CC Ground Investigations Ltd

DRAFT

FACTUAL REPORT

SITE: Prison Copse Wall, Northleach

CLIENT: Amey

ORDER No: **4800051555**

DATE: 12 April 2017

REPORT No: C5530

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CONTENTS

1. INTRODUCTION

This investigation was carried out by CC Ground Investigations Ltd (CCGI) on the instruction and on behalf of Amey (The Client and the Engineer).

The purpose of the ground investigation was as follows:

- To determine the failure mechanism of the ground underlying the retaining wall.
- To determine the ground conditions and obtain appropriate soil parameters for use in the pioneering of geotechnical solutions to remediate the retaining wall and to obtain groundwater information.
- To identify any contamination of the underlying soils and groundwater, with particular attention to geotechnical engineering constraints and waste disposal.
- To determine the internal construction and dimensions of the dry stone retaining wall.

The scope of the ground investigation was defined in the Engineer's specification, reference: CON-GE-BHAM- COGL43043047-GI-SPEC-001 Revision 0

This report describes the work carried out by CCGI and presents the findings.

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work, and on the results of laboratory and field tests performed during the investigation. There may however be conditions at or adjacent to the site which have not been taken into account,

such as unpredictable soil strata and water conditions between or below exploratory holes. A careful watch should be maintained during any future groundworks and the comments of this report reviewed as necessary.

This report has been prepared for Amey. This report shall not be relied upon or transferred to other parties without the written consent of CCGI. Should any information contained within this report be used by any unauthorised third party it is done so at their own risk and shall not be the responsibility of CCGI.

2. SITE DESCRIPTION AND GEOLOGY

2.1 Site Description

The area of investigation comprises a currently closed road approximately 200m west of its junction with the A429 at, Northleach, Gloucestershire. The site is centred on the approximate National Grid Reference SP 10659 14929.

2.2 Geology

Geological Records (British Geological Survey (BGS), England and Wales sheet 235 1:50,000 scale) indicate the underlying solid geology comprising the White Limestone Formation, Hampden Formation (Limestone), Taynton Limestone Formation, Fuller's Earth Formation (Mudstone) and Salperton Limestone Formation is recorded. No superficial deposits are recorded.

3. GROUND INVESTIGATION

3.1 Fieldwork

Seven exploratory holes were carried out between 6th and 10th February 2016. All exploratory hole locations are shown on the site plan (Appendix A). The exploratory hole locations were set out by CCGI as directed by the Client on site.

The fieldwork was carried out in general accordance with BS5930; 2015.

Three boreholes, referenced BH01 to BH03 (Exploratory Hole Data – Appendix B) were formed using a track mounted Comacchio MC300 multi-purpose rig. Following CAT scanning hand tools were used to excavate an inspection pit to a maximum depth of 1.20m to check for buried services. Bulk, small disturbed and environmental soil samples were taken and retained from the inspection pits. The boreholes were then advanced using percussive sampling techniques to produce continuous disturbed samples of 98mm diameter.

On refusal of percussive sampling the boreholes were continued by rotary core drilling techniques utilising a water flush. A double-tube swivel core barrel with a semi-rigid plastic liner was utilised to recover continuous cores of 91mm diameter.

Undisturbed samples of 100mm nominal diameter were taken in suitable cohesive material using an open drive sampler (U(T)100). The samples were wax sealed on site to prevent moisture loss.

Boreholes were monitored for groundwater ingress as they were advanced. Upon encountering water, sampling was temporarily stopped to allow the level to stabilise. Water levels were also recorded at the start and finish of each shifts work and on completion of the borehole and are presented on the relevant log.

On completion combined gas and water monitoring standpipes were installed in BH01 and BH03. Each installation consisted of a 19mm ID HDPE slotted tube set in a filter response zone of limestone free gravel. The installation was sealed above and below with a bentonite pellet seal and accessed via a valve assembly.

On completion an inclinometer monitoring standpipe was installed in BH02. The installation consisted of a 70mm 0D HDPE tube set in bentonite-cement grout. The installation was sealed above with a bentonite pellet seal.

The installations were protected at the surface by a D400 traffic rated stopcock covers set in concrete. Installation details are given on the relevant borehole log.

Following CAT scanning, two trial pits, referenced TP01 and TP02, (Exploratory Hole Data – Appