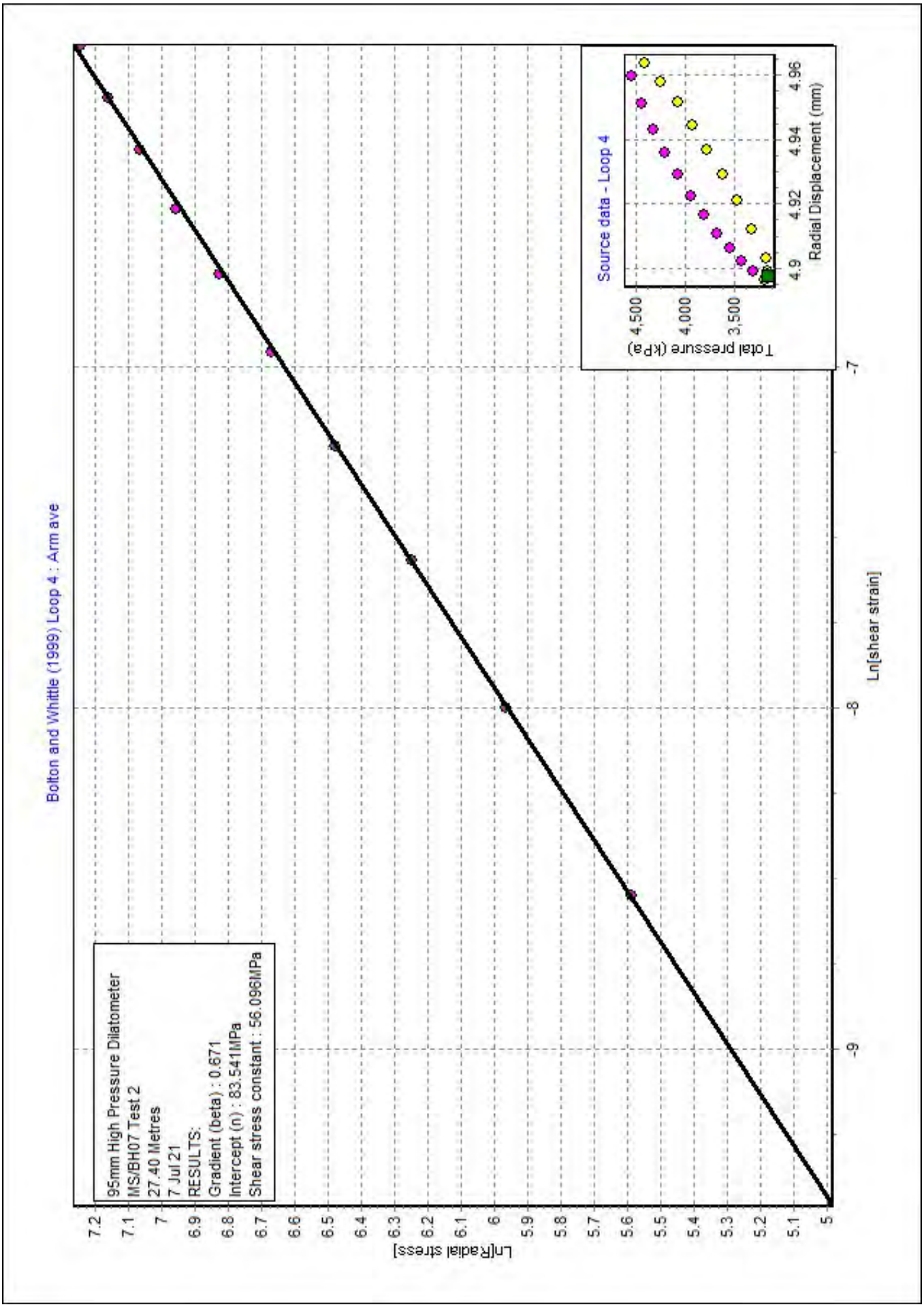

Shear modulus from unload/reload cycles Loop 5 : Arm ave
RESULTS:
Gur : 509.1MPa
Cycle mid-point:
Cavity strain : 3.679%
Total stress : 5122kPa
Size of cycle :
Shear strain : 0.377%
Total stress : 1921kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

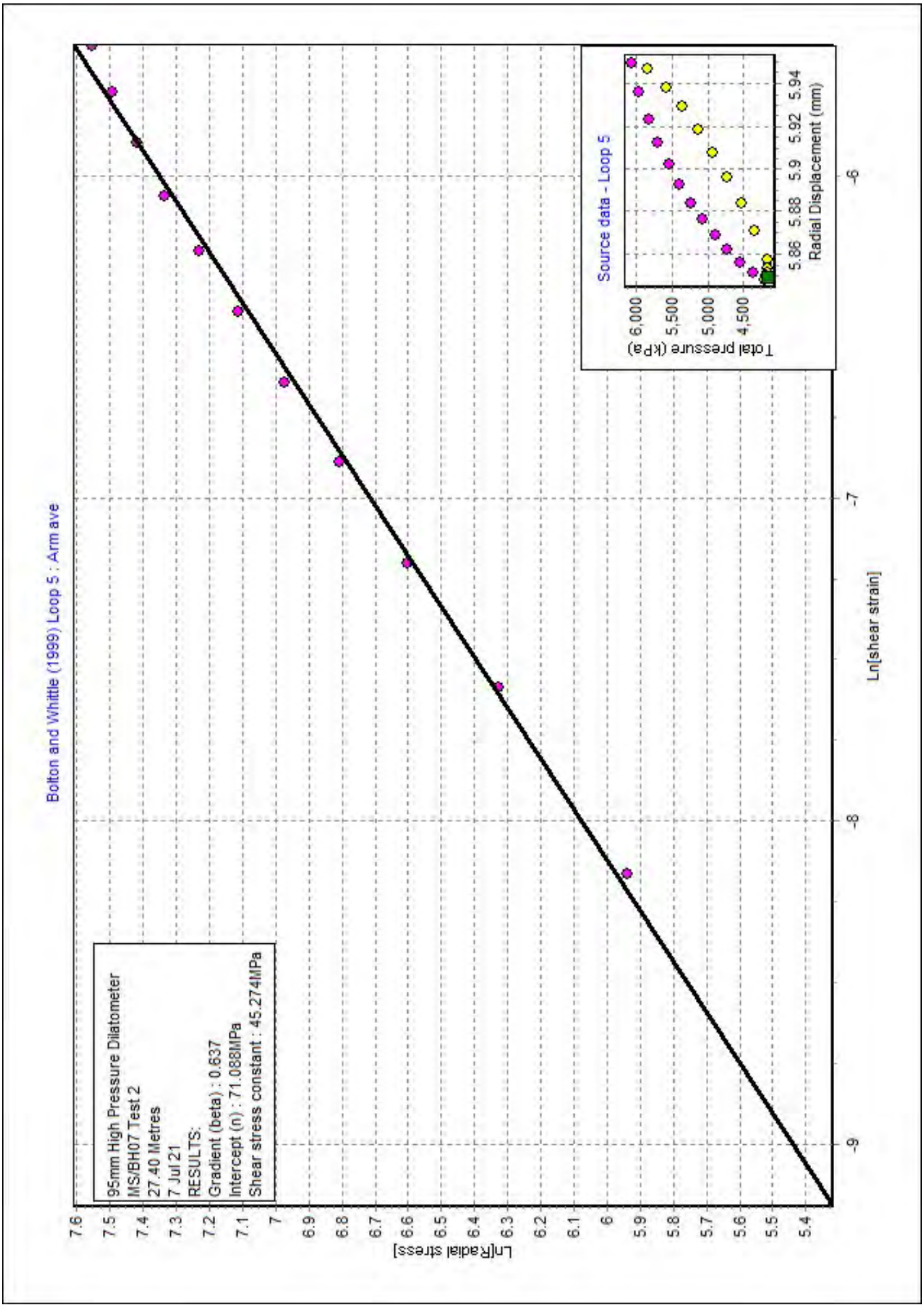

Shear modulus from unload/reload cycles Loop 6 : Arm ave
RESULTS:
Gur : 488.6MPa
Cycle mid-point:
Cavity strain : 9.259%
Total stress : 3634kPa
Size of cycle :
Shear strain : 0.404%
Total stress : 1979kPa
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

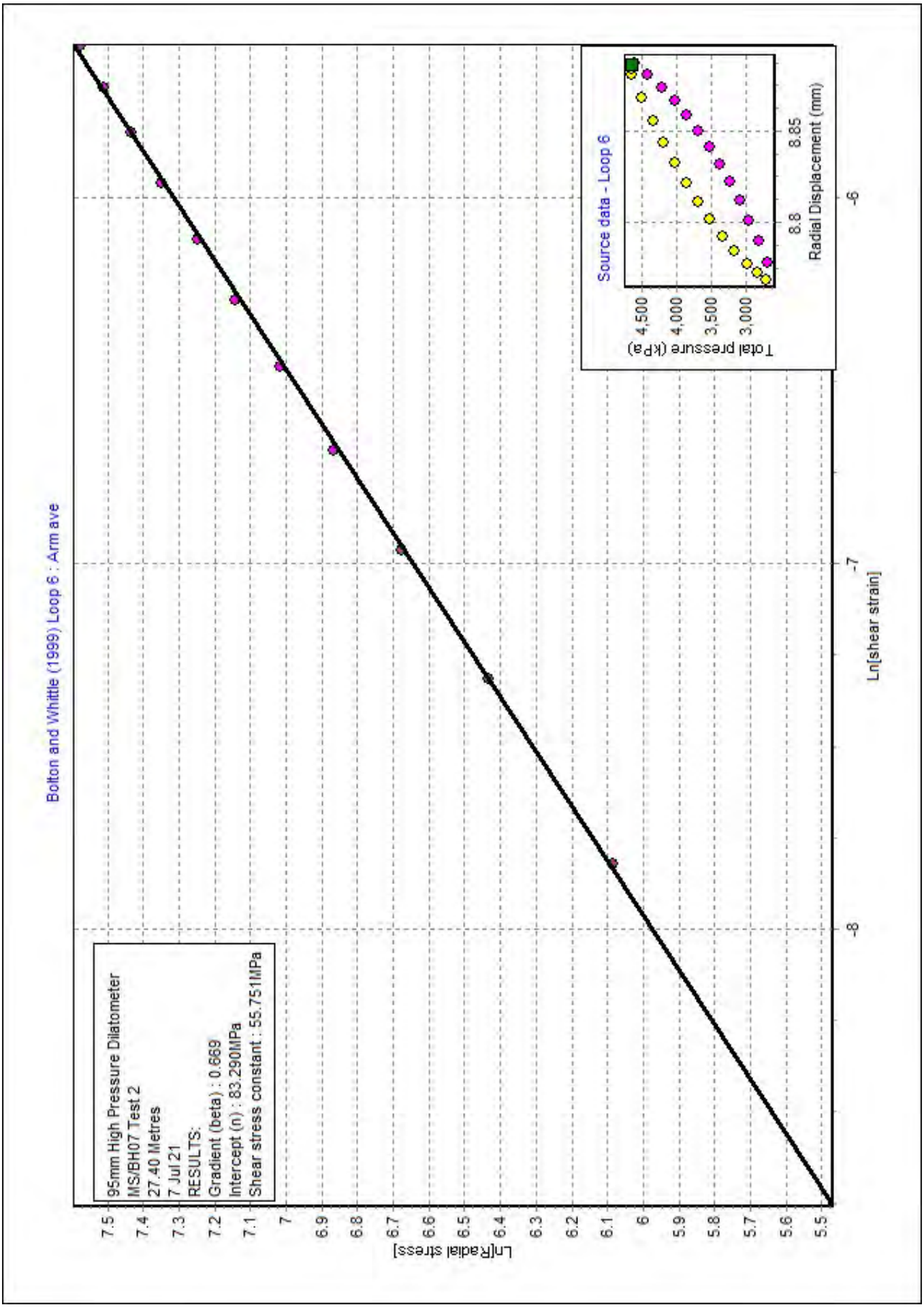

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.879
Intercept (n) : 136.280MPa
Shear stress constant : 119.772MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

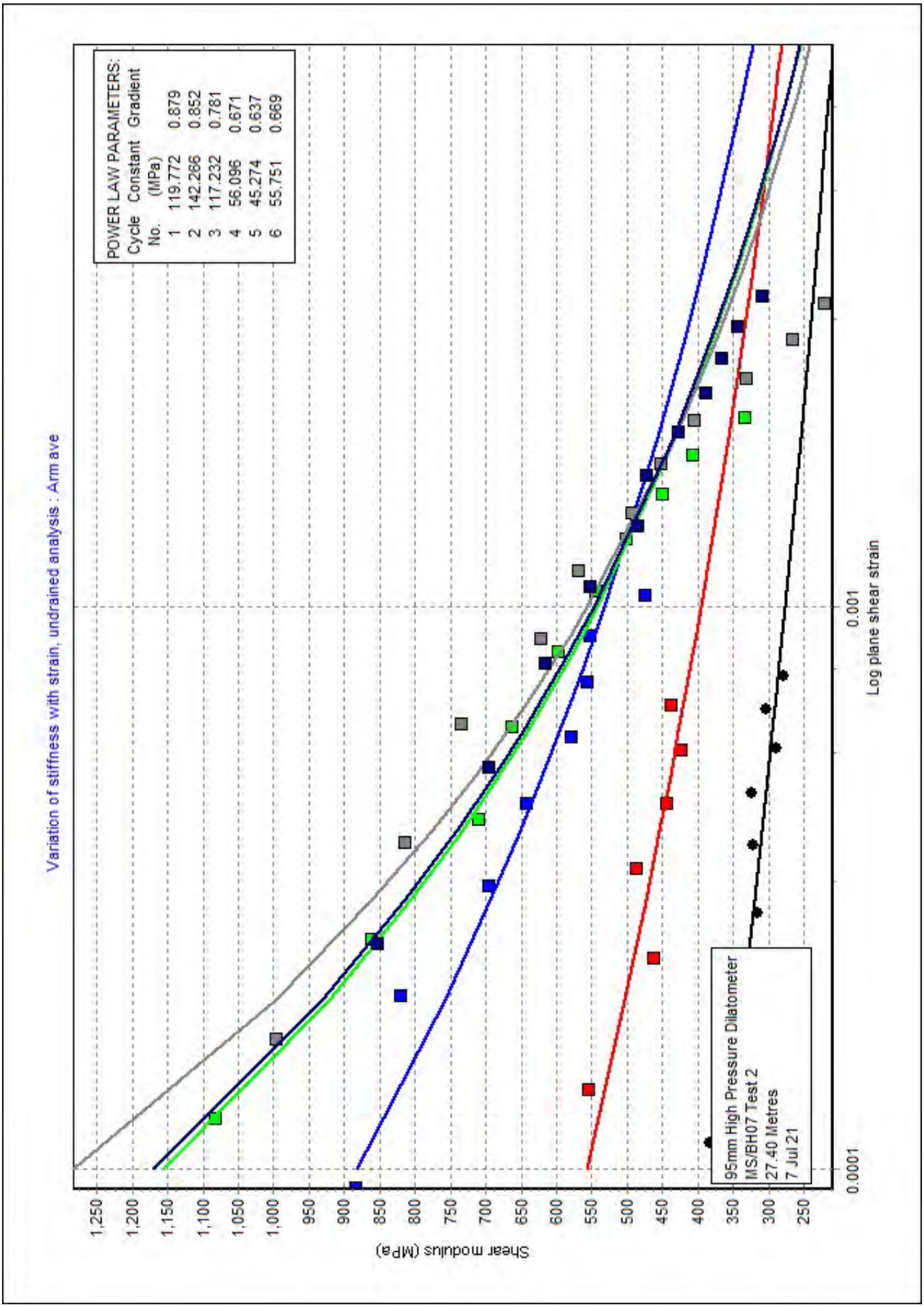

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.852
Intercept (n) : 167.031MPa
Shear stress constant : 142.266MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

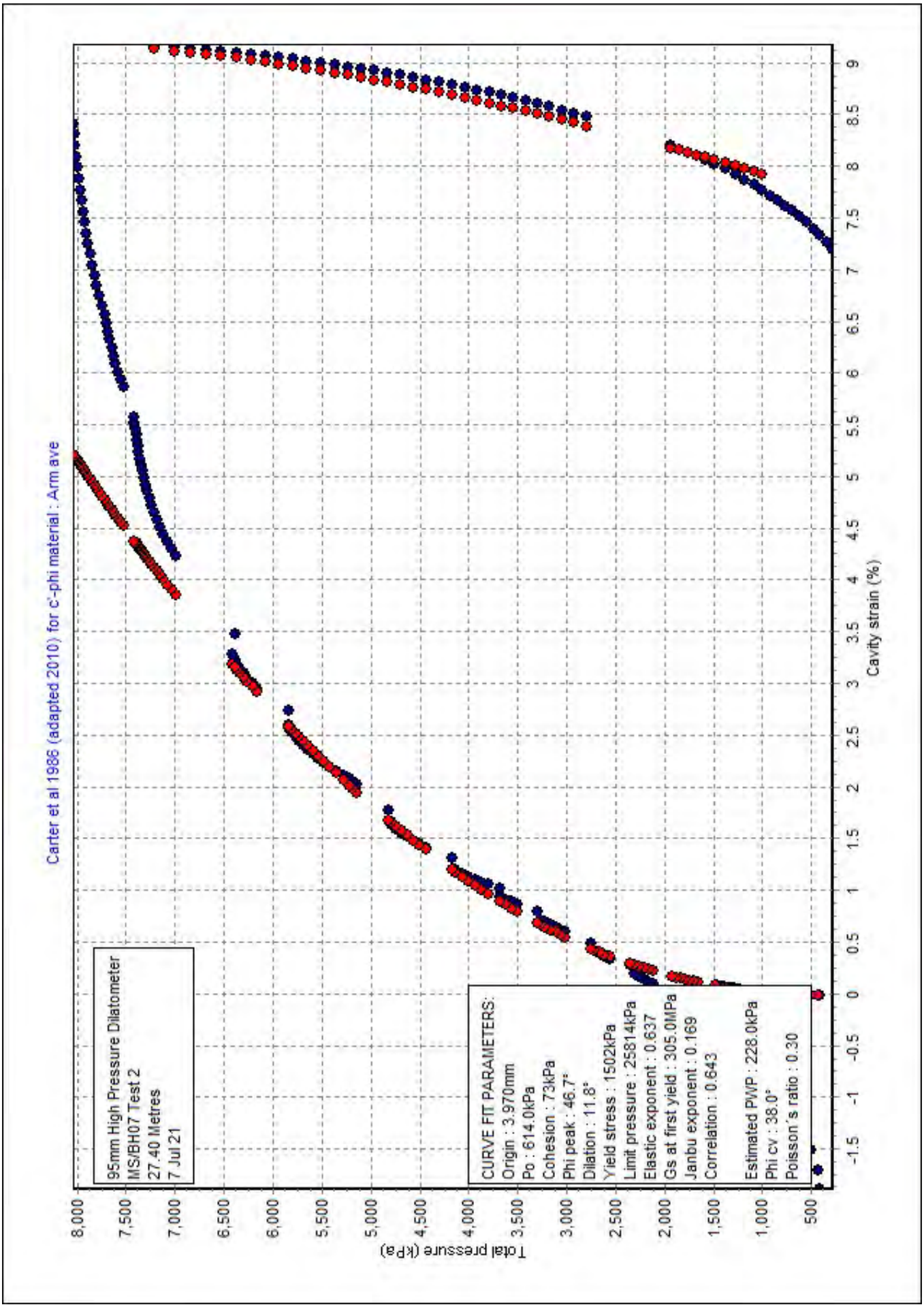

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.781
Intercept (n) : 150.145MPa
Shear stress constant : 117.232MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

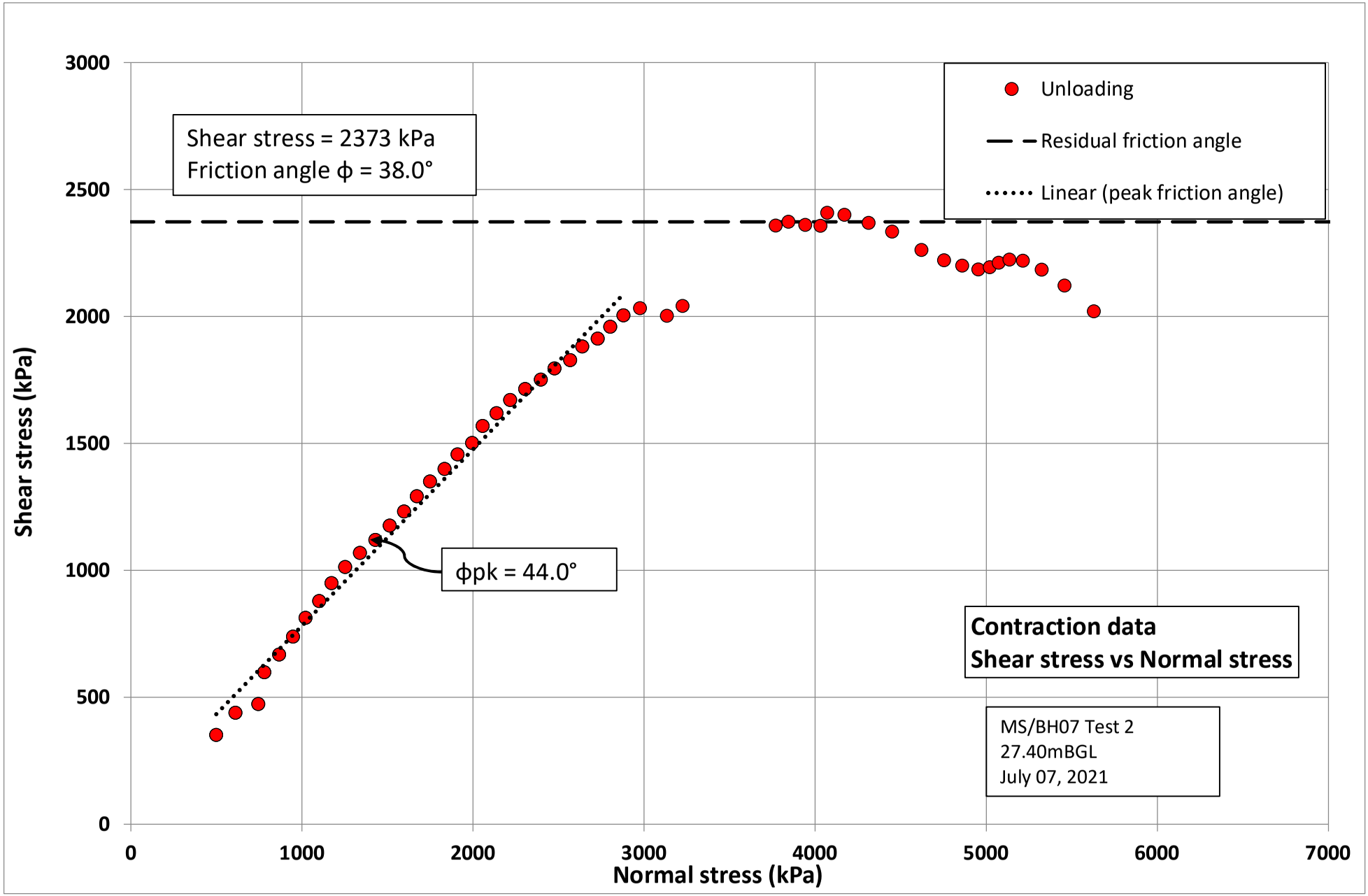

Bolton and Whittle (1999) Loop 4 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.671
Intercept (n) : 83.541MPa
Shear stress constant : 56.096MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 4
Total pressure (kPa)
Radial Displacement (mm)

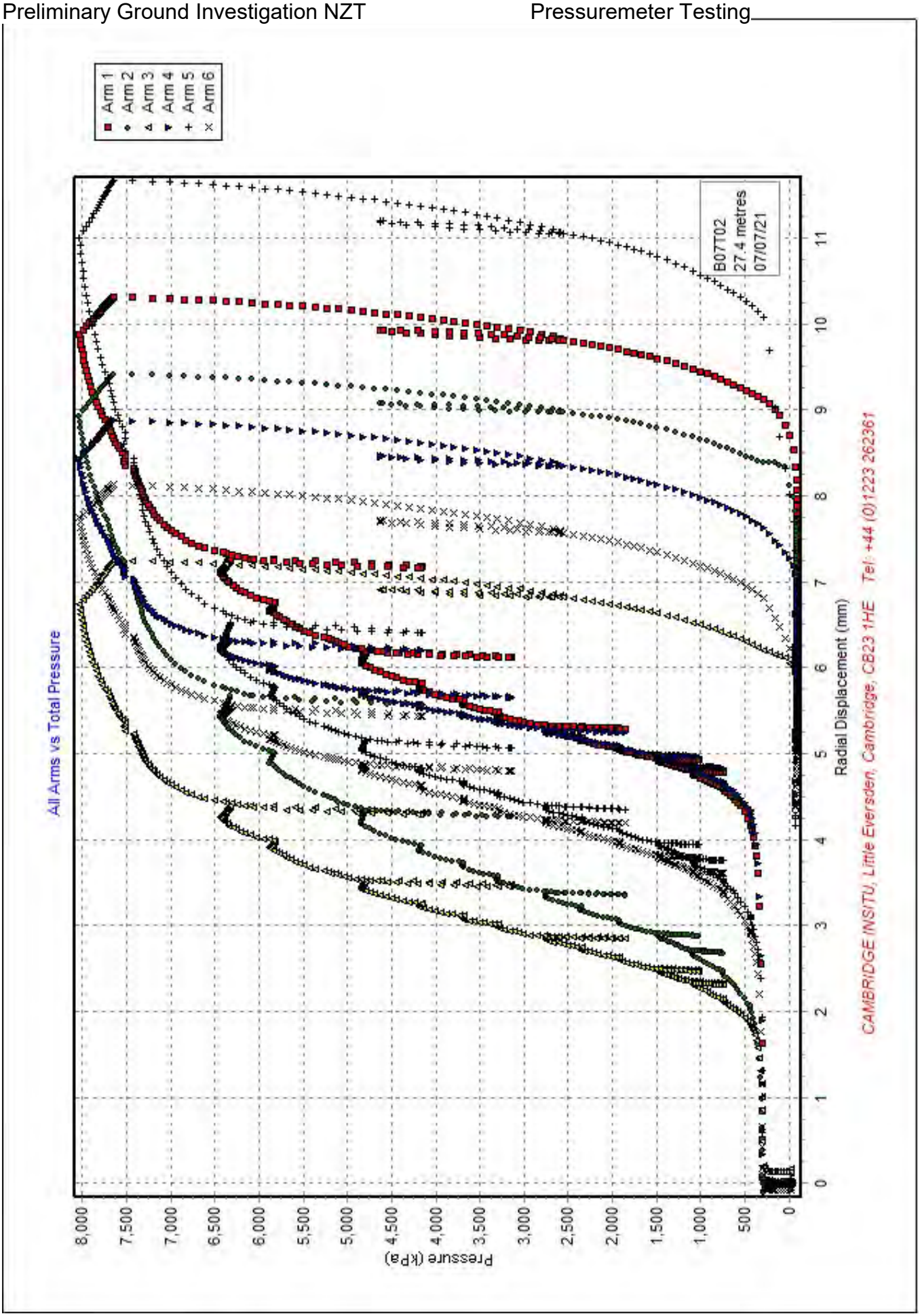

Bolton and Whittle (1999) Loop 5 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.637
Intercept (n) : 71.088MPa
Shear stress constant : 45.274MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 5
Total pressure (kPa)
Radial Displacement (mm)

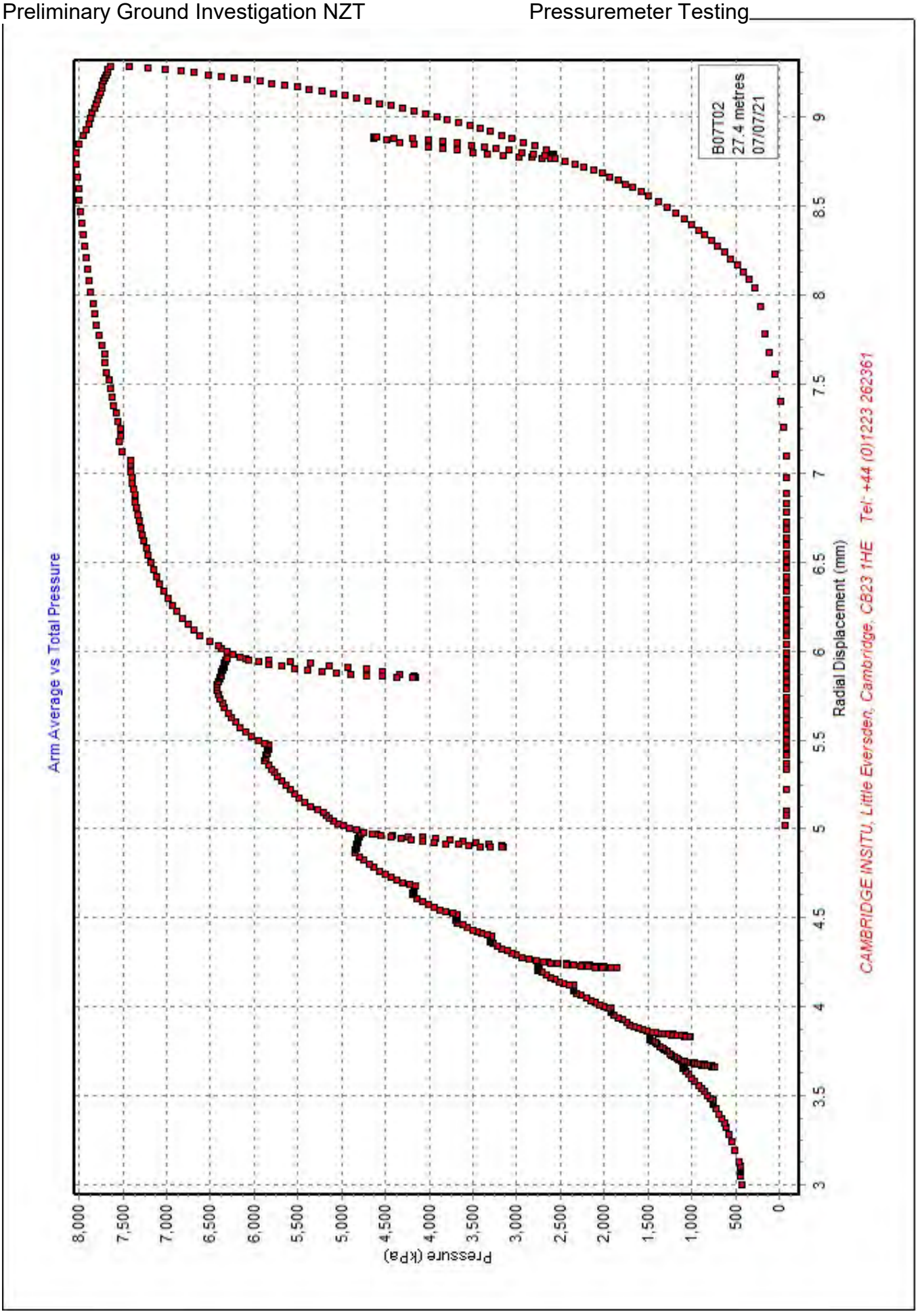

Bolton and Whittle (1999) Loop 6 : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
RESULTS:
Gradient (beta) : 0.669
Intercept (n) : 83.290MPa
Shear stress constant : 55.751MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 6
Total pressure (kPa)
Radial Displacement (mm)

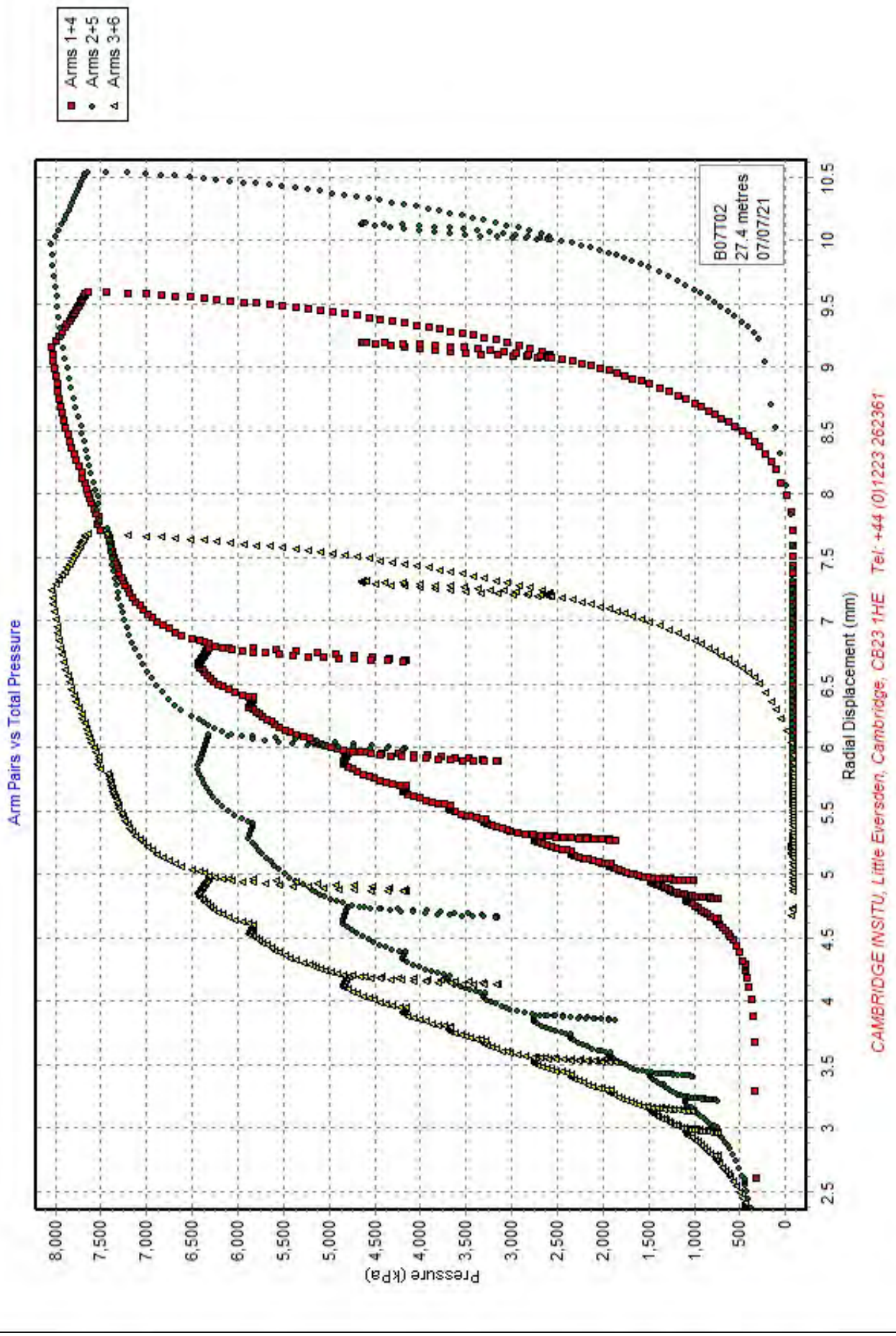

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 119.772 0.879
2 142.266 0.852
3 117.232 0.781
4 56.096 0.671
5 45.274 0.637
6 55.751 0.669
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
Shear modulus (MPa)
Log plane shear strain
0.0001
0.001
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

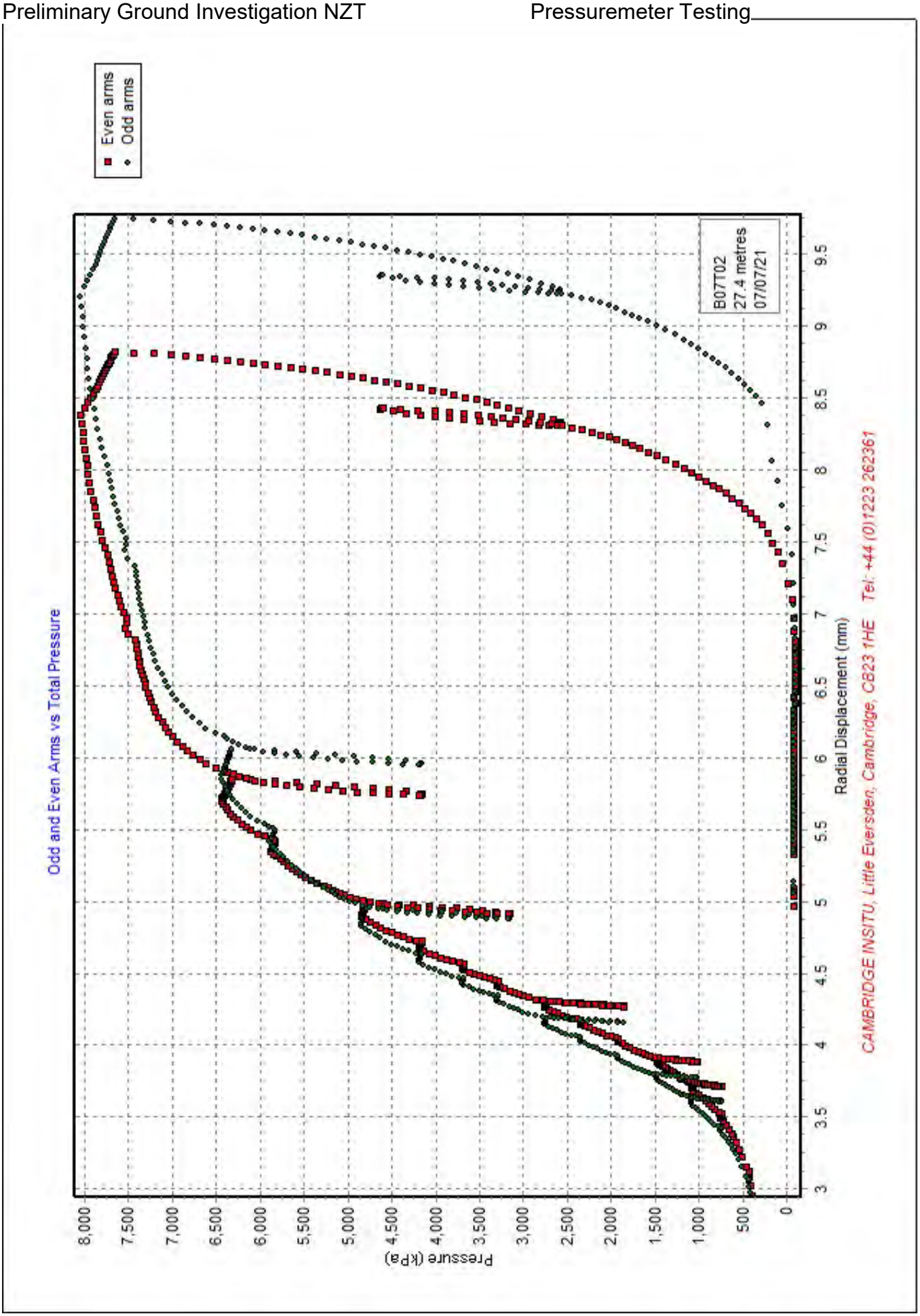

Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH07 Test 2
27.40 Metres
7 Jul 21
CURVE FIT PARAMETERS:
Origin : 3.970mm
Po : 614.0kPa
Cohesion : 73kPa
Phi peak : 46.7°
Dilation : 11.8°
Yield stress : 1502kPa
Limit pressure : 25814kPa
Elastic exponent : 0.637
Gs at first yield : 305.0MPa
Janbu exponent : 0.169
Correlation : 0.643
Estimated PWP : 228.0kPa
Phi cv : 38.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


Shear stress = 2373 kPa
Friction angle ϕ = 38.0°
ϕpk = 44.0°
Unloading
Residual friction angle
Linear (peak friction angle)
Contraction data
Shear stress vs Normal stress
MS/BH07 Test 2
27.40mBGL
July 07, 2021
Shear stress (kPa)
Normal stress (kPa)
0
500
1000
1500
2000
2500
3000
0
1000
2000
3000
4000
5000
6000
7000


Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
All Arms vs Total Pressure
B07T02
27.4 metres
07/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B07T02
27.4 metres
07/07/21
Pressure (kPa)
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Radial Displacement (mm)
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arms 1+4
Arms 2+5
Arms 3+6
B07T02
27.4 metres
07/07/21
Arm Pairs vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
B07T02
27.4 metres
07/07/21
Odd and Even Arms vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH09 Test 1 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH09
Test name : MS/BH09 Test 1
Test date : 8 Jul 21
Test depth : 22.40 Metres
Water table : 4.27 Metres
Ambient PWP : 178.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 YB/RW on 28 Jul 21

Remarks: Membrane slip at 8MPa. Loop on unloading is questionable. Curve fit is speculative due to loss of much of the contraction.

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=4.58"
Po from Marsland & Randolph (kPa) : "Arm ave=819.8"
Best estimate of Po (kPa) : "Arm ave=619.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=4417.6"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 39.0
Angle of internal friction (°) : "Arm ave=43.3"
Dilation angle (°) : "Arm ave=5.7"
Gradient of log-log plot : "Arm ave=0.448"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=39.0"
Dilation angle (°) : "Arm ave=0.0"
Gradient of log-log plot : "Arm ave=-3.394"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=318.4"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	1182.5	0.072	2397	0.068	804
Arm ave	2	1248.5	0.424	3886	0.114	1419
Arm ave	3	706.6	0.899	2132	0.134	948

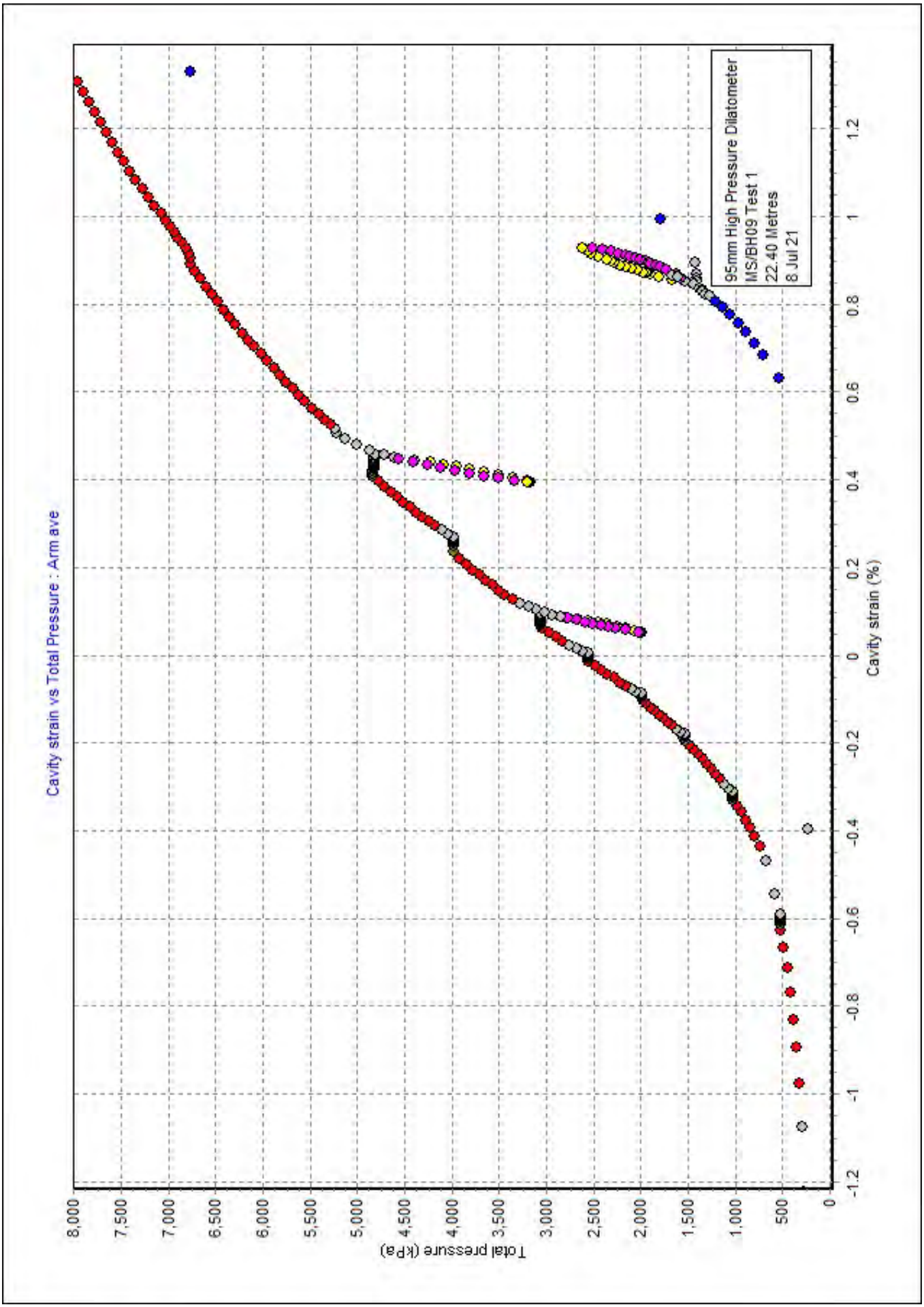
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

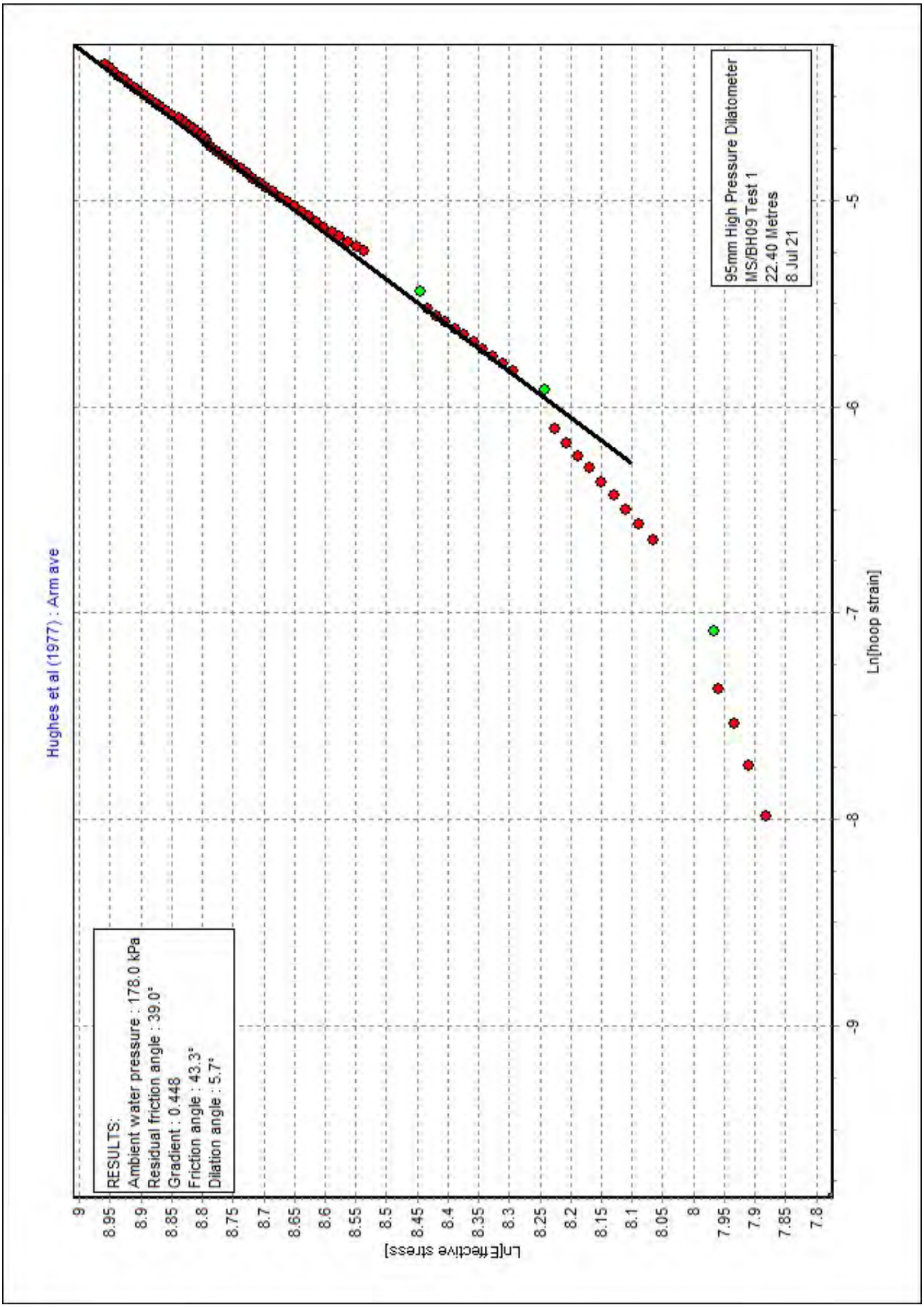
Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	814.878	768.522	0.943
Arm ave	2	426.415	355.774	0.834
Arm ave	3	67.494	42.369	0.628

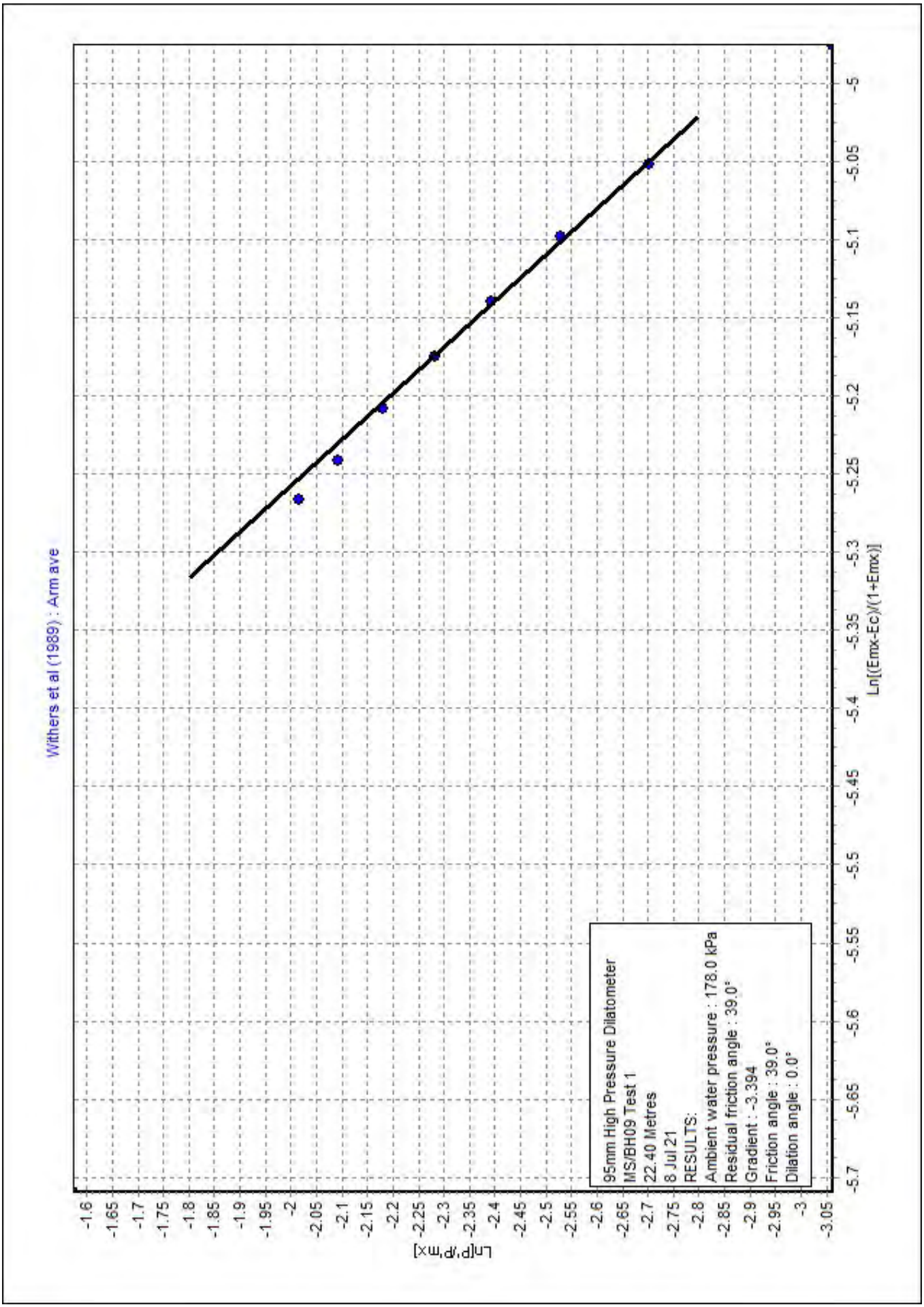
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 4.58
Po (kPa) : 619
Cohesion (kPa) : 112
Angle of peak friction (deg) : 43.3
Angle of peak dilation (deg) : 5.7
Total yield stress (kPa) : 1152
Total limit stress (kPa) : 41112

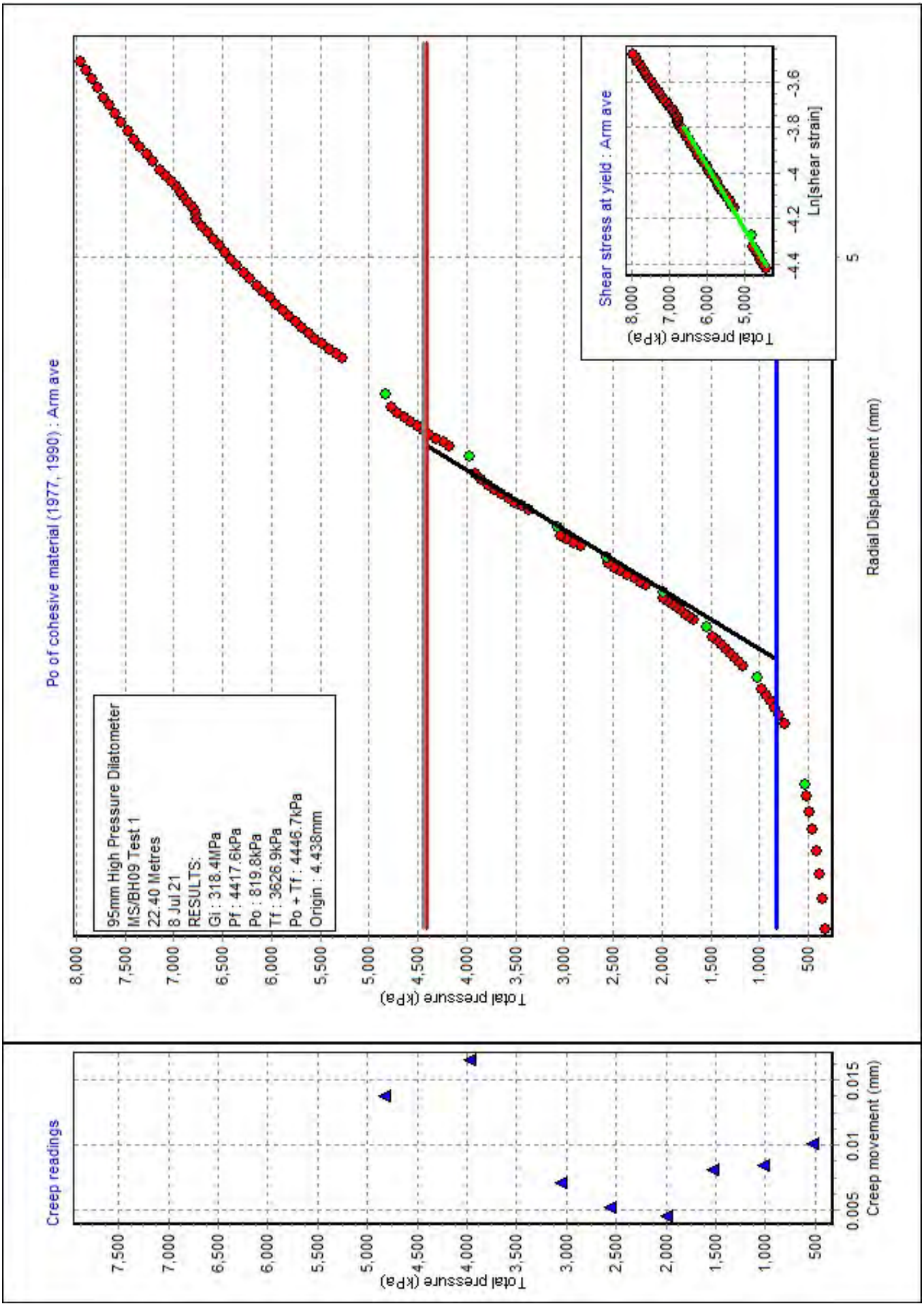
MS/BH09 Test 1 - SUMMARY OF RESULTS

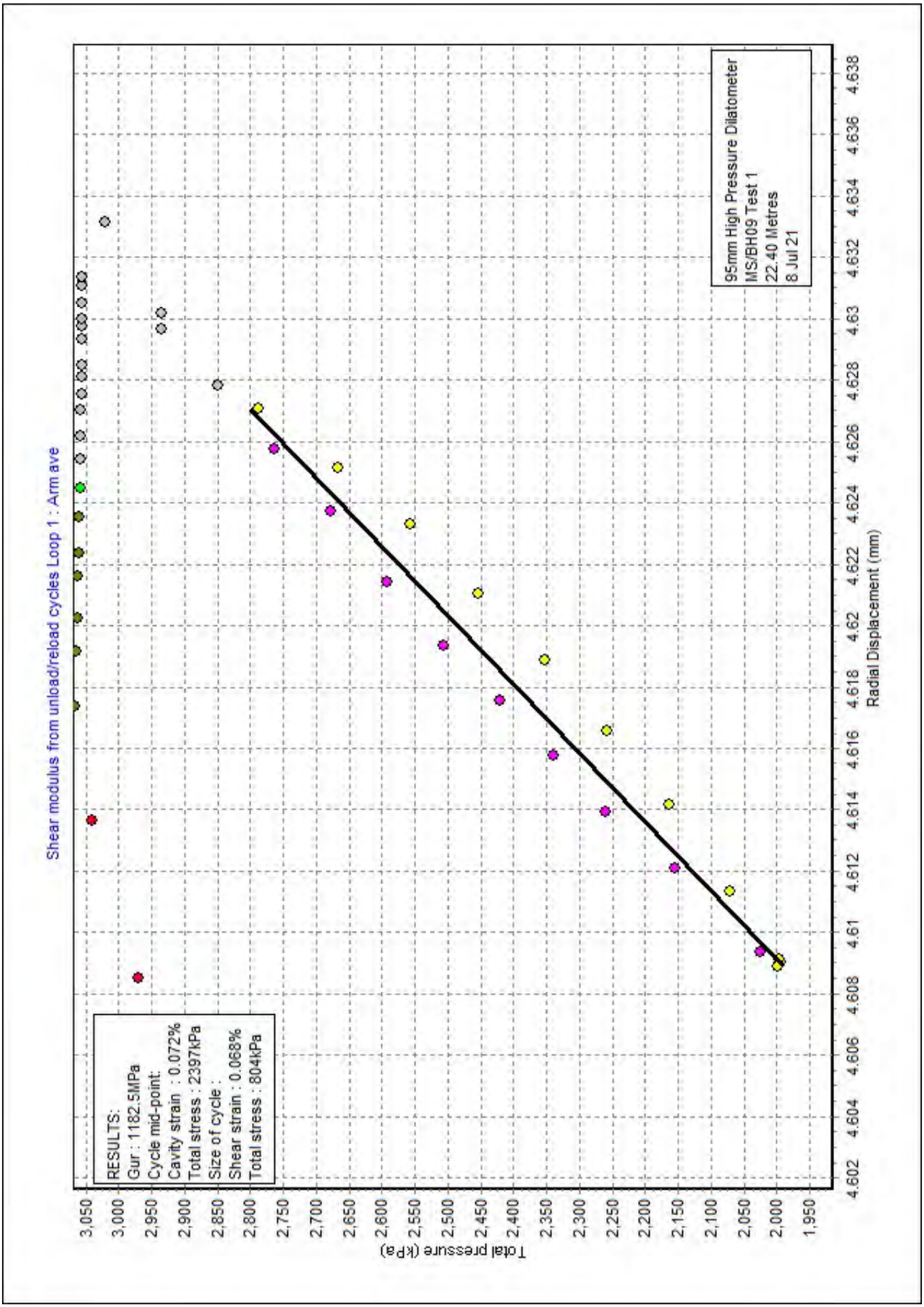
G at first yield (MPa)	:	2193.4
Non-linear exponent	:	0.834
Janbu exponent	:	-0.224
Correlation	:	0.357
Ambient pore water pressure (kPa)	:	178
Residual friction angle (deg)	:	39.0
Poisson's ratio	:	0.30

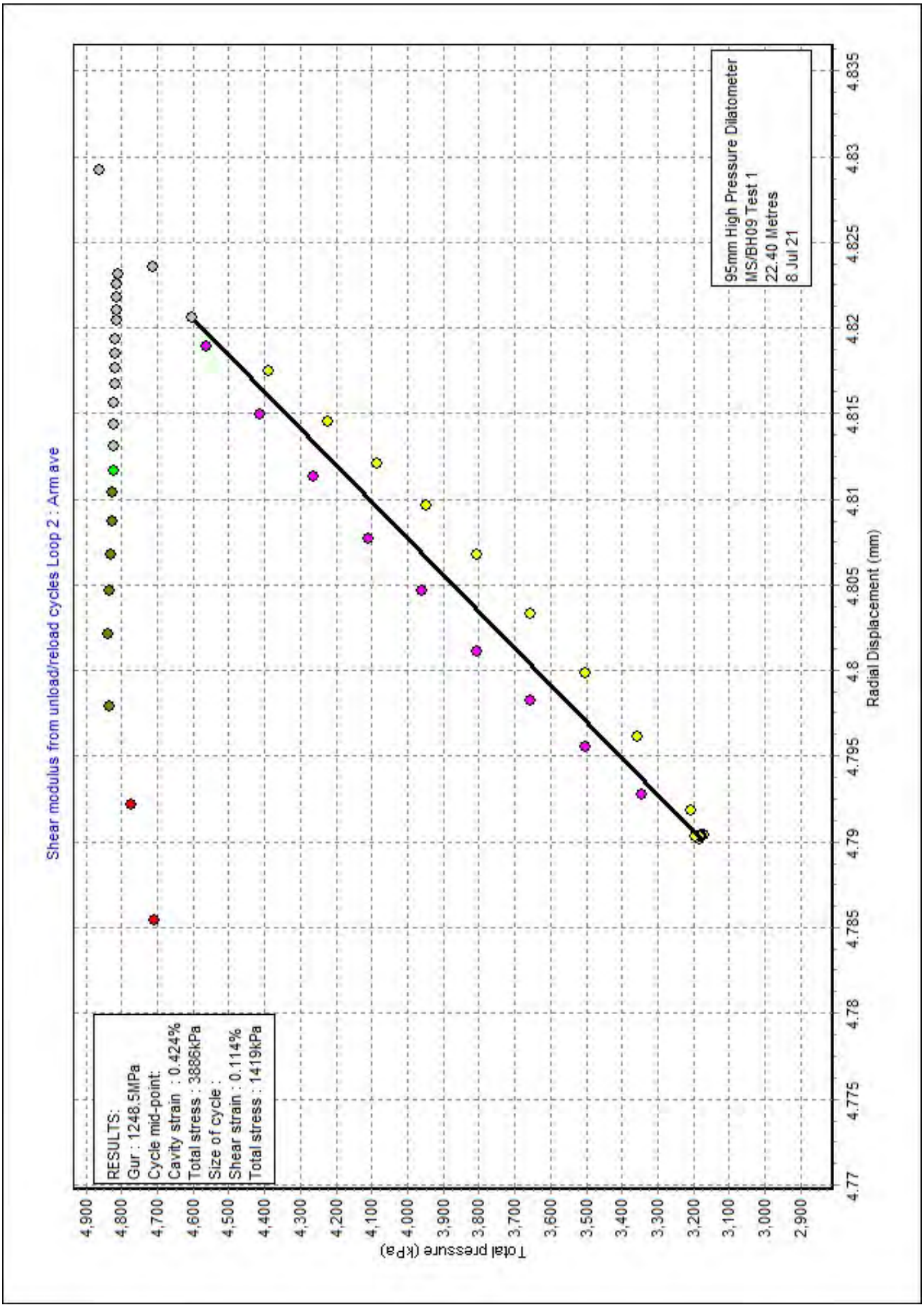

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
Total pressure (kPa)
Cavity strain (%)
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2

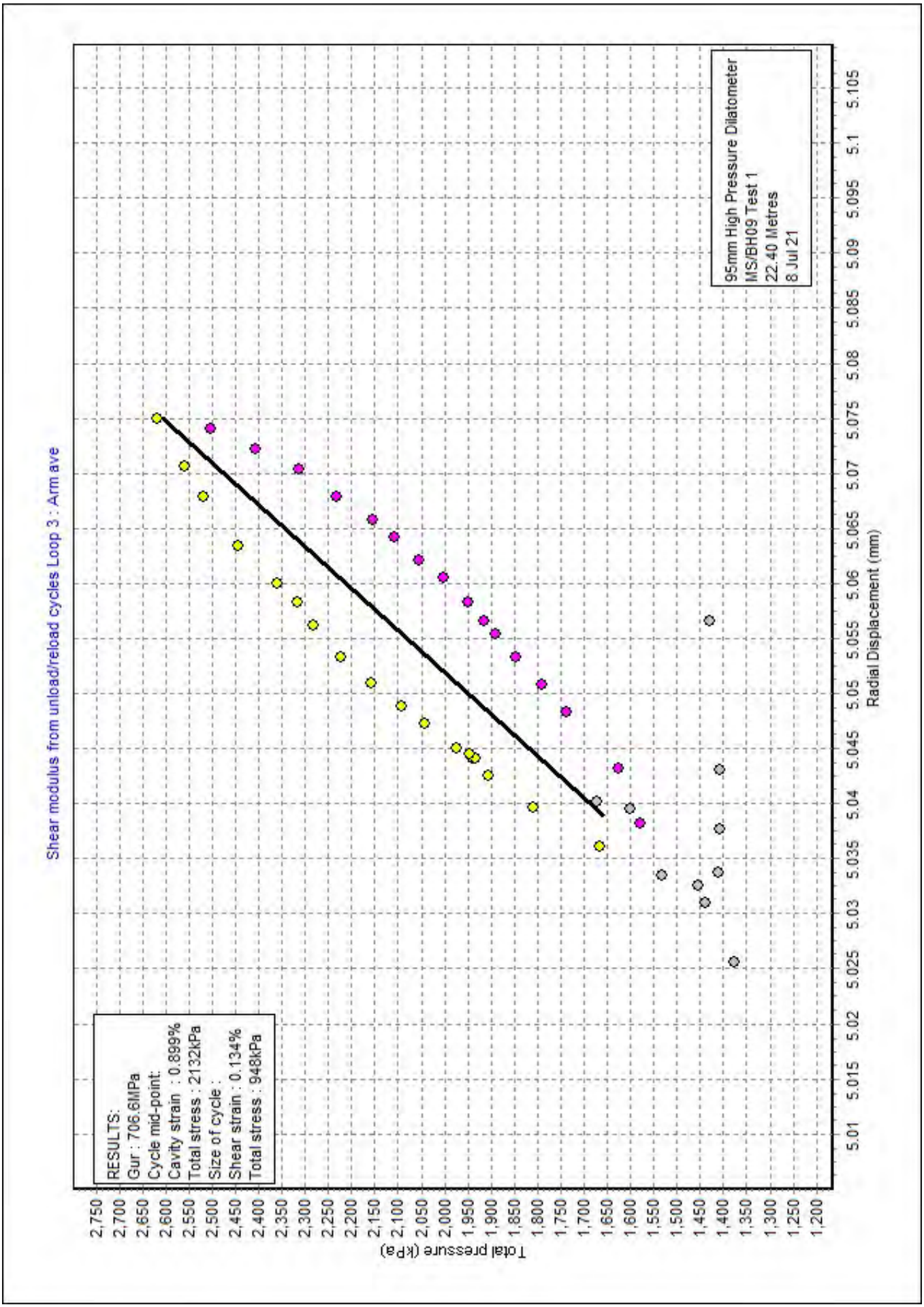

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 178.0 kPa
Residual friction angle : 39.0°
Gradient : 0.448
Friction angle : 43.3°
Dilation angle : 5.7°
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
Ln[Effective stress]
Ln[hoop strain]
9
8.95
8.9
8.85
8.8
8.75
8.7
8.65
8.6
8.55
8.5
8.45
8.4
8.35
8.3
8.25
8.2
8.15
8.1
8.05
8
7.95
7.9
7.85
7.8
-5
-6
-7
-8
-9

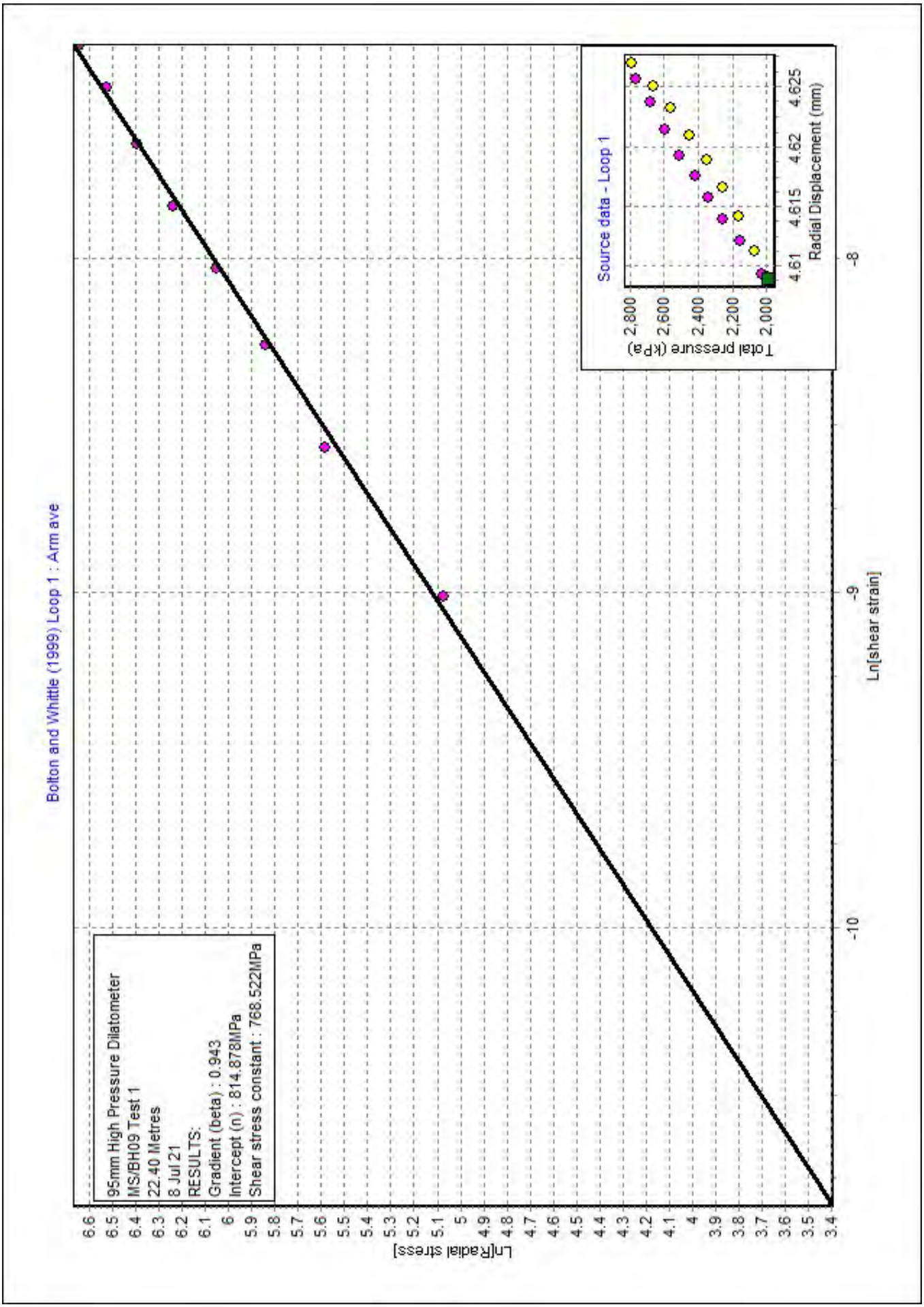

Withers et al (1989) : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
RESULTS:
Ambient water pressure : 178.0 kPa
Residual friction angle : 39.0°
Gradient : -3.394
Friction angle : 39.0°
Dilation angle : 0.0°
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]

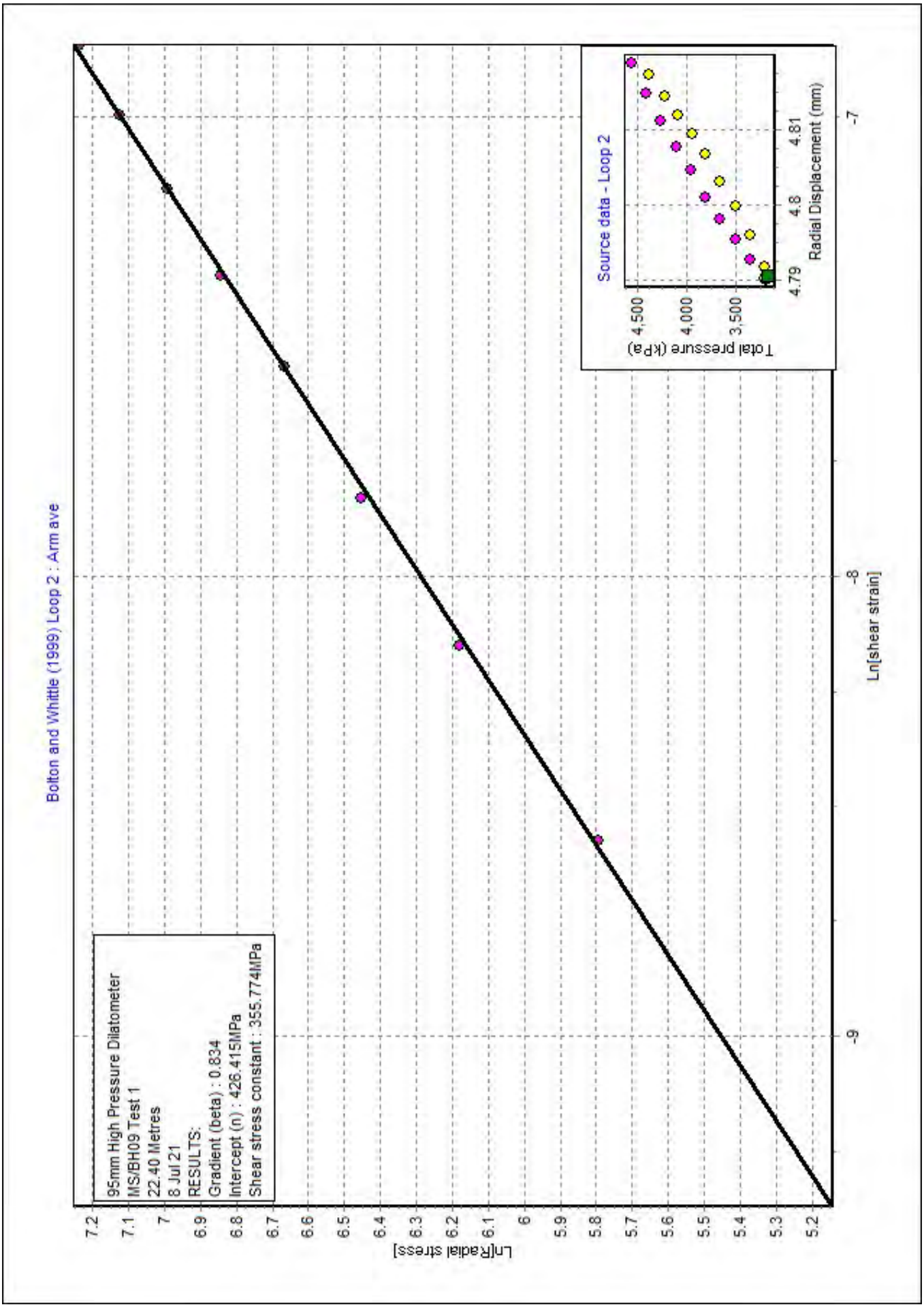

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22:40 Metres
8 Jul 21
RESULTS:
Gi : 318.4MPa
Pf : 4417.6kPa
Po : 819.8kPa
Tf : 3626.9kPa
Po + Tf : 4446.7kPa
Origin : 4.438mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]
Creep readings
Total pressure (kPa)
Creep movement (mm)

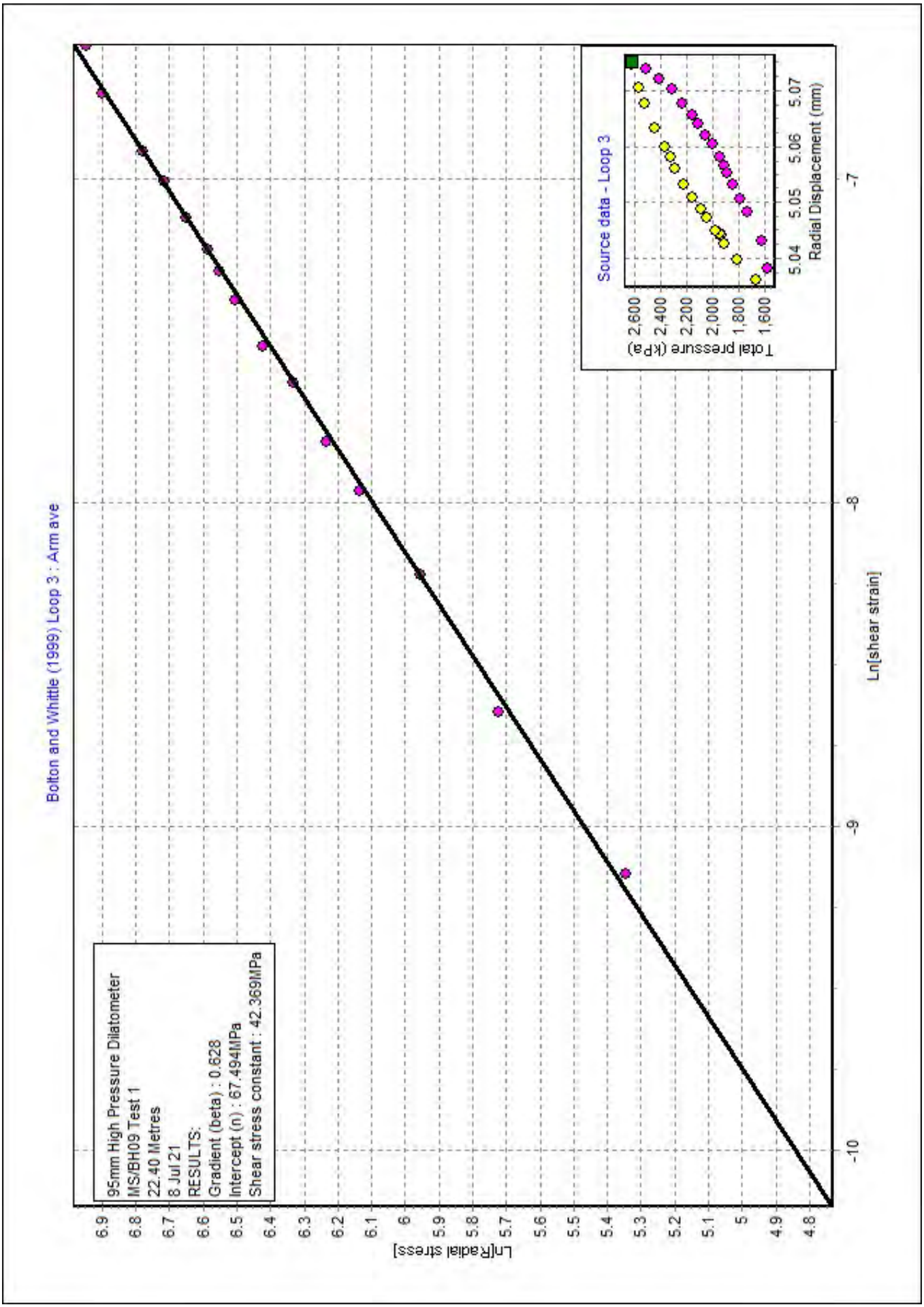

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 1182.5MPa
Cycle mid-point:
Cavity strain : 0.072%
Total stress : 2397kPa
Size of cycle :
Shear strain : 0.068%
Total stress : 804kPa
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

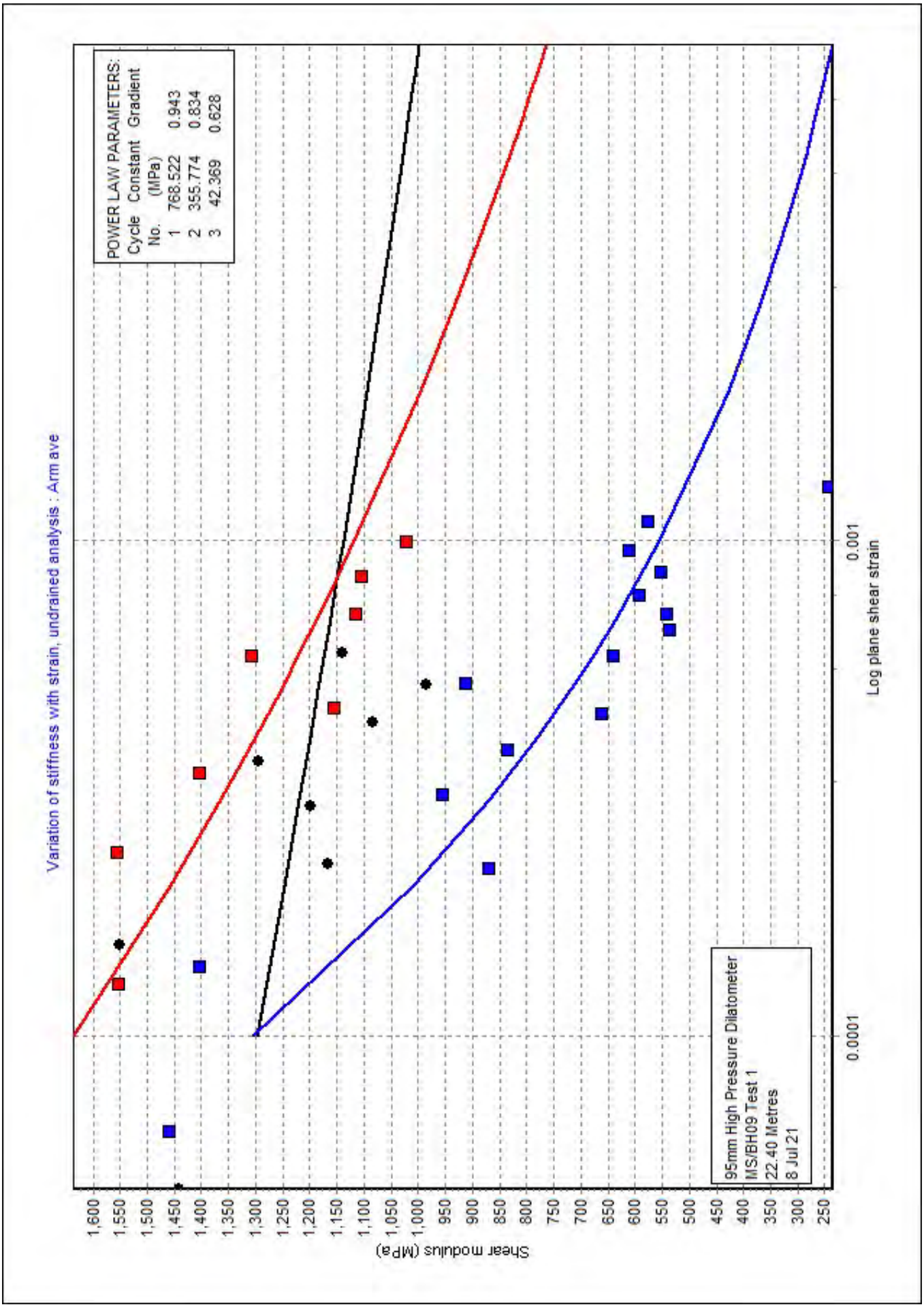

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 1248.5MPa
Cycle mid-point:
Cavity strain : 0.424%
Total stress : 3886kPa
Size of cycle :
Shear strain : 0.114%
Total stress : 1419kPa
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
4,900
4,800
4,700
4,600
4,500
4,400
4,300
4,200
4,100
4,000
3,900
3,800
3,700
3,600
3,500
3,400
3,300
3,200
3,100
3,000
2,900
4.77
4.775
4.78
4.785
4.79
4.795
4.8
4.805
4.81
4.815
4.82
4.825
4.83
4.835

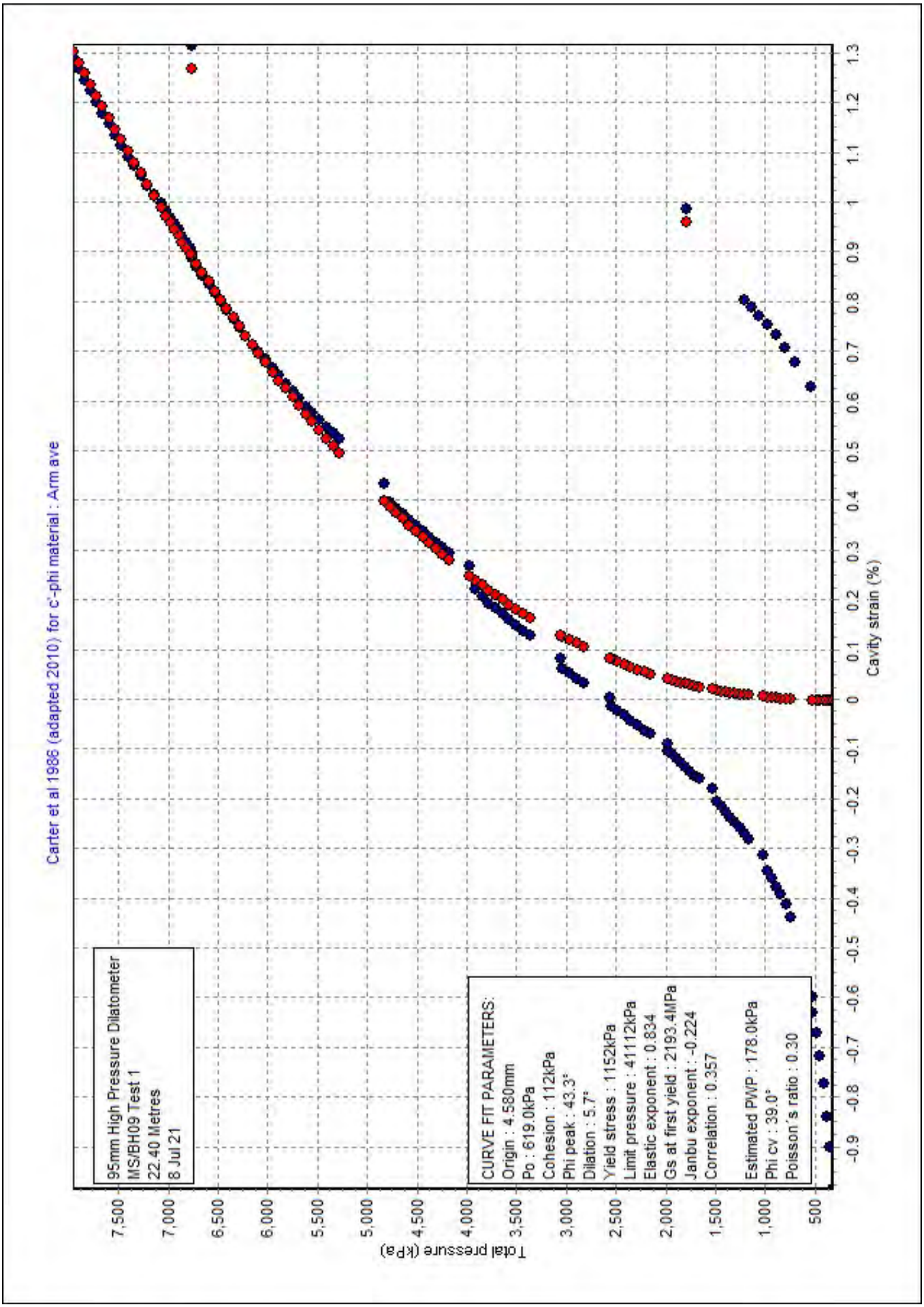

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 706.6MPa
Cycle mid-point:
Cavity strain : 0.899%
Total stress : 2132kPa
Size of cycle :
Shear strain : 0.134%
Total stress : 948kPa
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

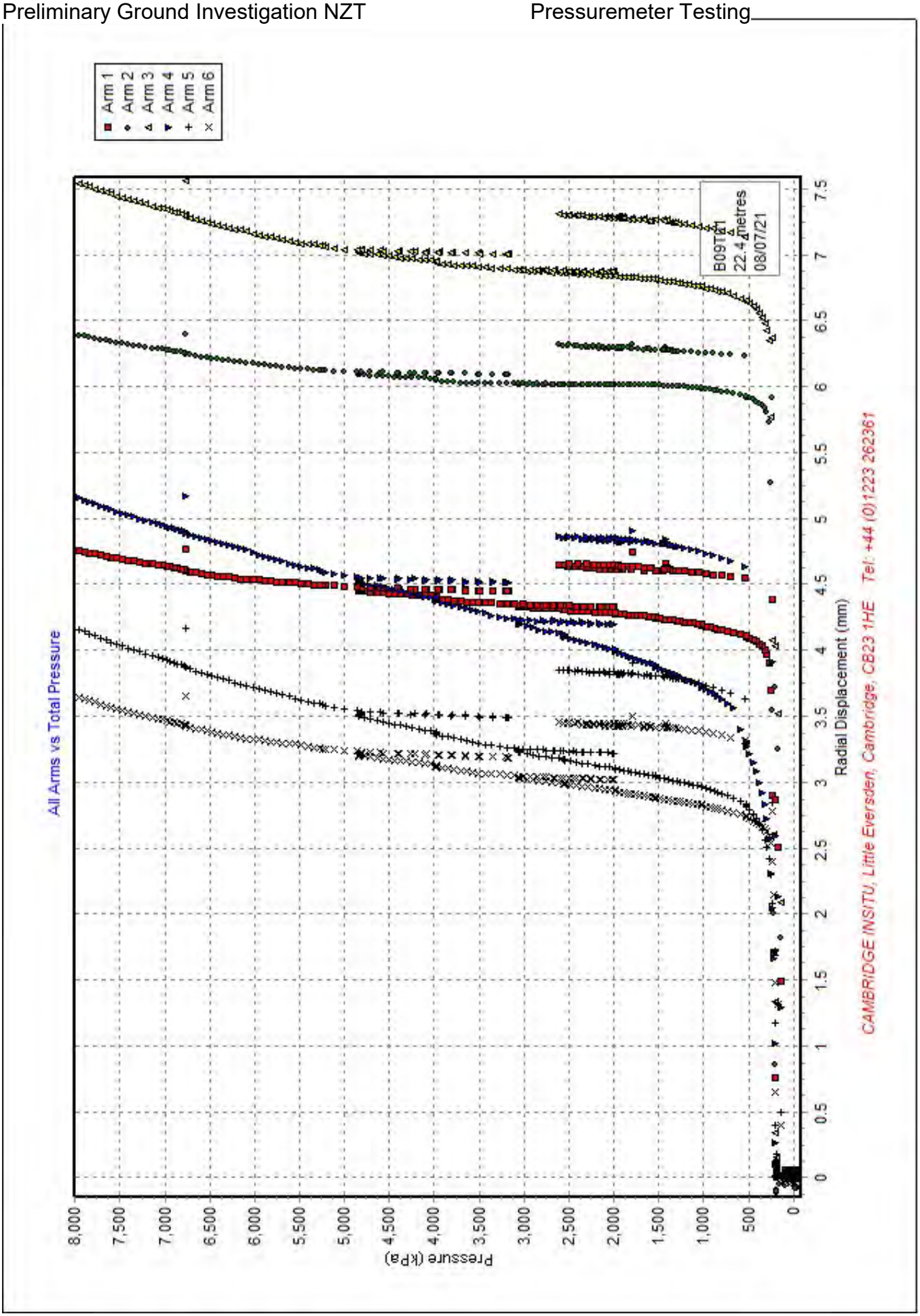

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
RESULTS:
Gradient (beta) : 0.943
Intercept (n) : 814.878MPa
Shear stress constant : 768.522MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

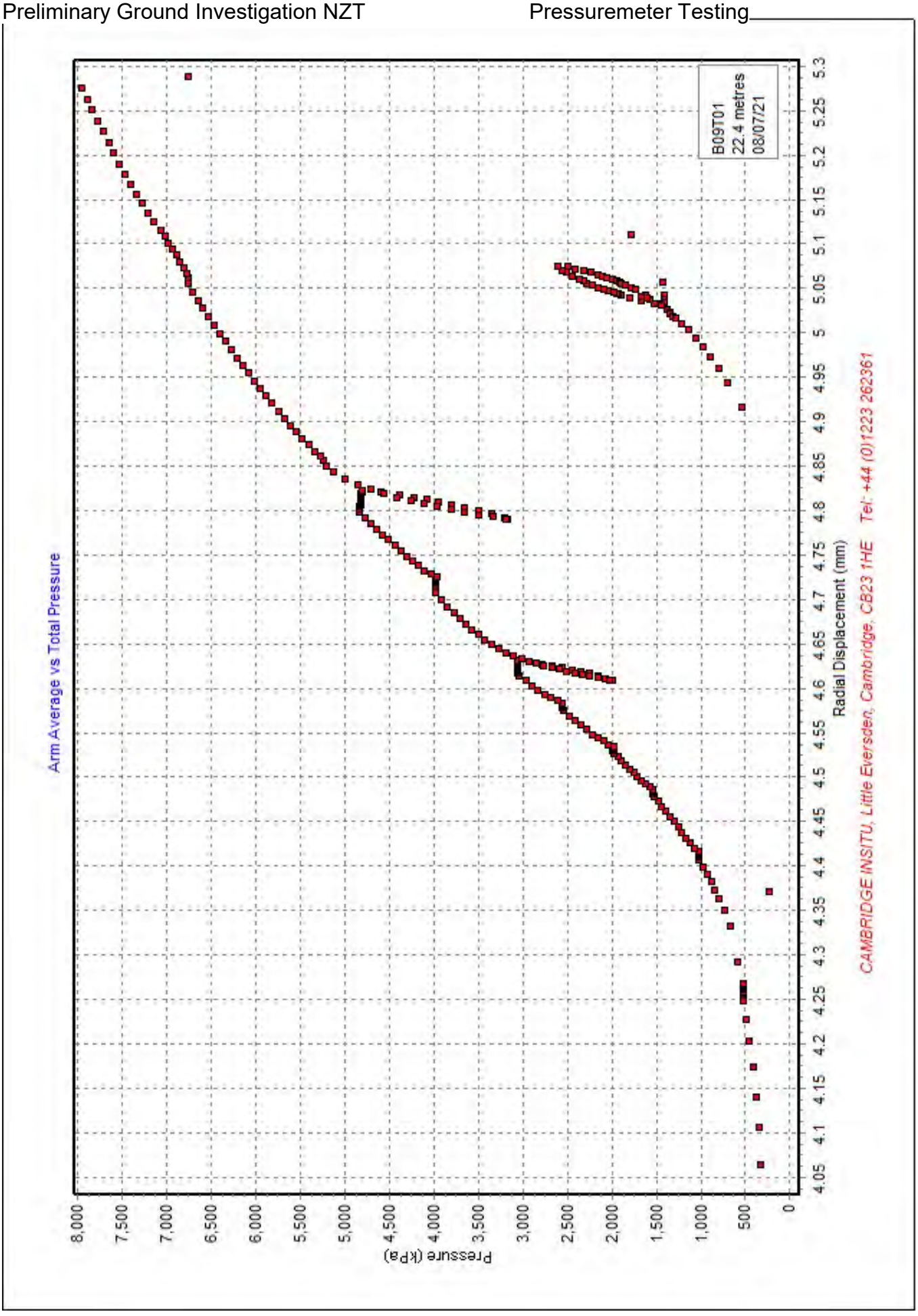

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
RESULTS:
Gradient (beta) : 0.834
Intercept (n) : 426.415MPa
Shear stress constant : 355.774MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

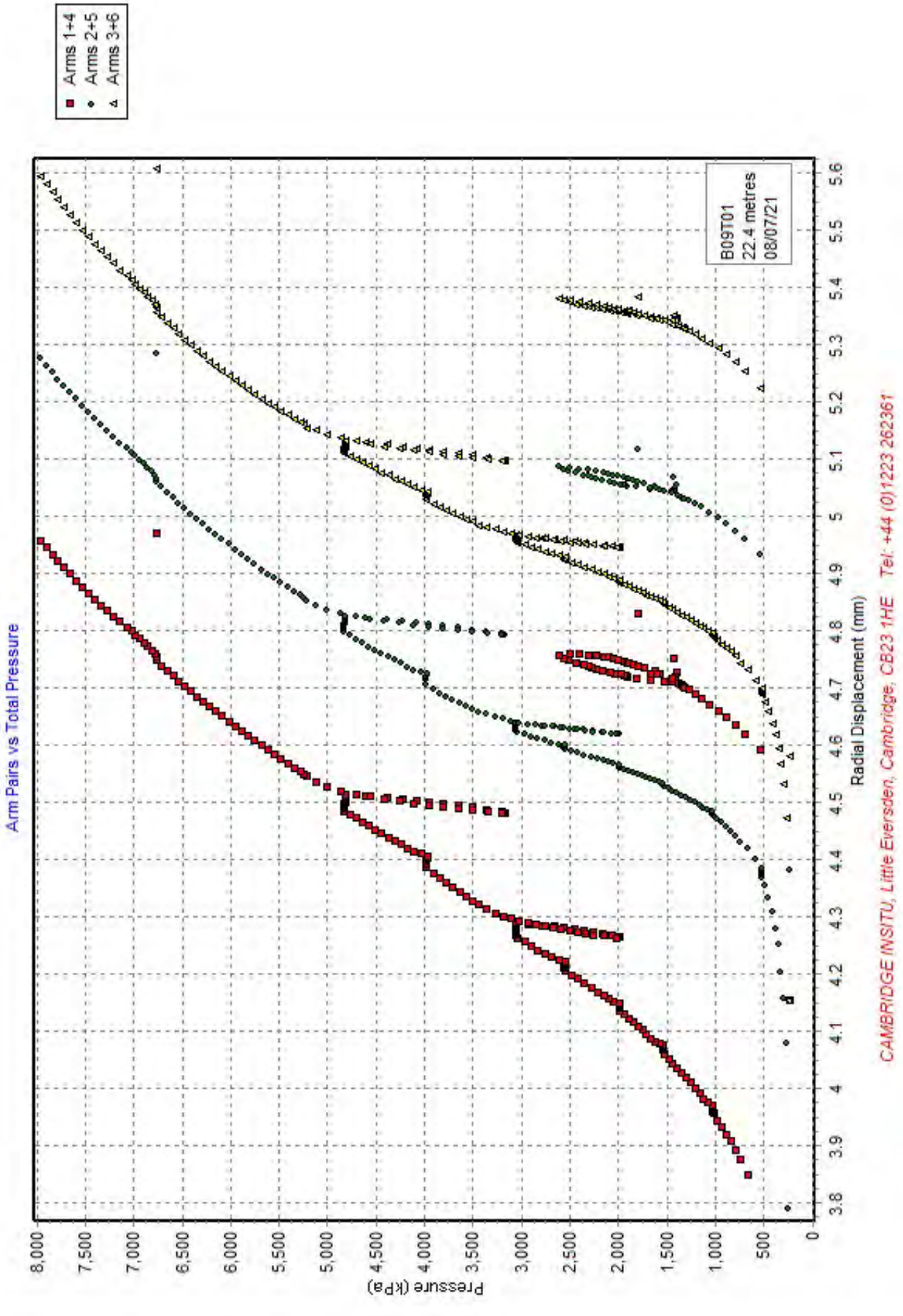

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
RESULTS:
Gradient (beta) : 0.628
Intercept (n) : 67.494MPa
Shear stress constant : 42.369MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

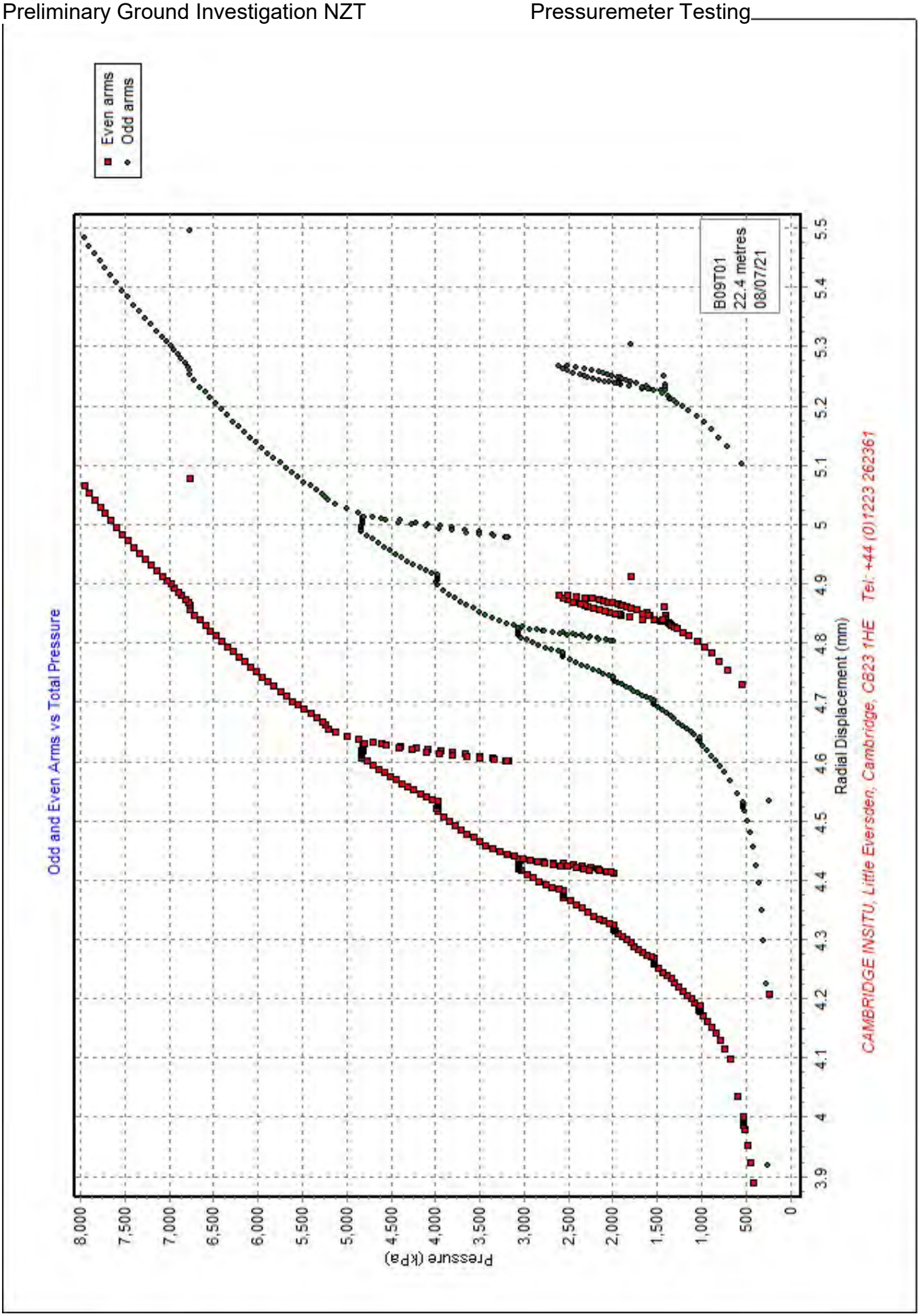

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 768.522 0.943
2 355.774 0.834
3 42.369 0.628
Shear modulus (MPa)
Log plane shear strain
0.0001
0.001
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21


Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 1
22.40 Metres
8 Jul 21
CURVE FIT PARAMETERS:
Origin : 4.580mm
Po : 619.0kPa
Cohesion : 112kPa
Phi peak : 43.3°
Dilation : 5.7°
Yield stress : 1152kPa
Limit pressure : 41112kPa
Elastic exponent : 0.834
Gs at first yield : 2193.4MPa
Janbu exponent : -0.224
Correlation : 0.357
Estimated PWP : 178.0kPa
Phi cv : 39.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
B09T01
22.4 metres
08/07/21
All Arms vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B09T01
22.4 metres
08/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arms 1+4
Arms 2+5
Arms 3+6
B09T01
22.4 metres
08/07/21
Arm Pairs vs Total Pressure
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
Odd and Even Arms vs Total Pressure
B09T01
22.4 metres
08/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH09 Test 2 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH09
Test name : MS/BH09 Test 2
Test date : 9 Jul 21
Test depth : 25.15 Metres
Water table : 4.27 Metres
Ambient PWP : 215.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 ES/RW on 28 Jul 21

Remarks: Unable to curve fit past 5% cavity strain due to stuctural breakdown of material.

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=2.62"
Po from Marsland & Randolph (kPa) : "Arm ave=478.2"
Best estimate of Po (kPa) : "Arm ave=666.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=5538.4"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 40.0
Angle of internal friction (°) : "Arm ave=47.0"
Dilation angle (°) : "Arm ave=9.6"
Gradient of log-log plot : "Arm ave=0.493"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=44.8"
Dilation angle (°) : "Arm ave=6.5"
Gradient of log-log plot : "Arm ave=-3.920"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=172.8"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	813.1	0.230	2374	0.098	795
Arm ave	2	867.2	1.550	5458	0.237	2054
Arm ave	3	888.3	3.077	7133	0.262	2333
Arm ave	4	908.1	9.913	5170	0.270	2453

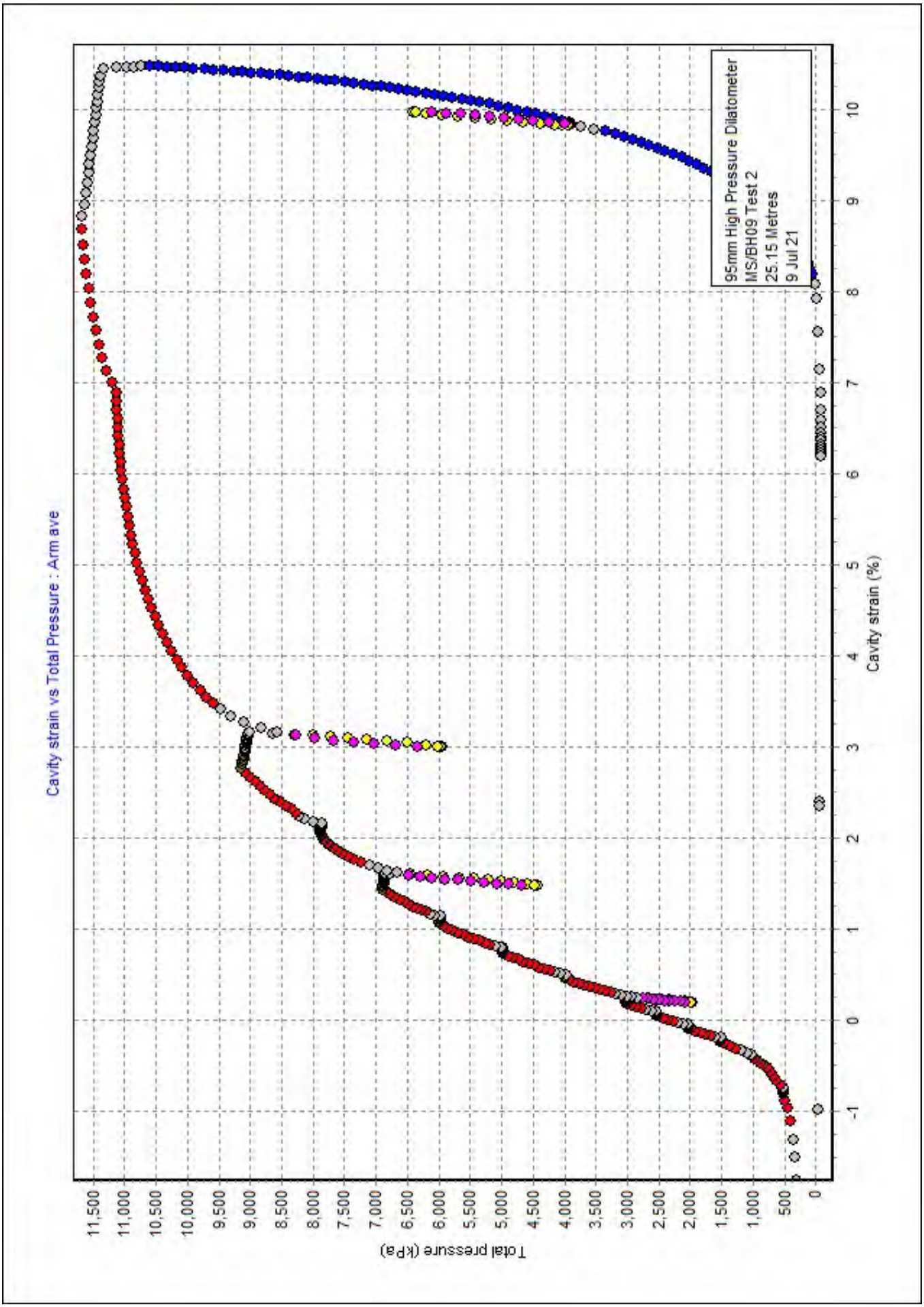
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	340.224	295.005	0.867
Arm ave	2	235.124	181.873	0.774
Arm ave	3	148.336	101.331	0.683
Arm ave	4	244.594	187.669	0.767

[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 2.62
Po (kPa) : 666
Cohesion (kPa) : 191
Angle of peak friction (deg) : 47.0
Angle of peak dilation (deg) : 9.6

MS/BH09 Test 2 - SUMMARY OF RESULTS

Total yield stress (kPa)	:	1686
Total limit stress (kPa)	:	36902
G at first yield (MPa)	:	596.8
Non-linear exponent	:	0.683
Janbu exponent	:	0.152
Correlation	:	0.996
Ambient pore water pressure (kPa)	:	215
Residual friction angle (deg)	:	40.0
Poisson's ratio	:	0.30


Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Total pressure (kPa)
Cavity strain (%)
11,500
11,000
10,500
10,000
9,500
9,000
8,500
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
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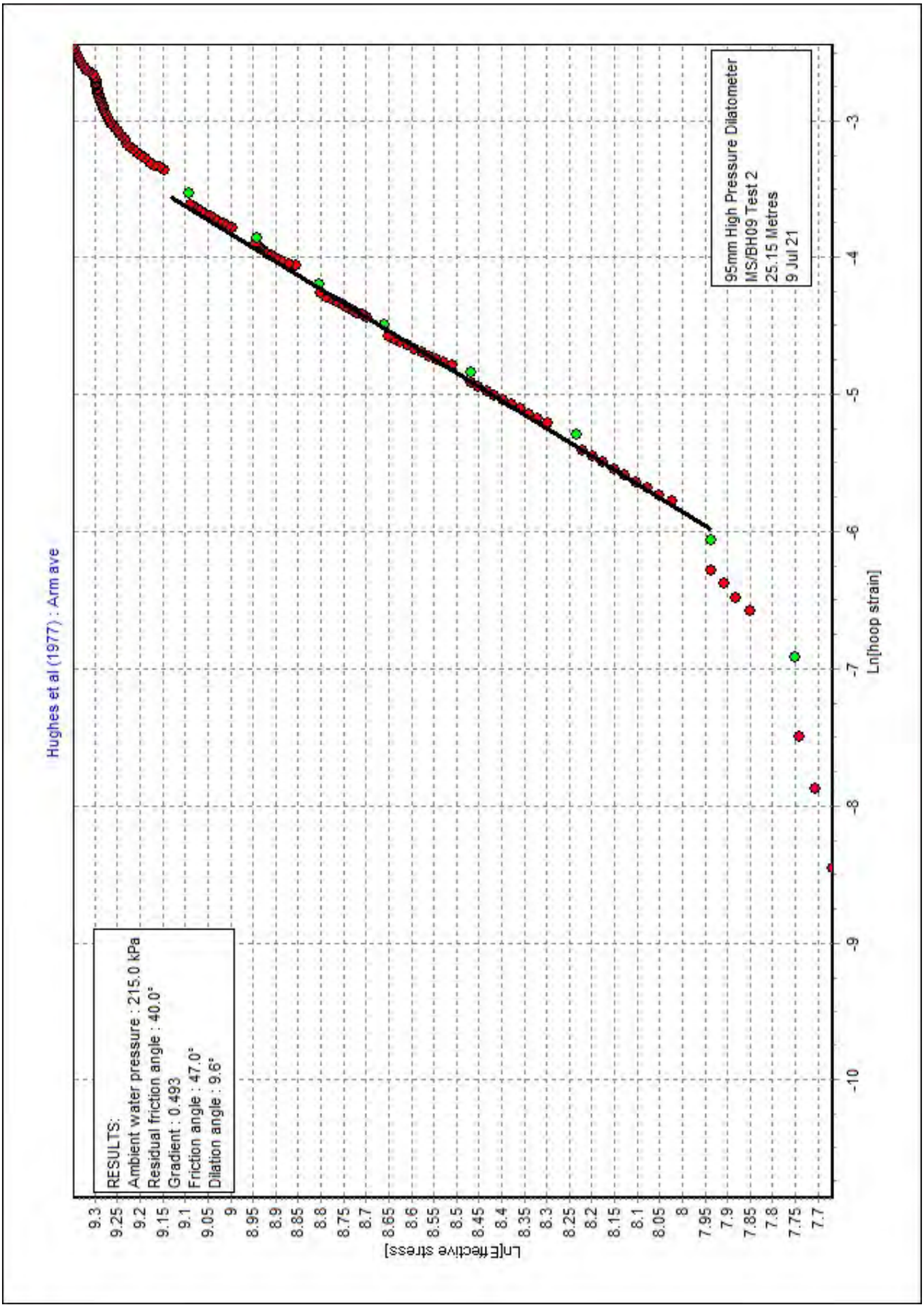
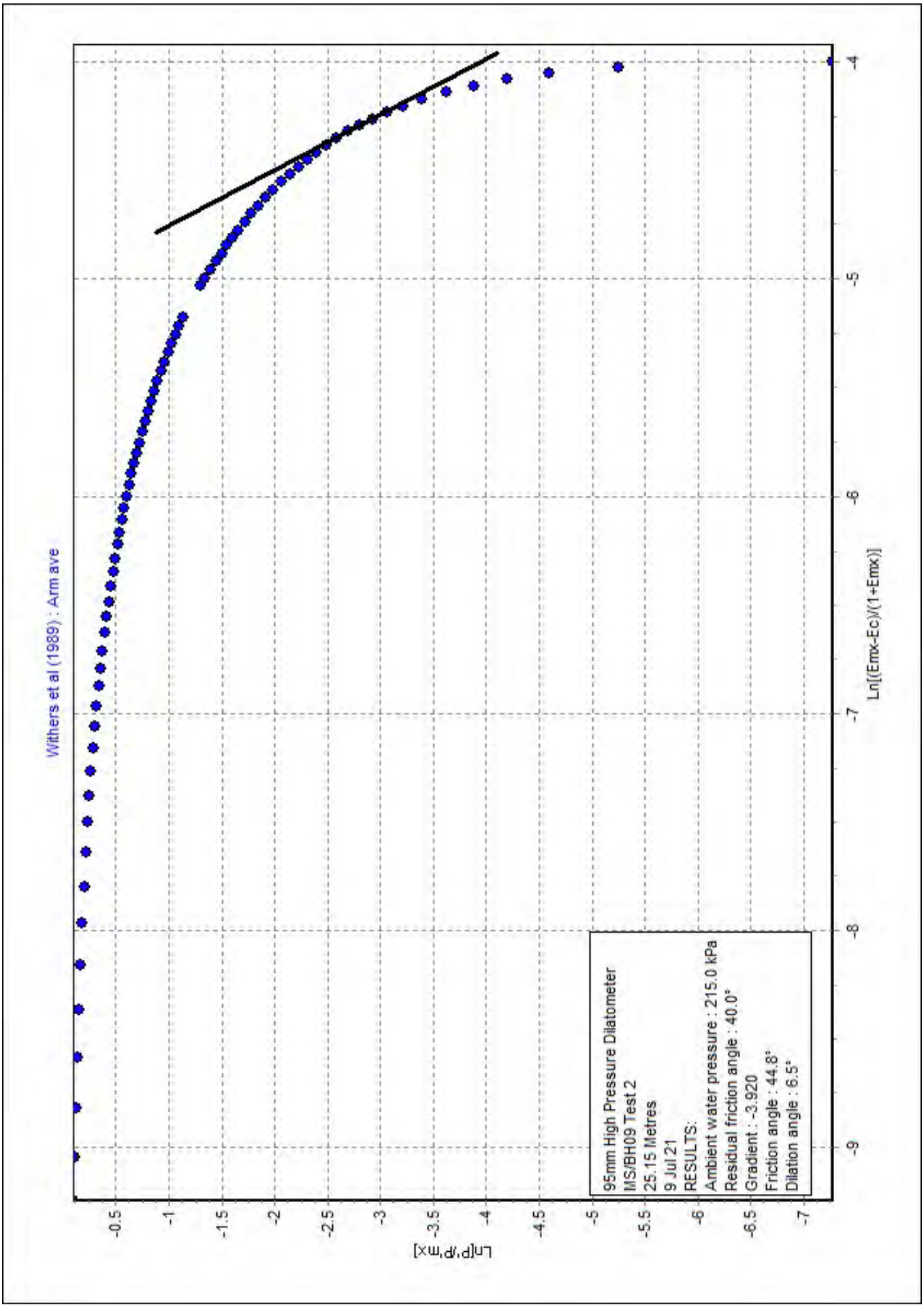
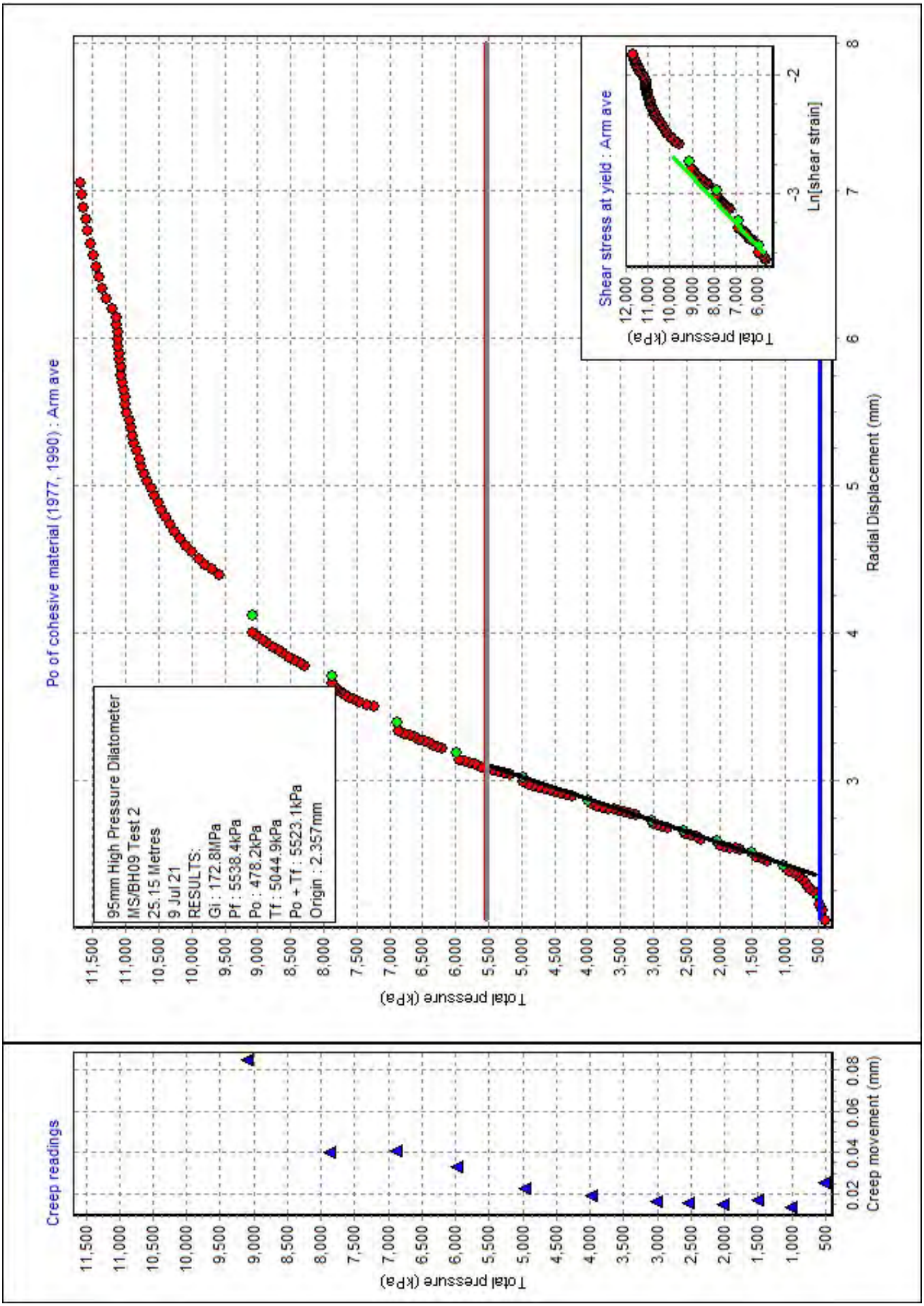
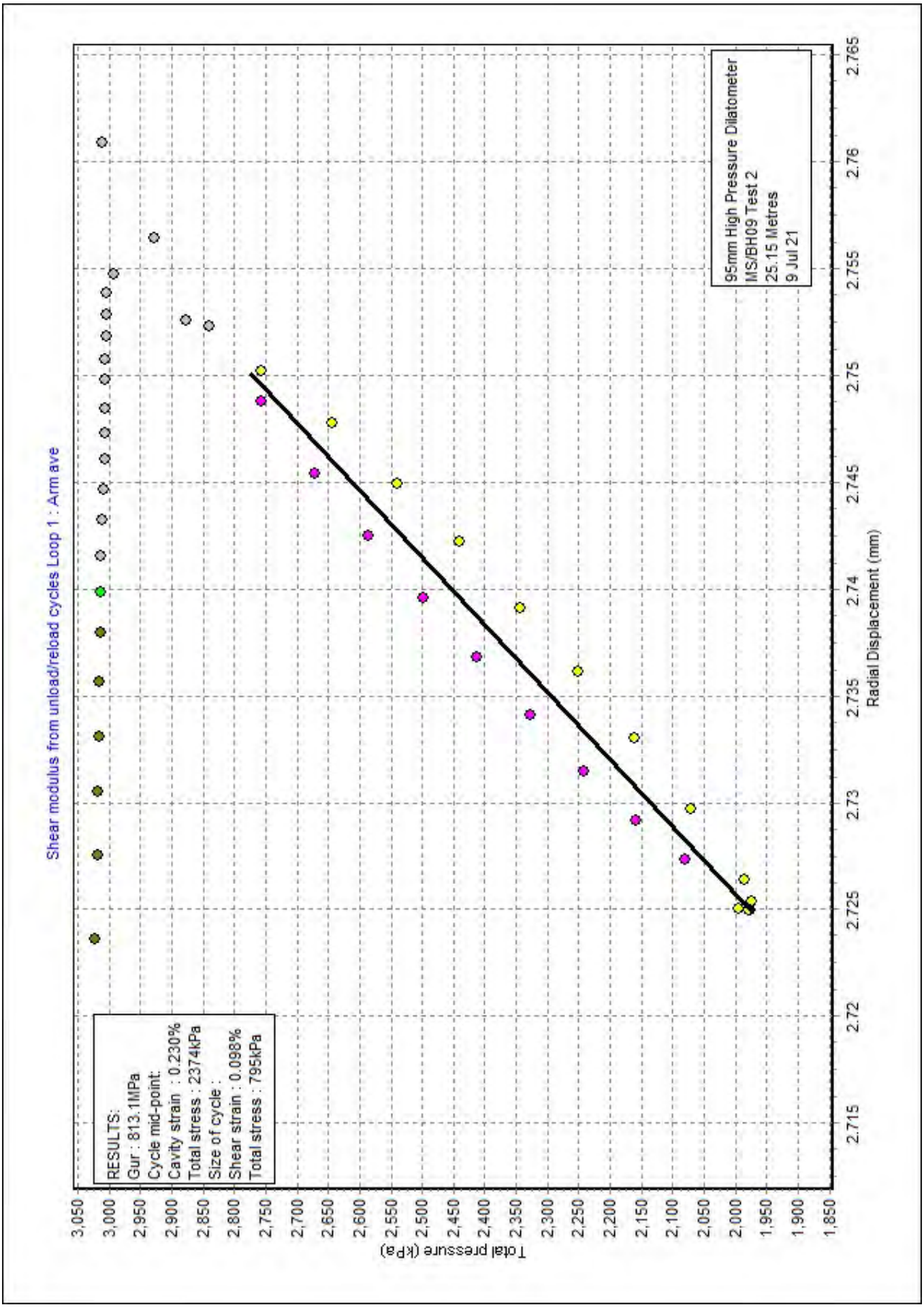
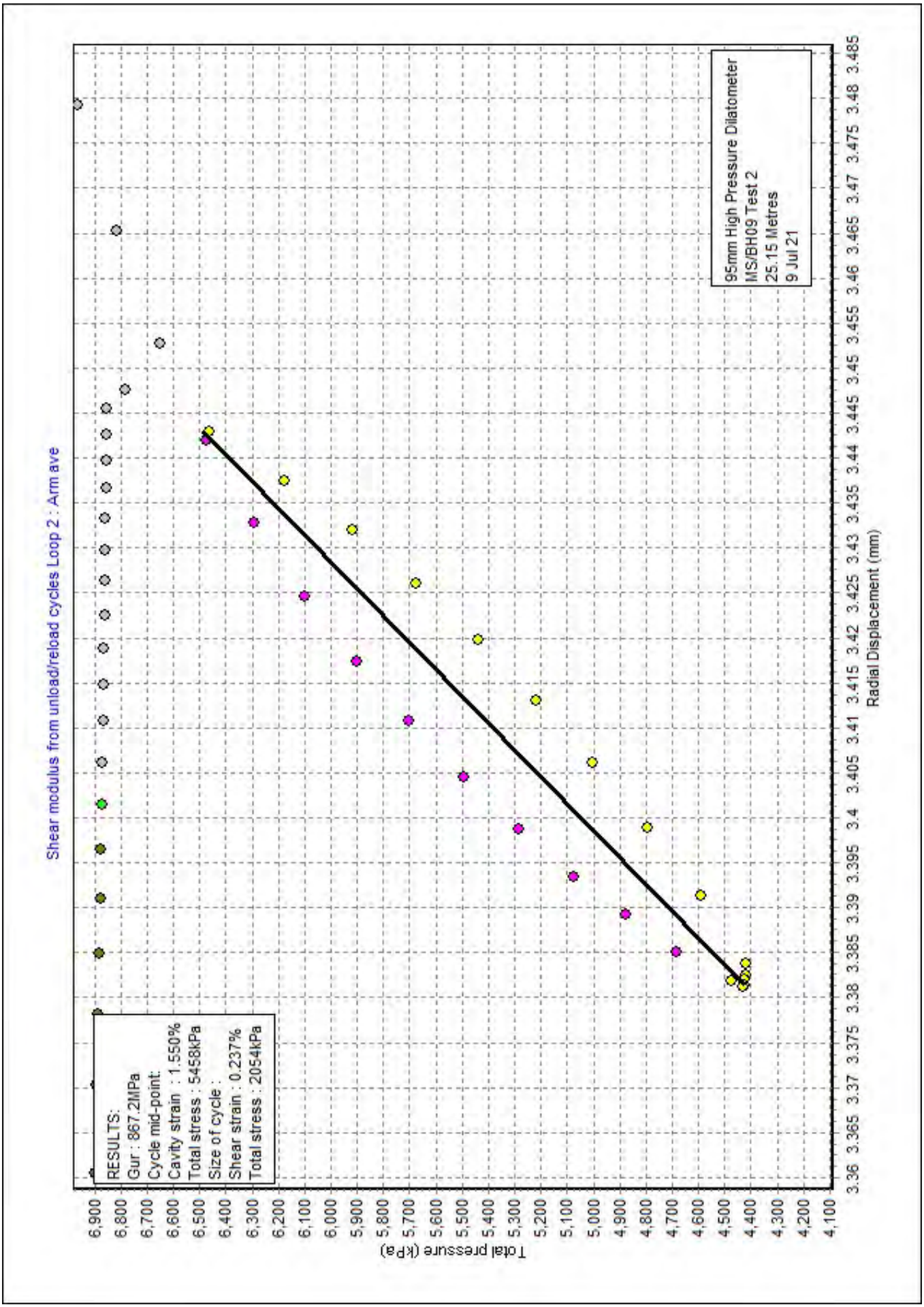
-1
0
1
2
3
4
5
6
7
8
9
10

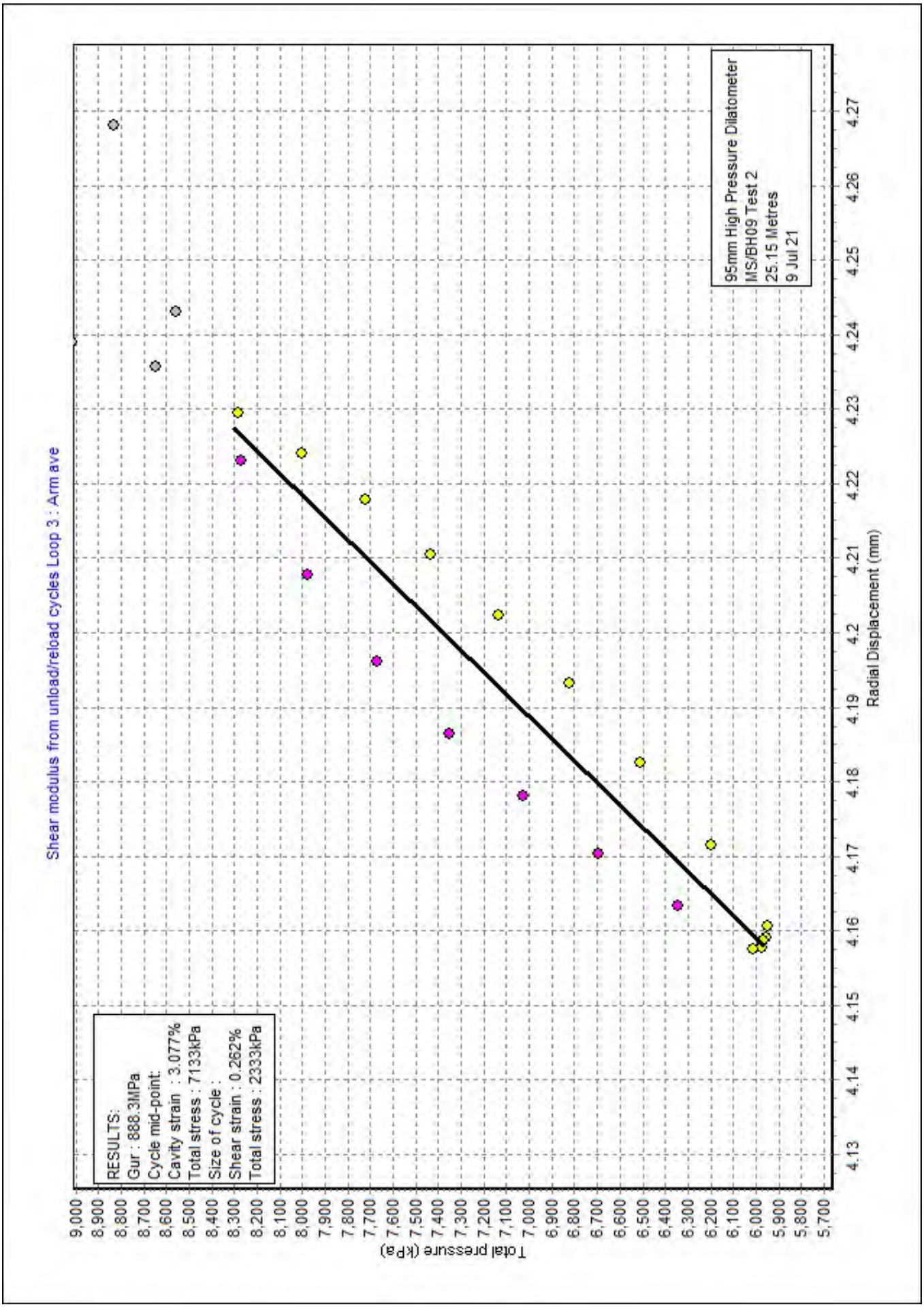

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 215.0 kPa
Residual friction angle : 40.0°
Gradient : 0.493
Friction angle : 47.0°
Dilation angle : 9.6°
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Ln[Effective stress]
Ln[hoop strain]

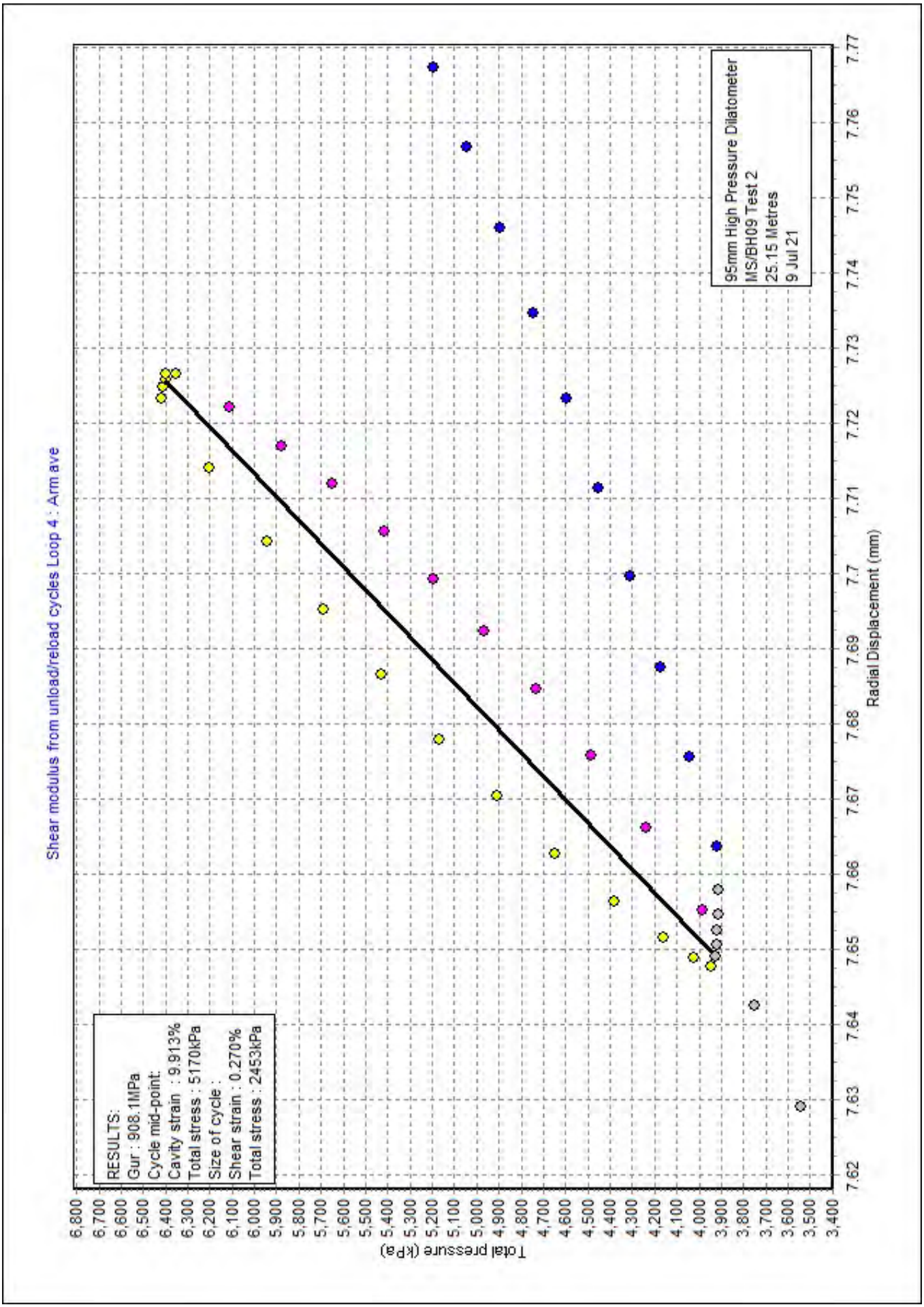

Withers et al (1989) : Arm ave
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Ambient water pressure : 215.0 kPa
Residual friction angle : 40.0°
Gradient : -3.920
Friction angle : 44.8°
Dilation angle : 6.5°

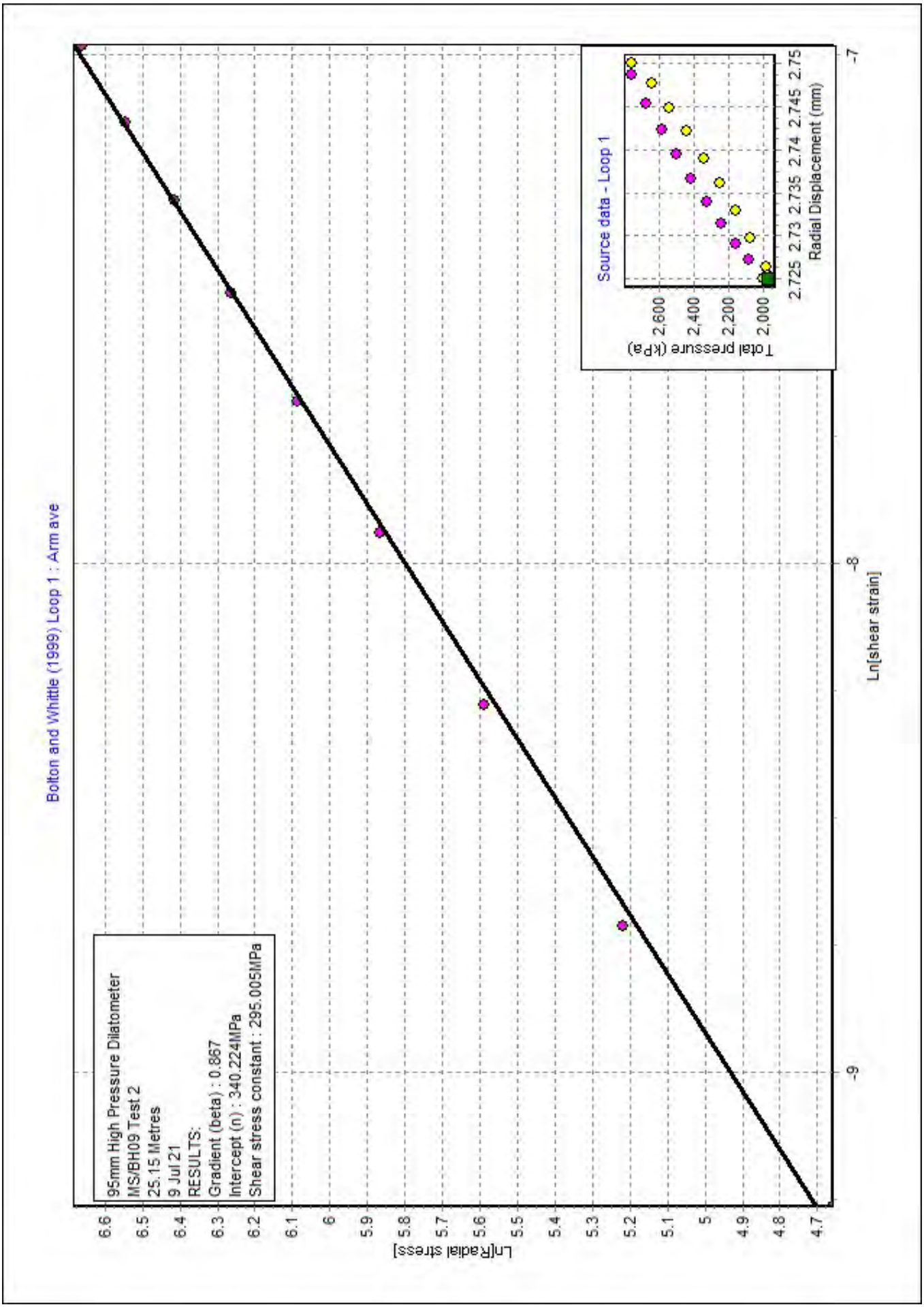

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Gi : 172.8MPa
Pf : 5538.4kPa
Po : 478.2kPa
Tf : 5044.9kPa
Po + Tf : 5523.1kPa
Origin : 2.357mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]
Creep readings
Total pressure (kPa)
Creep movement (mm)

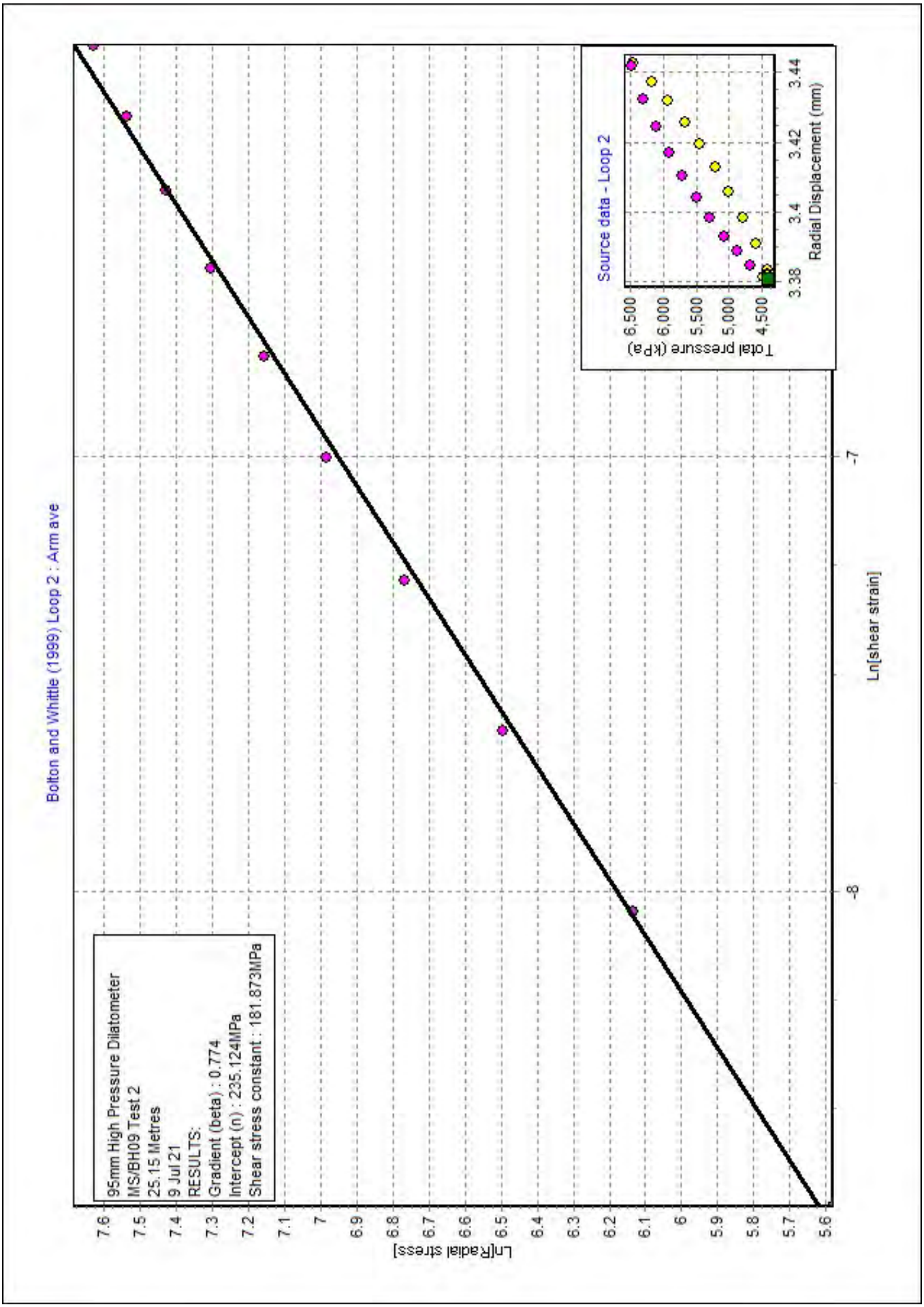

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 813.1MPa
Cycle mid-point:
Cavity strain : 0.230%
Total stress : 2374kPa
Size of cycle :
Shear strain : 0.098%
Total stress : 795kPa
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Total pressure (kPa)
Radial Displacement (mm)
3,050
3,000
2,950
2,900
2,850
2,800
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
1,950
1,900
1,850
2.715
2.72
2.725
2.73
2.735
2.74
2.745
2.75
2.755
2.76
2.765

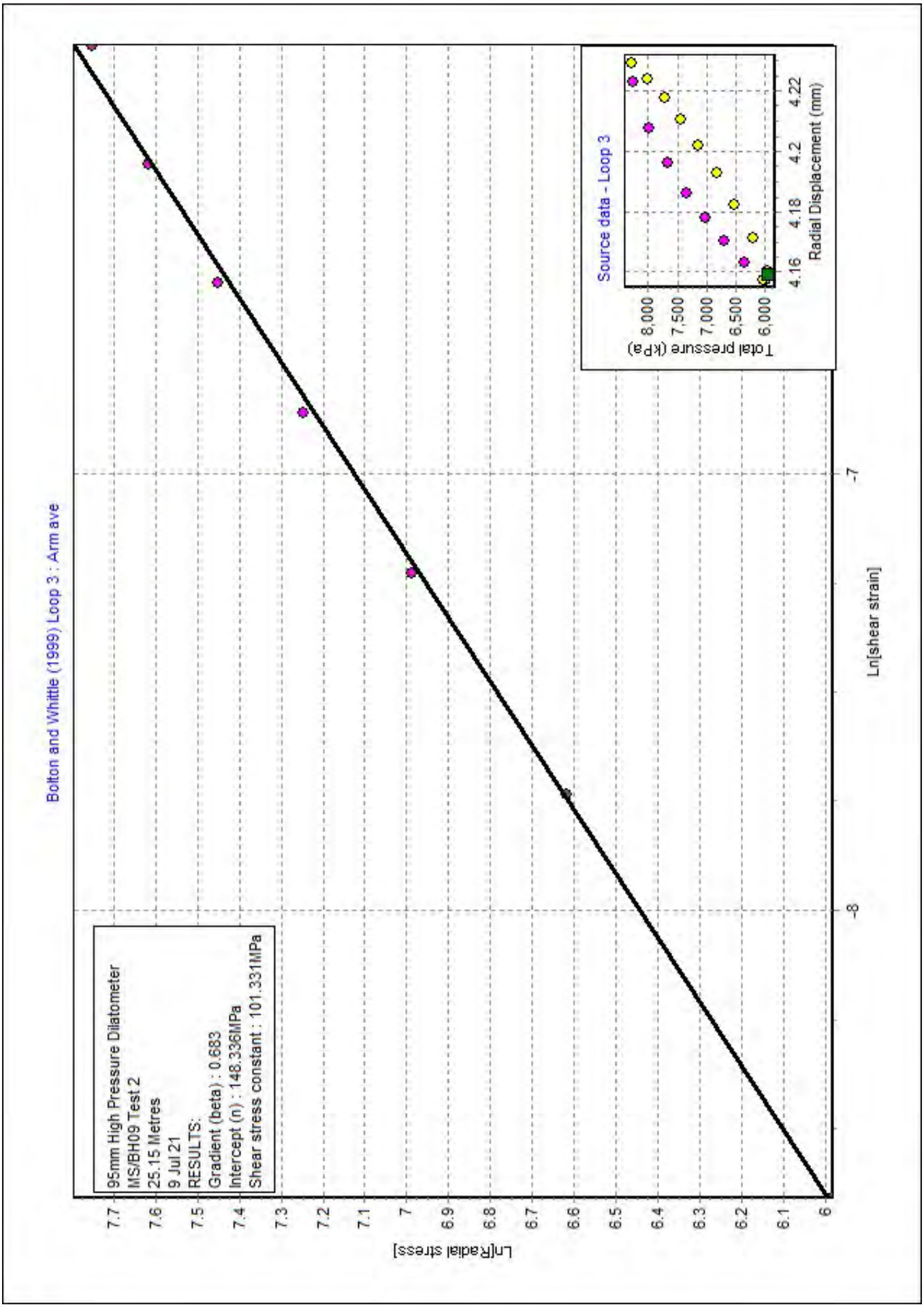

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 867.2MPa
Cycle mid-point:
Cavity strain : 1.550%
Total stress : 5458kPa
Size of cycle :
Shear strain : 0.237%
Total stress : 2054kPa
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

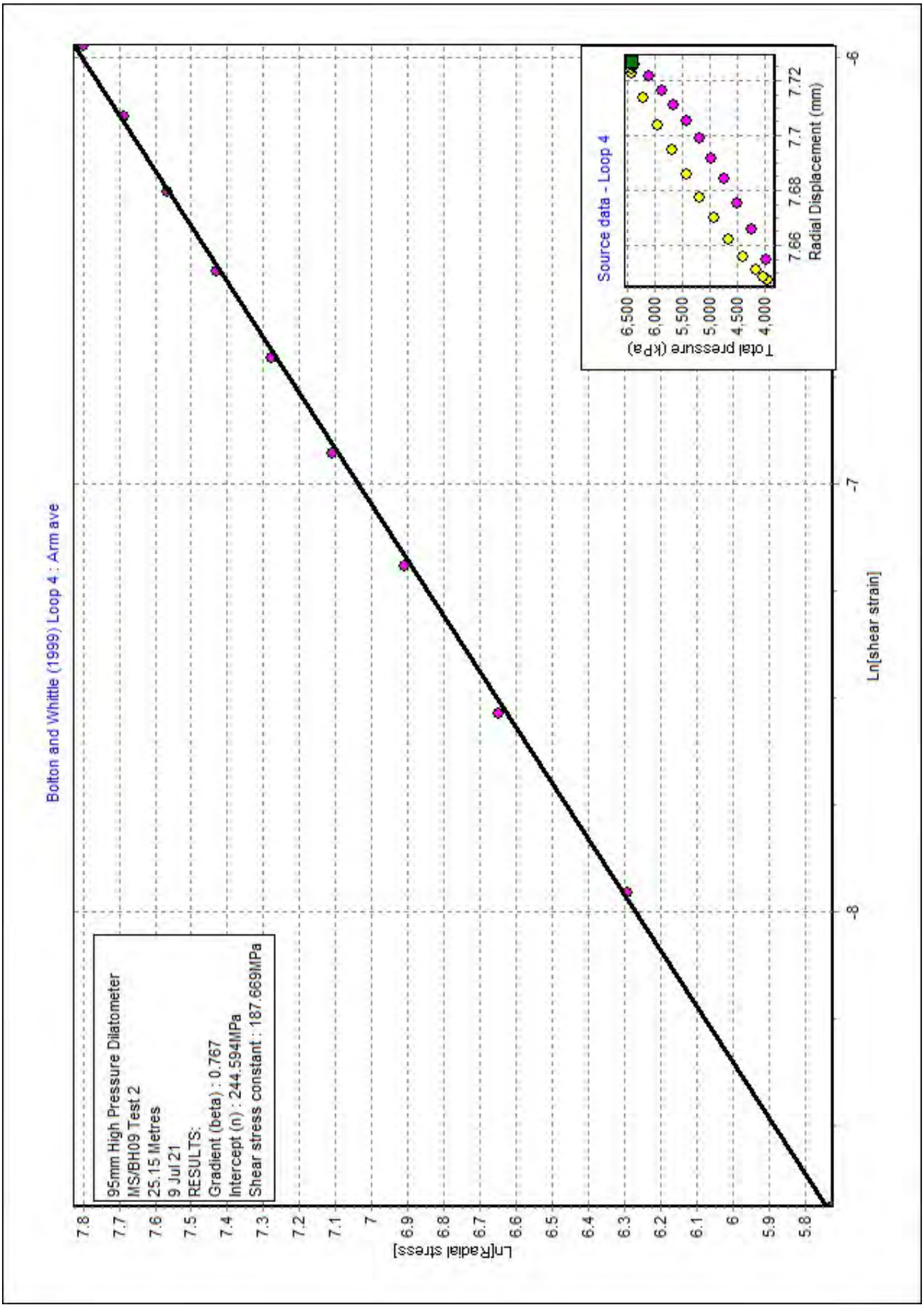

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 888.3MPa
Cycle mid-point:
Cavity strain : 3.077%
Total stress : 7133kPa
Size of cycle :
Shear strain : 0.262%
Total stress : 2333kPa
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

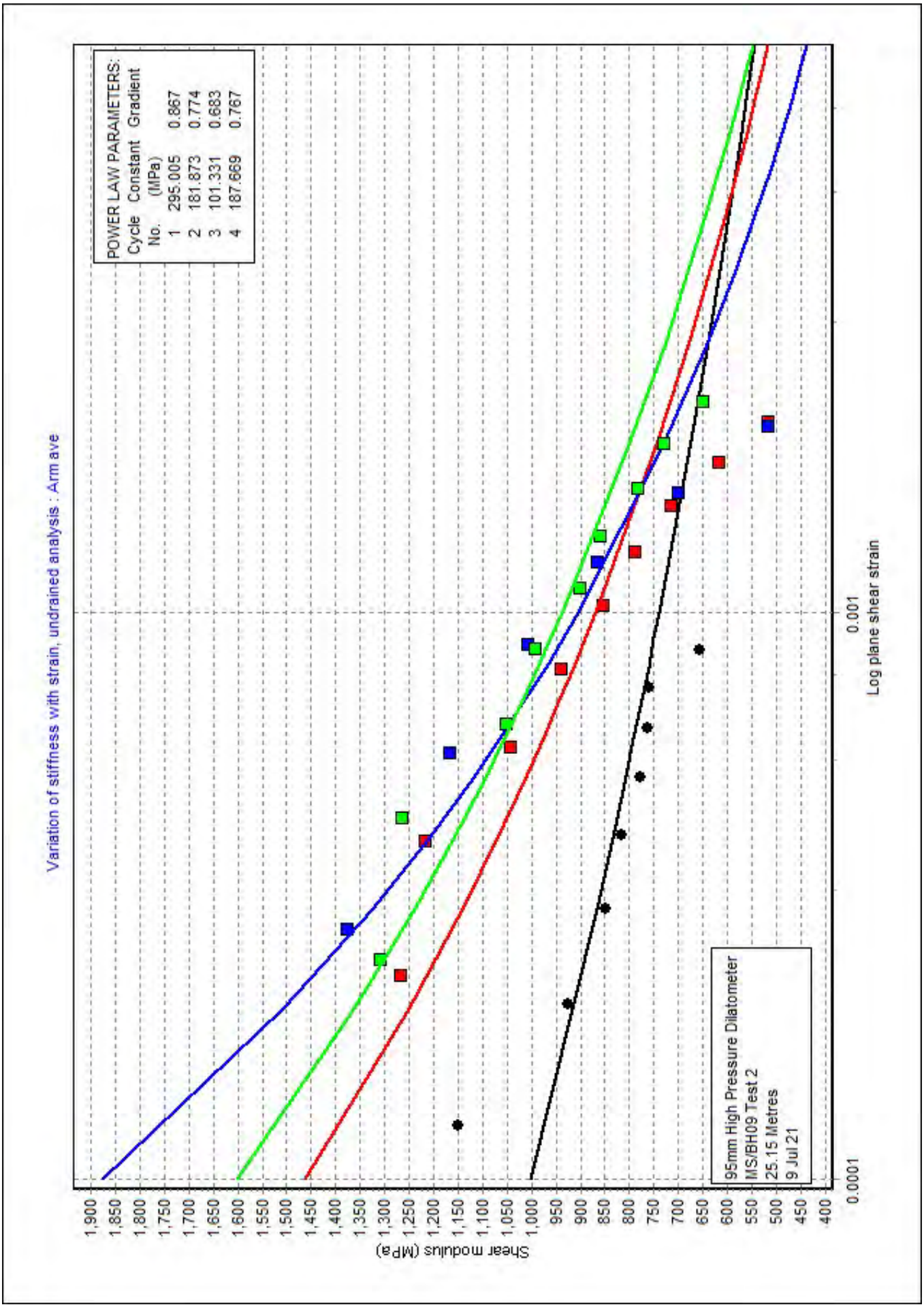

Shear modulus from unload/reload cycles Loop 4 : Arm ave
RESULTS:
Gur : 908.1MPa
Cycle mid-point:
Cavity strain : 9.913%
Total stress : 5170kPa
Size of cycle :
Shear strain : 0.270%
Total stress : 2453kPa
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
Total pressure (kPa)
Radial Displacement (mm)

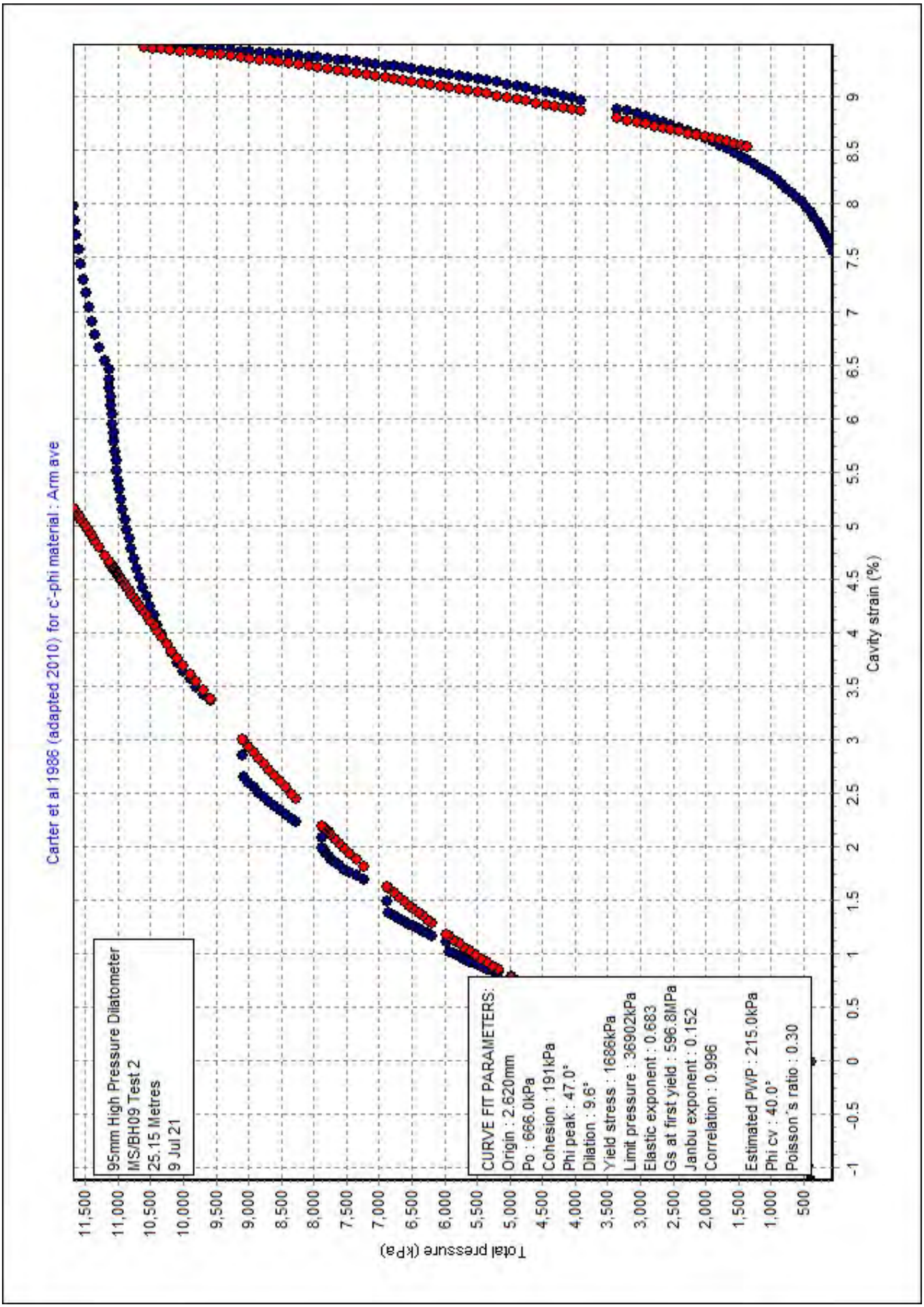

Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Gradient (beta) : 0.867
Intercept (n) : 340.224MPa
Shear stress constant : 295.005MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)

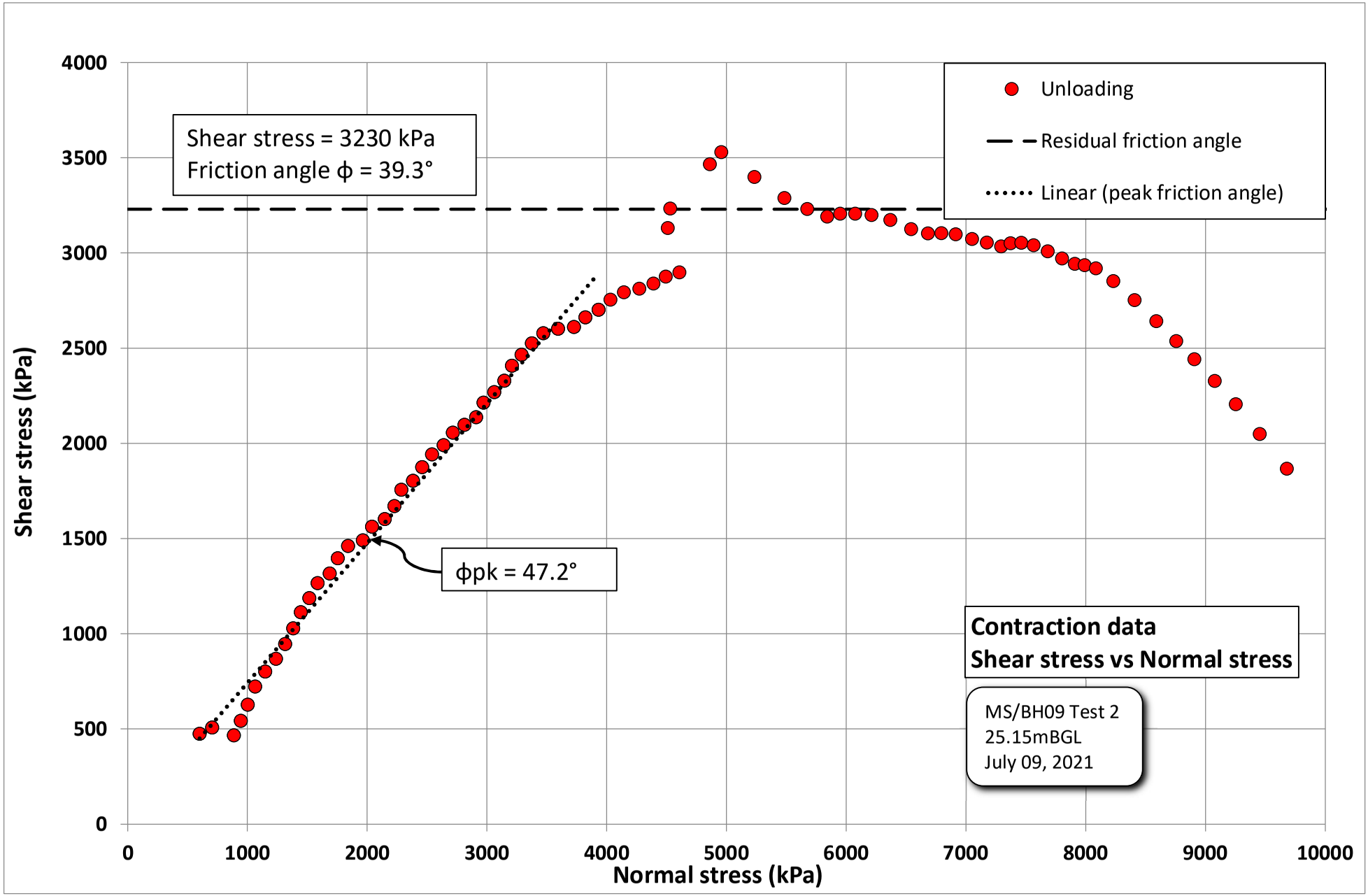

Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Gradient (beta) : 0.774
Intercept (n) : 235.124MPa
Shear stress constant : 181.873MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)

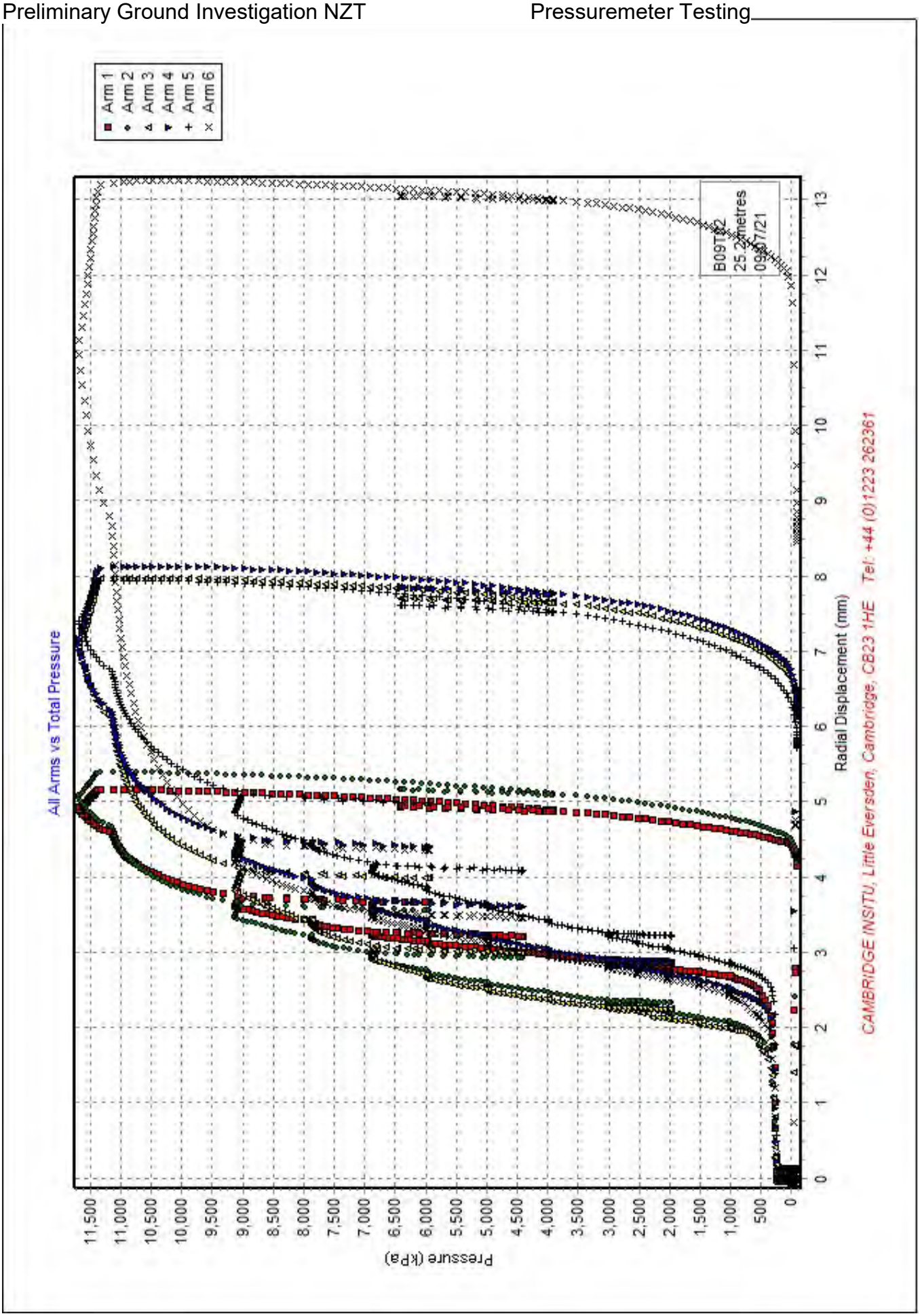

Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Gradient (beta) : 0.683
Intercept (n) : 148.336MPa
Shear stress constant : 101.331MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)

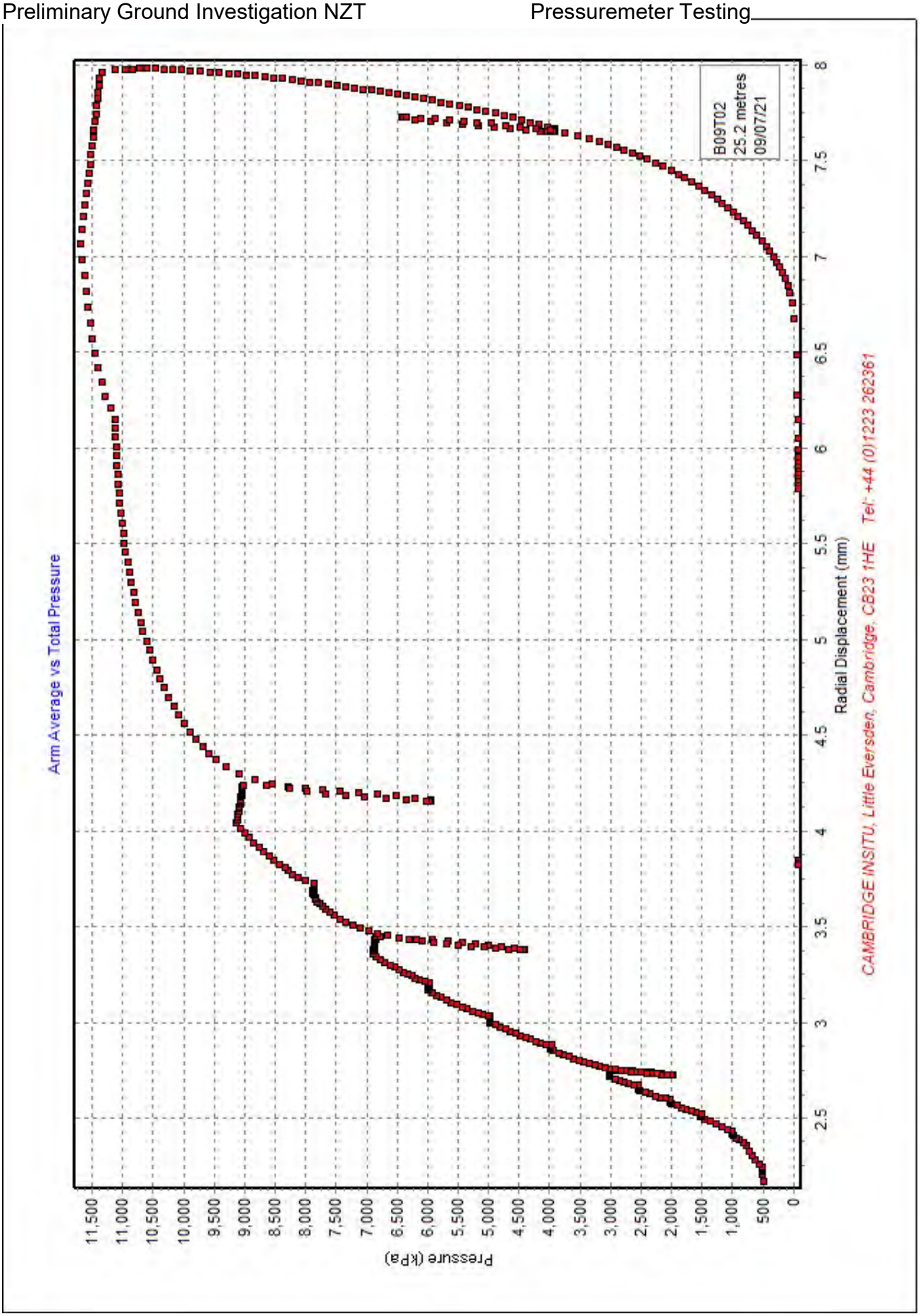

Bolton and Whittle (1999) Loop 4 : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
RESULTS:
Gradient (beta) : 0.767
Intercept (n) : 244.594MPa
Shear stress constant : 187.669MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 4
Total pressure (kPa)
Radial Displacement (mm)

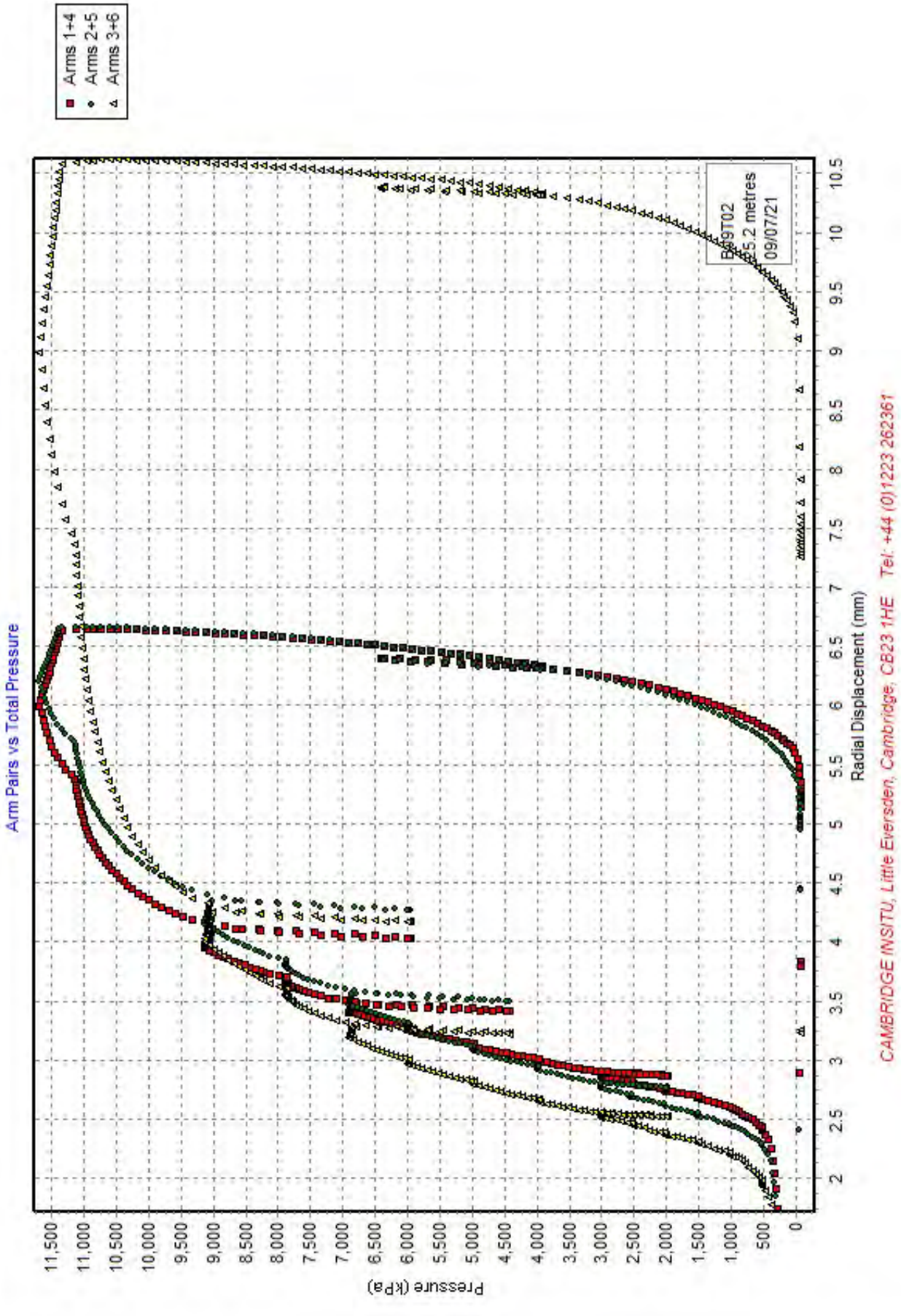

Variation of stiffness with strain, undrained analysis : Arm ave
POWER LAW PARAMETERS:
Cycle No. Constant (MPa) Gradient
1 295.005 0.867
2 181.873 0.774
3 101.331 0.683
4 187.669 0.767
Shear modulus (MPa)
Log plane shear strain
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21

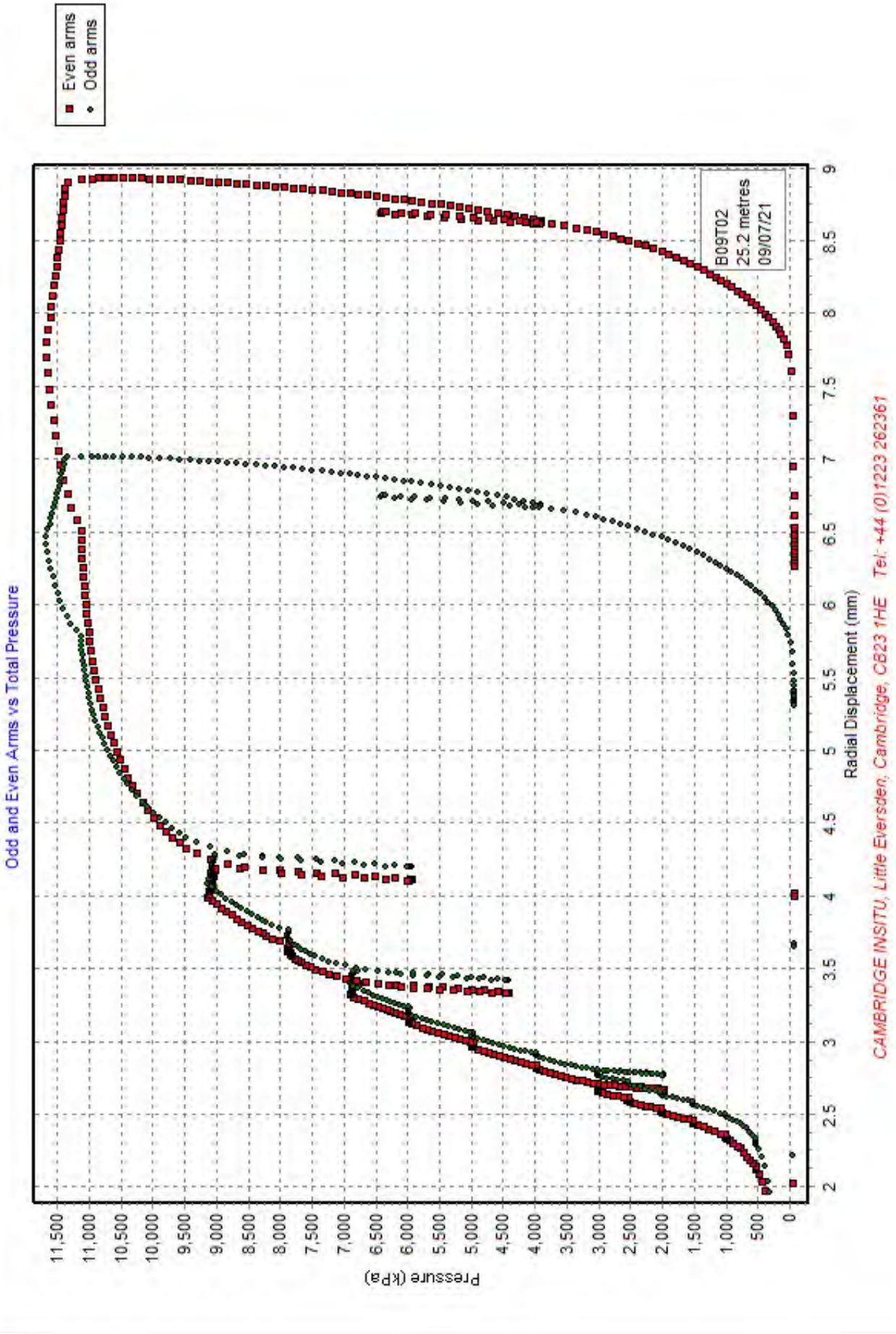

Carter et al 1986 (adapted 2010) for c'-phi material : Arm ave
95mm High Pressure Dilatometer
MS/BH09 Test 2
25.15 Metres
9 Jul 21
CURVE FIT PARAMETERS:
Origin : 2.620mm
Po : 666.0kPa
Cohesion : 191kPa
Phi peak : 47.0°
Dilation : 9.6°
Yield stress : 1686kPa
Limit pressure : 36902kPa
Elastic exponent : 0.683
Gs at first yield : 596.8MPa
Janbu exponent : 0.152
Correlation : 0.996
Estimated PWP : 215.0kPa
Phi cv : 40.0°
Poisson's ratio : 0.30
Total pressure (kPa)
Cavity strain (%)


Shear stress = 3230 kPa
Friction angle ϕ = 39.3°
ϕpk = 47.2°
Unloading
Residual friction angle
Linear (peak friction angle)
Contraction data
Shear stress vs Normal stress
MS/BH09 Test 2
25.15mBGL
July 09, 2021
Shear stress (kPa)
Normal stress (kPa)
0
500
1000
1500
2000
2500
3000
3500
4000
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000


Arm 1
Arm 2
Arm 3
Arm 4
Arm 5
Arm 6
All Arms vs Total Pressure
B09TP2
25.2metres
09/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Average vs Total Pressure
B09T02
25.2 metres
09/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Arm Pairs vs Total Pressure
Arms 1+4
Arms 2+5
Arms 3+6
Pressure (kPa)
Radial Displacement (mm)
B09T02
5.2 metres
09/07/21
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361


Even arms
Odd arms
Odd and Even Arms vs Total Pressure
B09T02
25.2 metres
09/07/21
Pressure (kPa)
Radial Displacement (mm)
CAMBRIDGE INSITU, Little Eversden, Cambridge, CB23 1HE Tel: +44 (0)1223 262361

MS/BH11 Test 1 - SUMMARY OF RESULTS
[File made with WinSitu]

[DETAILS OF TEST]
Project : 4339
Site : Preliminary Ground Investigation NZT
Borehole : MS/BH11
Test name : MS/BH11 Test 1
Test date : 10 Jun 21
Test depth : 22.80 Metres
Water table : 3.9 Metres
Ambient PWP : 185.0 kPa
Material : Mudstone
Probe : 95mm High Pressure Dilatometer
Diameter : 97.0 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 ES/YB/RWW on 11 Jun 21

Remarks:

[RESULTS FOR CAVITY REFERENCE PRESSURE]
Strain Origin (mm) : "Arm ave=6.17"
Po from Marsland & Randolph (kPa) : "Arm ave=555.5"
Best estimate of Po (kPa) : "Arm ave=479.0"

[UNDRAINED STRENGTH PARAMETERS]
Undrained yield stress (kPa) : "Arm ave=2069.4"

[DRAINED ANALYSIS OF SANDS]
[Hughes et al 1977]
Constant volume friction angle (°) : 40.0
Angle of internal friction (°) : "Arm ave=43.1"
Dilation angle (°) : "Arm ave=4.2"
Gradient of log-log plot : "Arm ave=0.436"

[Withers et al 1989]
Angle of internal friction (°) : "Arm ave=40.0"
Dilation angle (°) : "Arm ave=0.0"
Gradient of log-log plot : "Arm ave=-3.601"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=298.4"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	868.3	0.021	1129	0.048	417
Arm ave	2	1013.1	0.180	1812	0.067	683
Arm ave	3	840.1	0.514	2662	0.113	948
Arm ave	4	635.6	1.952	2678	0.223	1416

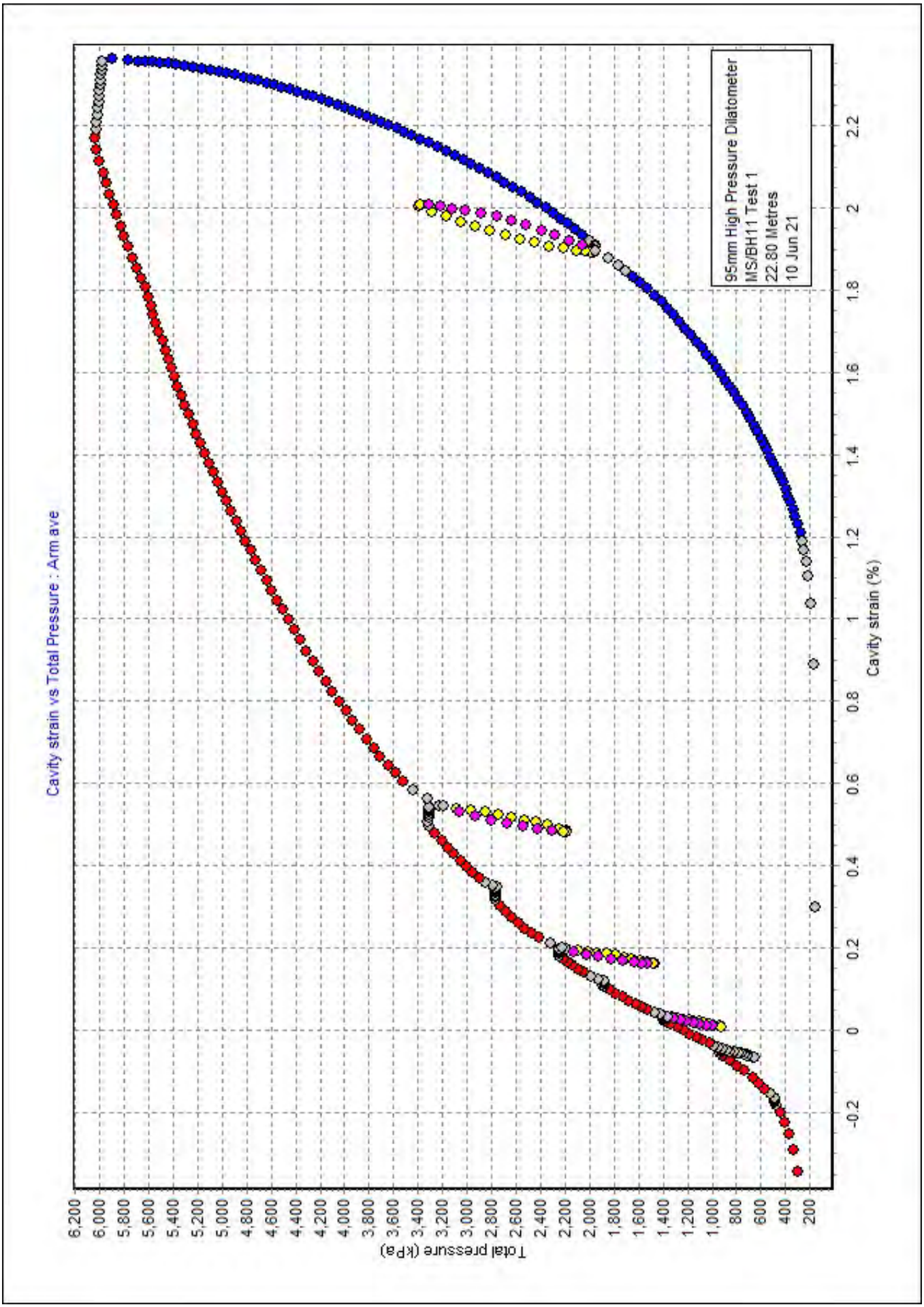
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

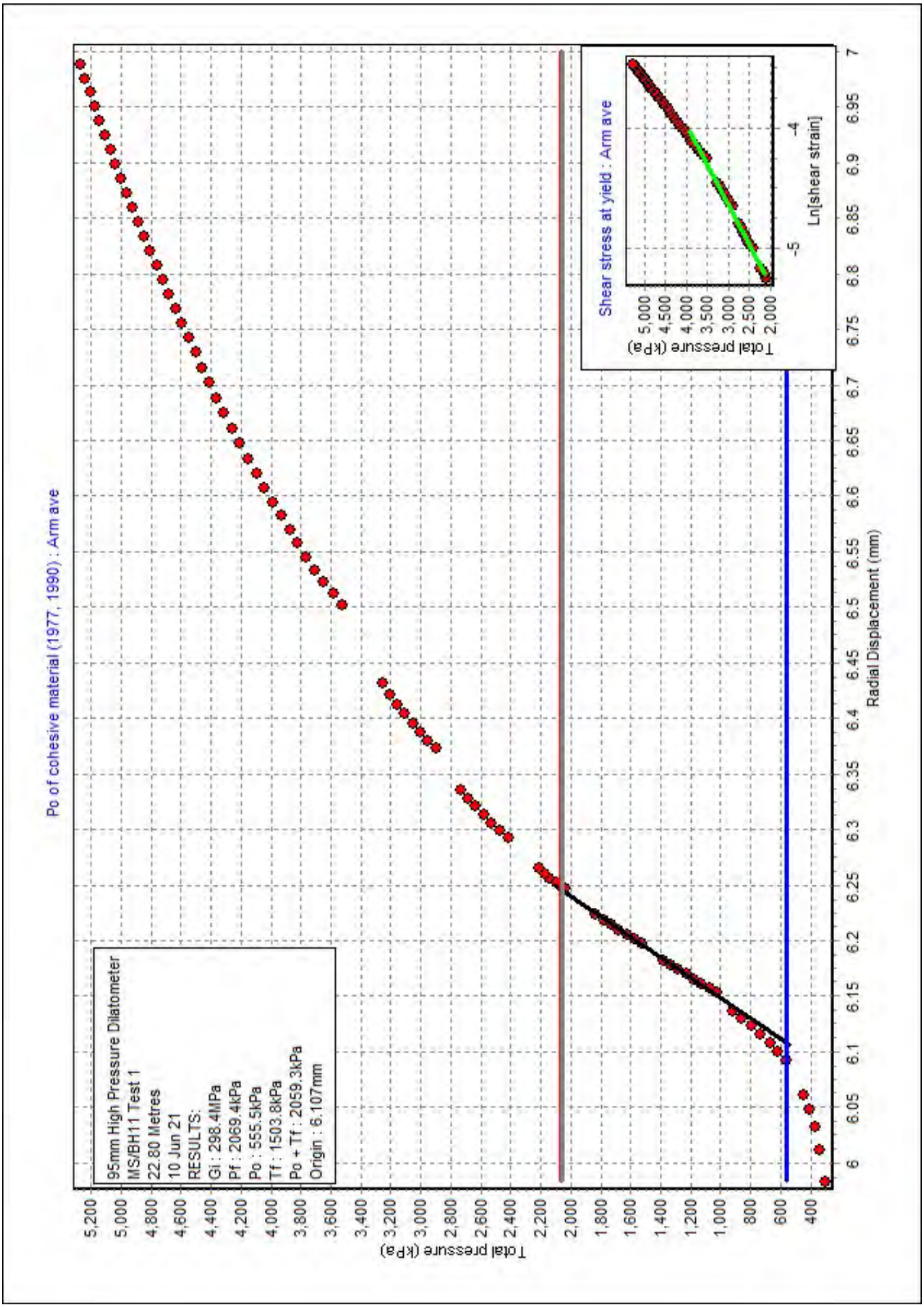
Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	660.512	632.558	0.958
Arm ave	2	151.469	110.543	0.730
Arm ave	3	138.559	99.979	0.722
Arm ave	4	94.514	64.085	0.678

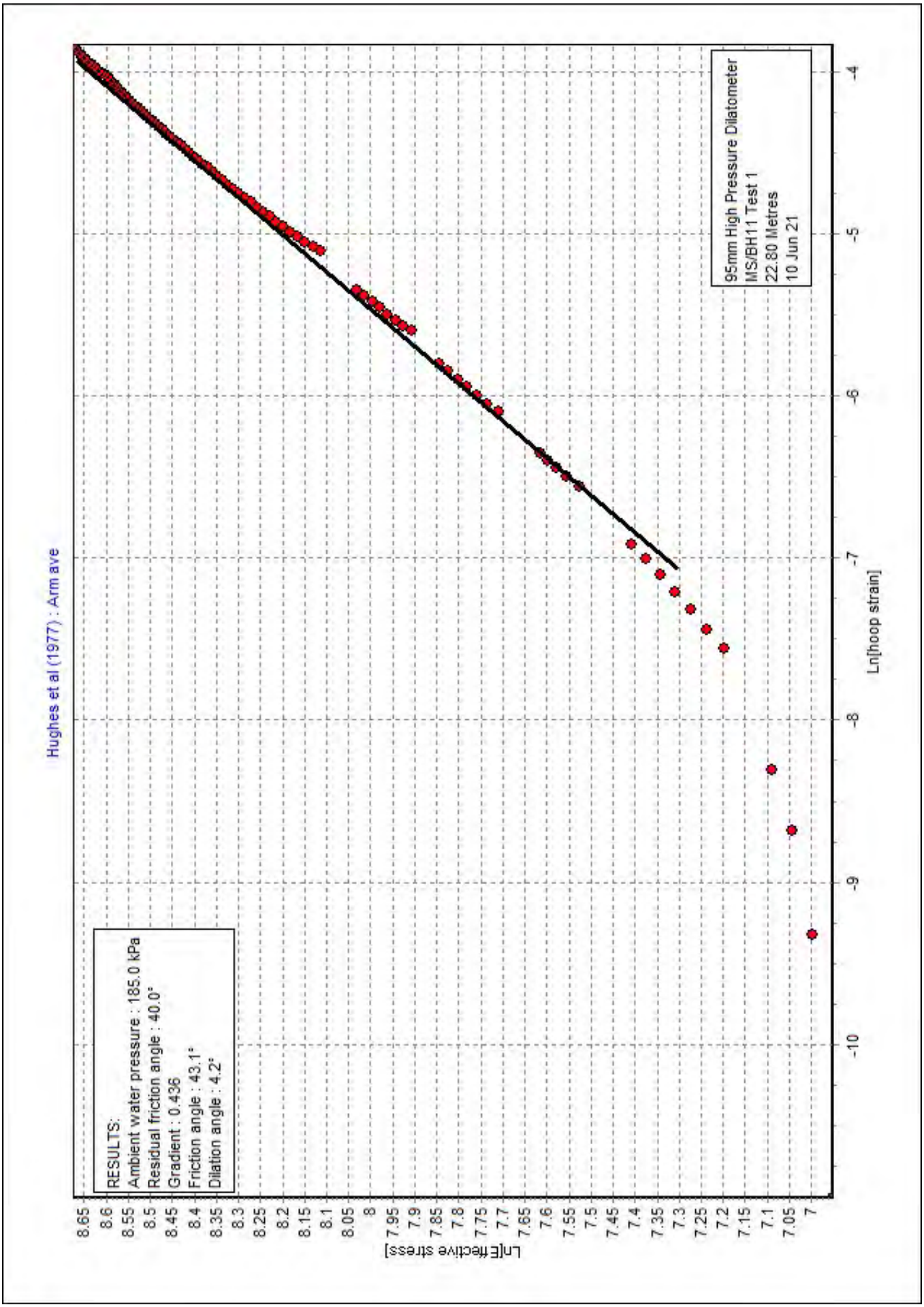
[PARAMETERS USED FOR DRAINED CURVE MODELLING]
{Axis is Arm ave}
Strain Origin (mm) : 6.17
Po (kPa) : 479
Cohesion (kPa) : 72
Angle of peak friction (deg) : 43.1
Angle of peak dilation (deg) : 4.2
Total yield stress (kPa) : 1033

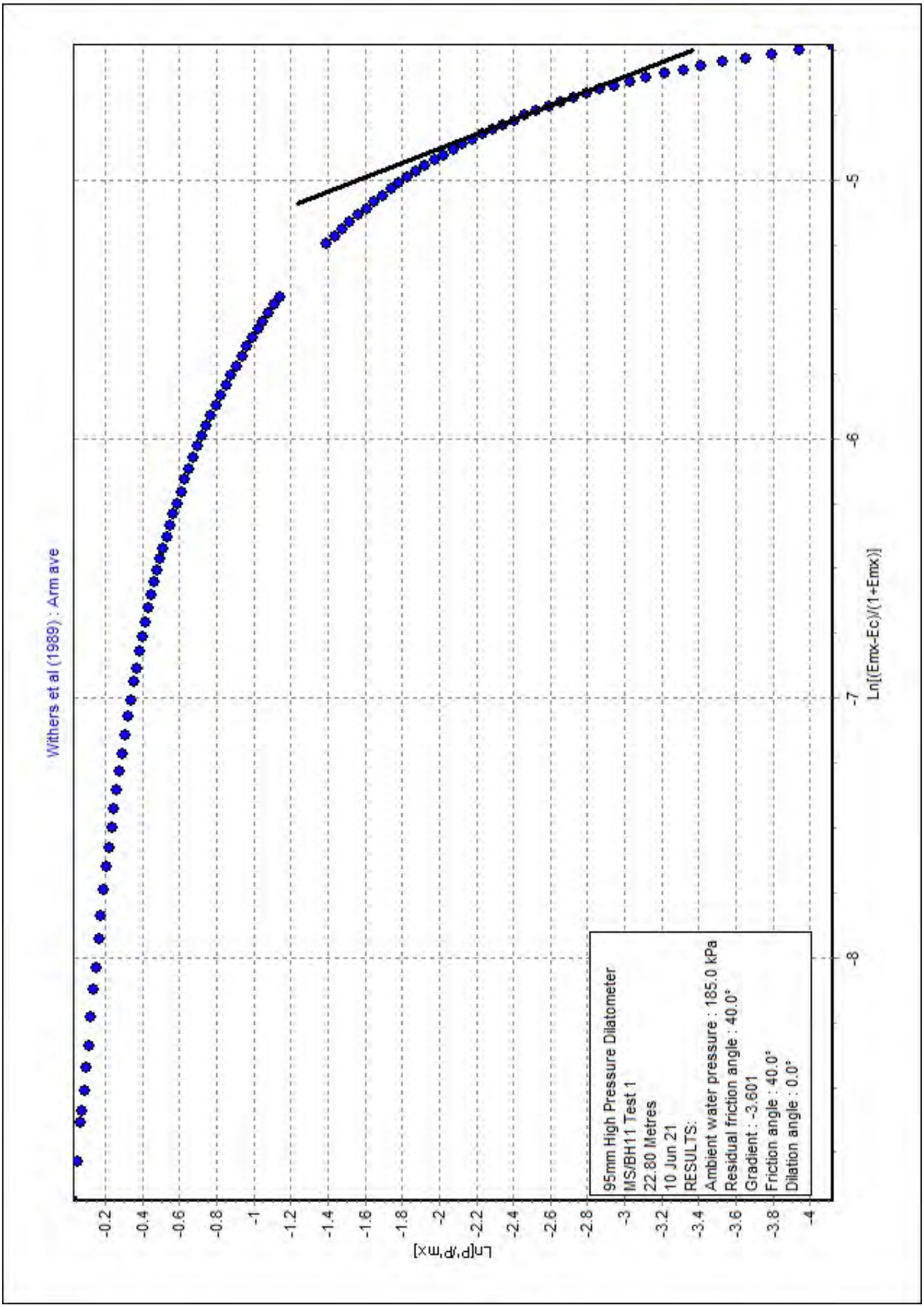
MS/BH11 Test 1 - SUMMARY OF RESULTS

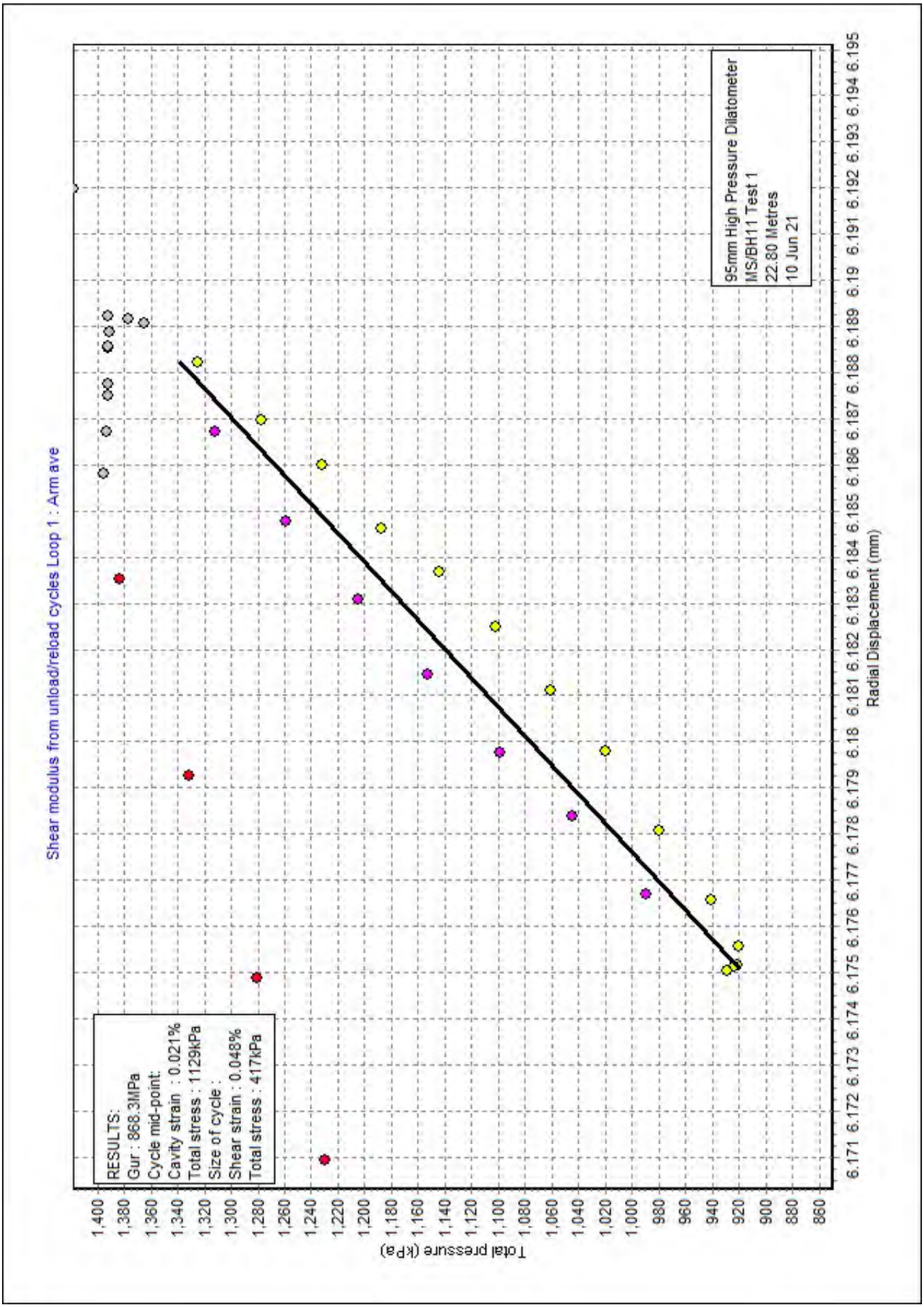
Total limit stress (kPa)	:	23725
G at first yield (MPa)	:	935.9
Non-linear exponent	:	0.678
Janbu exponent	:	-0.066
Correlation	:	0.574
Ambient pore water pressure (kPa)	:	185
Residual friction angle (deg)	:	40.0
Poisson's ratio	:	0.30

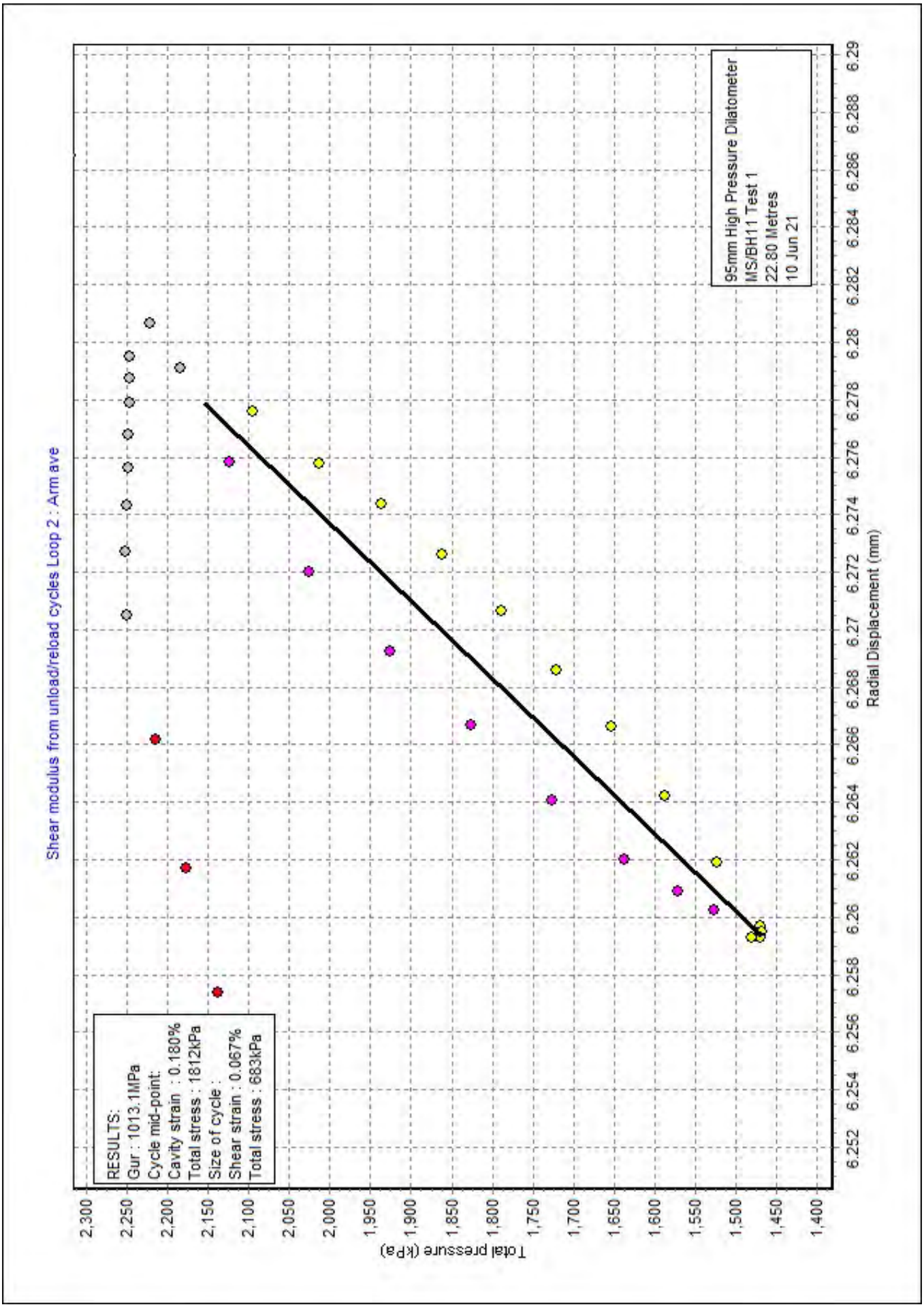

Cavity strain vs Total Pressure : Arm ave
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Total pressure (kPa)
Cavity strain (%)
6,200
6,000
5,800
5,600
5,400
5,200
5,000
4,800
4,600
4,400
4,200
4,000
3,800
3,600
3,400
3,200
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2

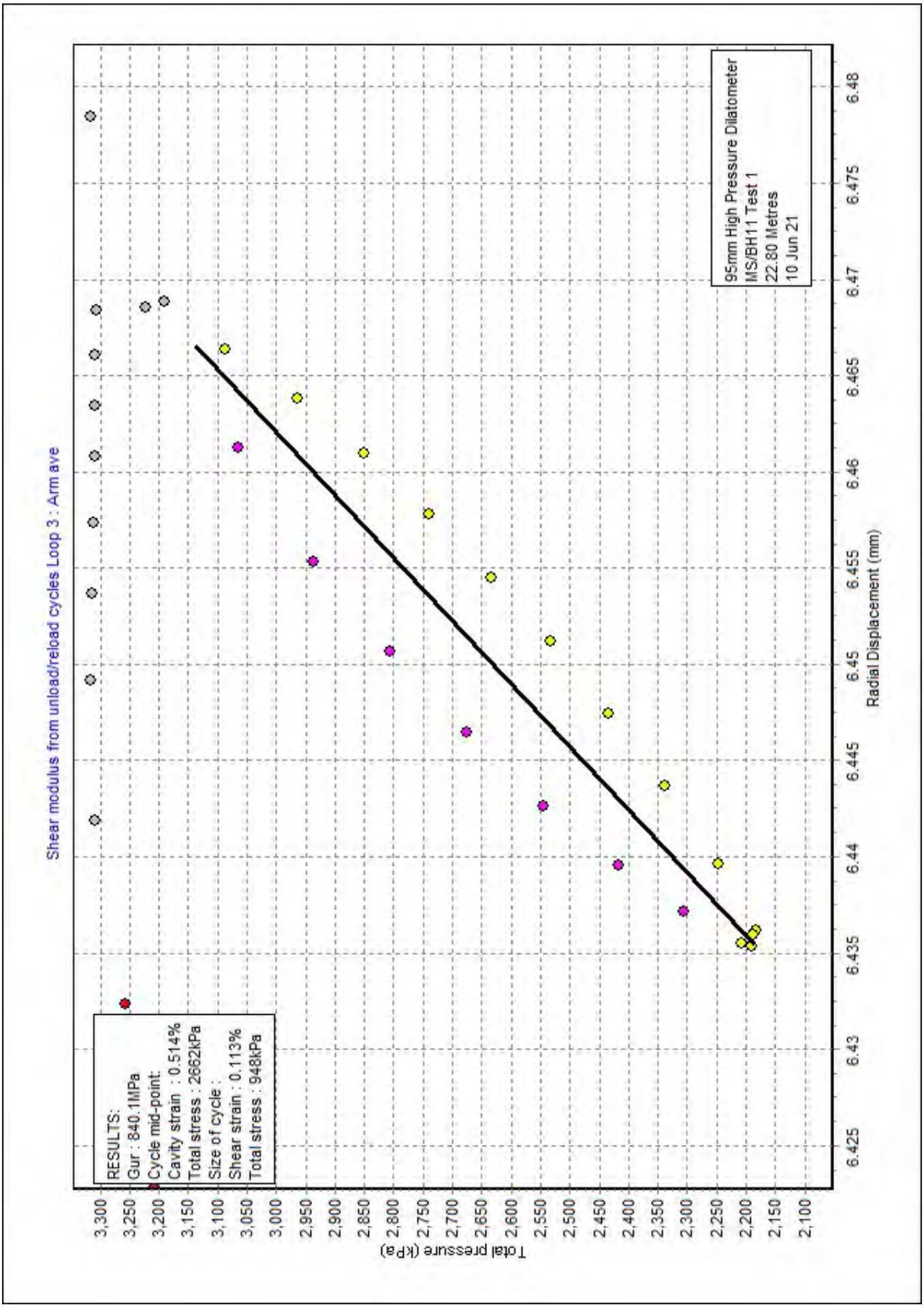

Po of cohesive material (1977, 1990) : Arm ave
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
RESULTS:
Gi : 298.4MPa
Pf : 2069.4kPa
Po : 555.5kPa
Tf : 1503.8kPa
Po + Tf : 2059.3kPa
Origin : 6.107mm
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]

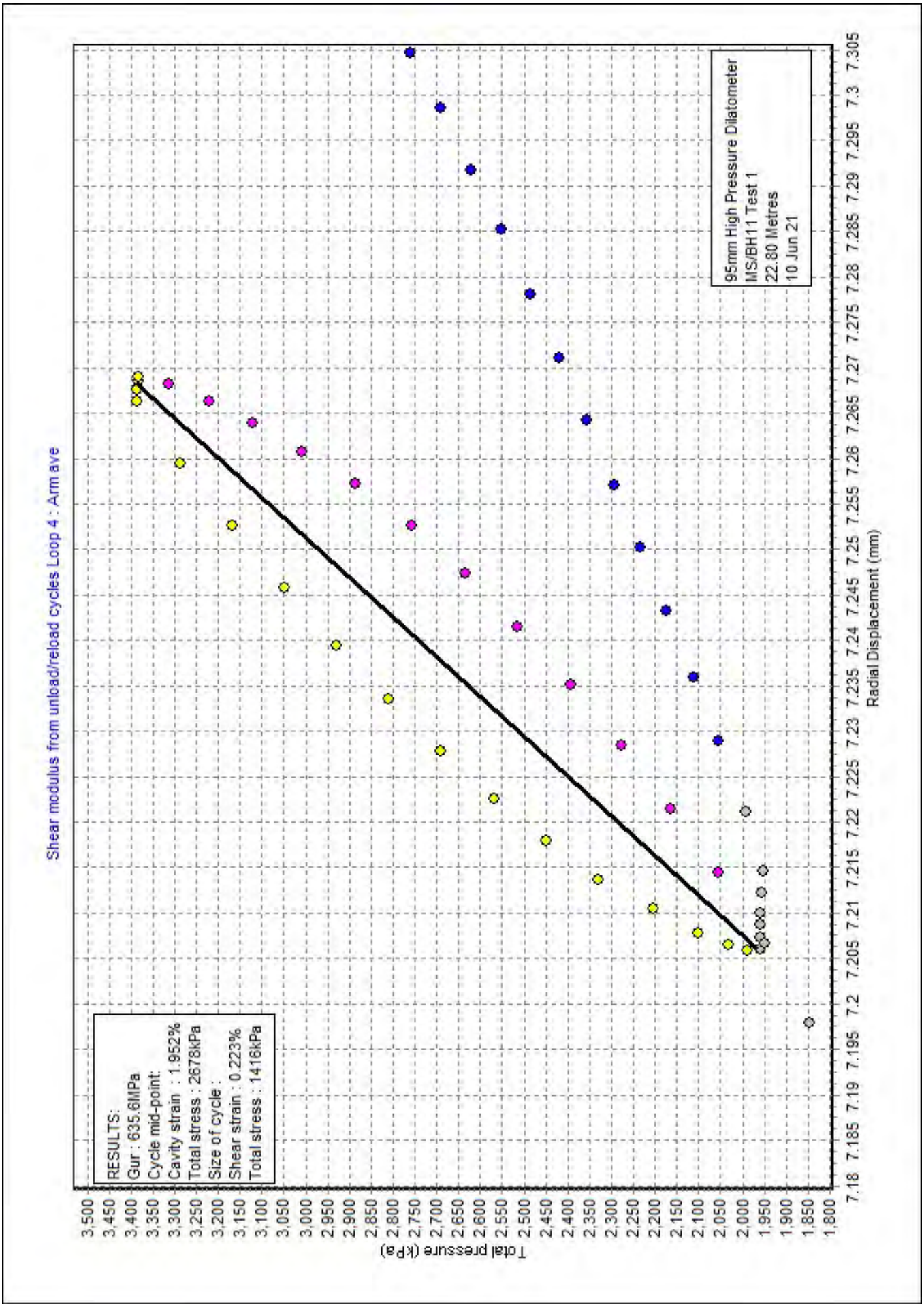

Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 185.0 kPa
Residual friction angle : 40.0°
Gradient : 0.436
Friction angle : 43.1°
Dilation angle : 4.2°
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Ln[Effective stress]
Ln[hoop strain]

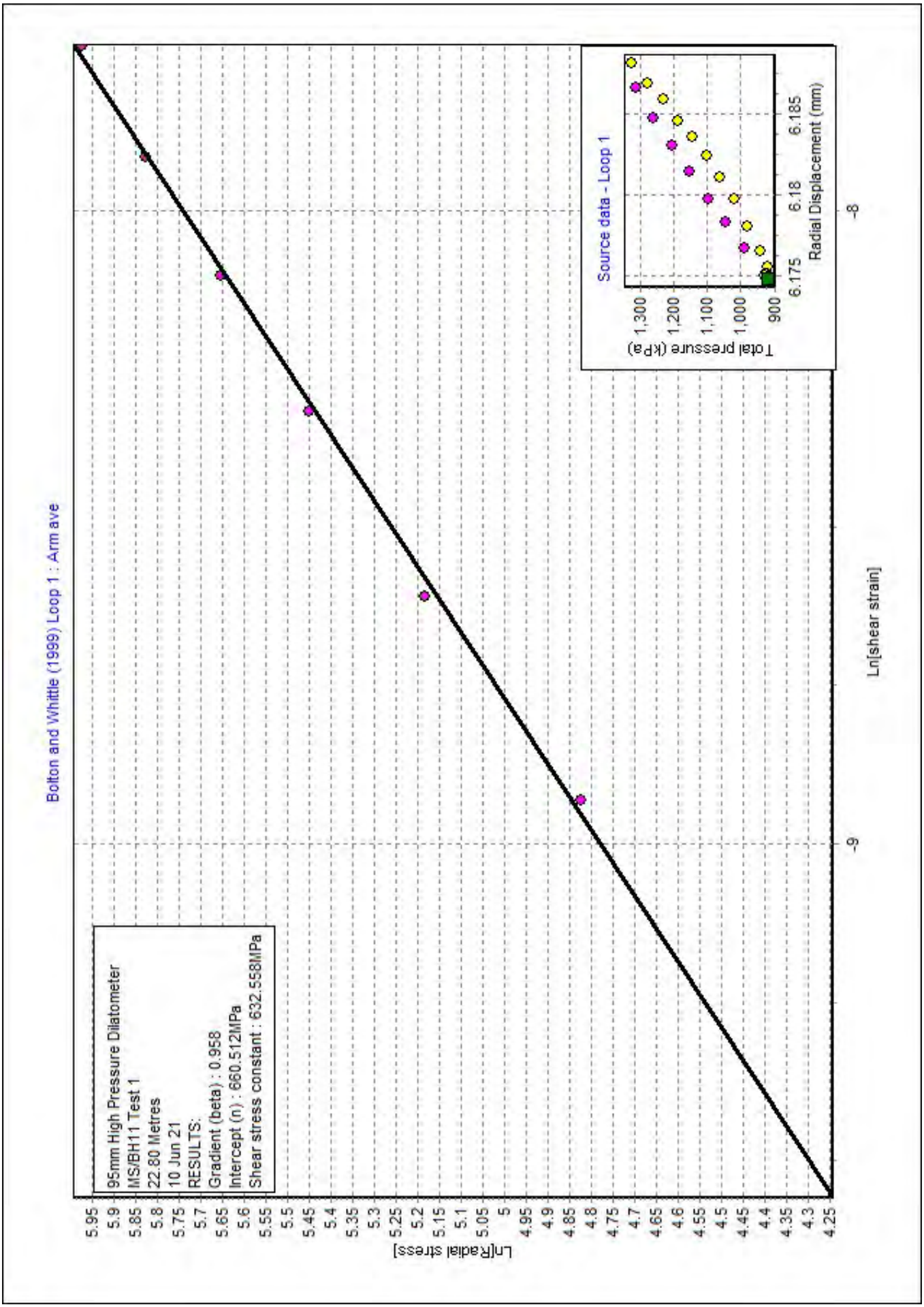

Withers et al (1989) : Arm ave
Ln[(Emx-Ec)/(1+Emx)]
Ln[P'/P'mx]
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
RESULTS:
Ambient water pressure : 185.0 kPa
Residual friction angle : 40.0°
Gradient : -3.601
Friction angle : 40.0°
Dilation angle : 0.0°

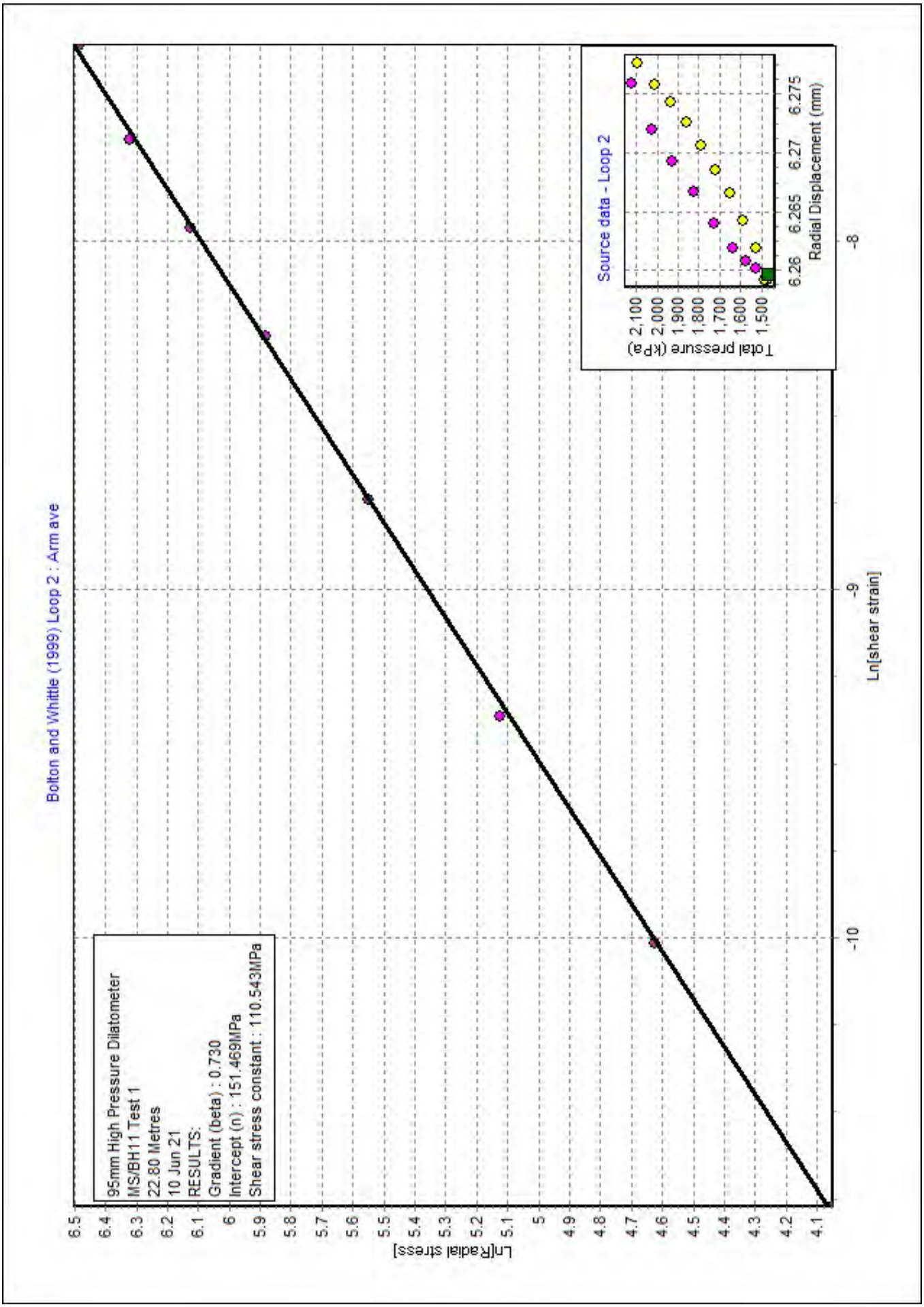

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 868.3MPa
Cycle mid-point:
Cavity strain : 0.021%
Total stress : 1129kPa
Size of cycle :
Shear strain : 0.048%
Total stress : 417kPa
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Total pressure (kPa)
Radial Displacement (mm)

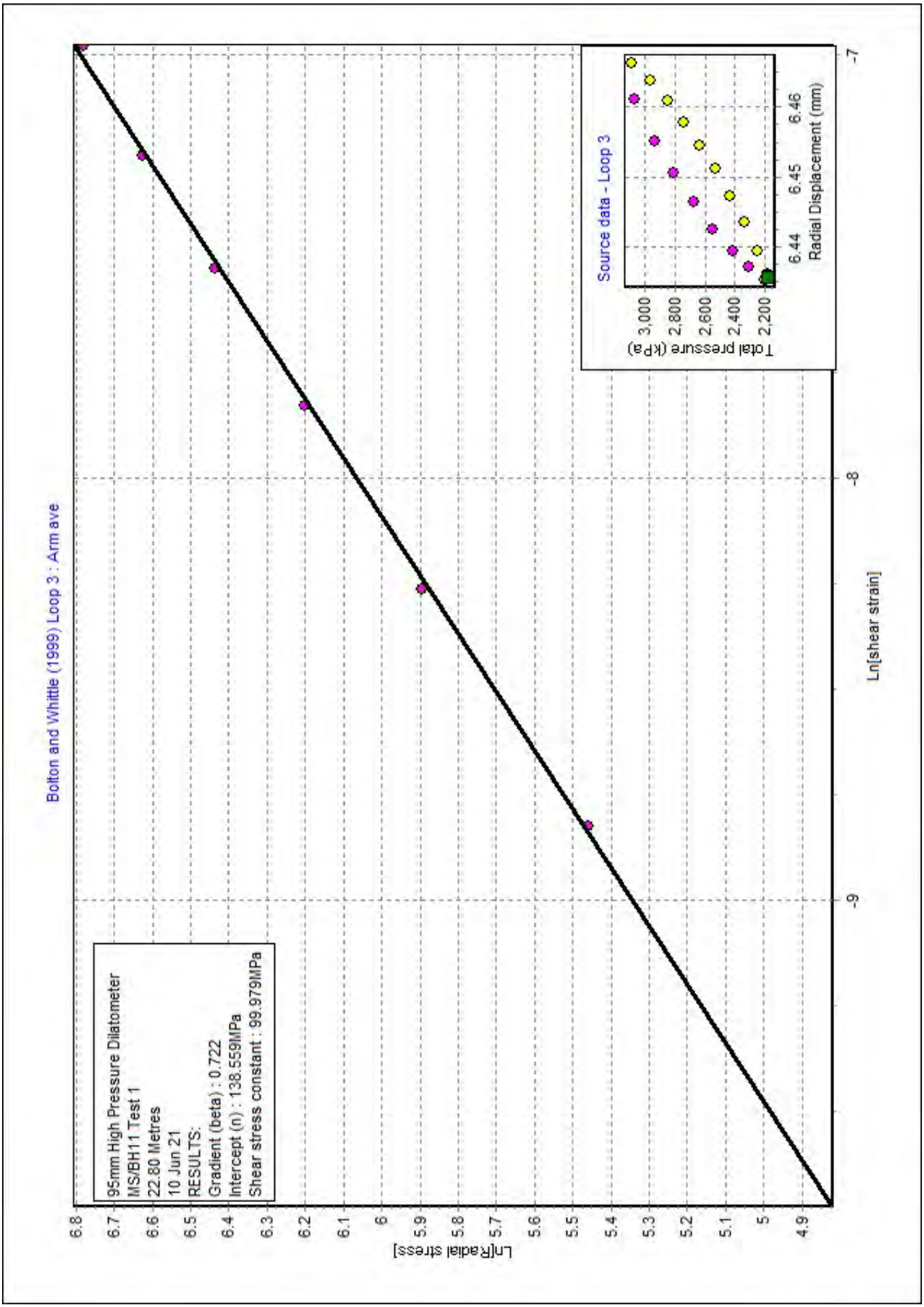

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 1013.1MPa
Cycle mid-point:
Cavity strain : 0.180%
Total stress : 1812kPa
Size of cycle :
Shear strain : 0.067%
Total stress : 683kPa
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Total pressure (kPa)
Radial Displacement (mm)
2,300
2,250
2,200
2,150
2,100
2,050
2,000
1,950
1,900
1,850
1,800
1,750
1,700
1,650
1,600
1,550
1,500
1,450
1,400
6.252
6.254
6.256
6.258
6.26
6.262
6.264
6.266
6.268
6.27
6.272
6.274
6.276
6.278
6.28
6.282
6.284
6.286
6.288
6.29


Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 840.1MPa
Cycle mid-point:
Cavity strain : 0.514%
Total stress : 2662kPa
Size of cycle :
Shear strain : 0.113%
Total stress : 948kPa
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Total pressure (kPa)
Radial Displacement (mm)


Shear modulus from unload/reload cycles Loop 4 : Arm ave
RESULTS:
Gur : 635.6MPa
Cycle mid-point:
Cavity strain : 1.952%
Total stress : 2678kPa
Size of cycle :
Shear strain : 0.223%
Total stress : 1416kPa
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
Total pressure (kPa)
Radial Displacement (mm)


Bolton and Whittle (1999) Loop 1 : Arm ave
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
RESULTS:
Gradient (beta) : 0.958
Intercept (n) : 660.512MPa
Shear stress constant : 632.558MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
Radial Displacement (mm)


Bolton and Whittle (1999) Loop 2 : Arm ave
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
RESULTS:
Gradient (beta) : 0.730
Intercept (n) : 151.469MPa
Shear stress constant : 110.543MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
Radial Displacement (mm)


Bolton and Whittle (1999) Loop 3 : Arm ave
95mm High Pressure Dilatometer
MS/BH11 Test 1
22.80 Metres
10 Jun 21
RESULTS:
Gradient (beta) : 0.722
Intercept (n) : 138.559MPa
Shear stress constant : 99.979MPa
Ln[Radial stress]
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
Radial Displacement (mm)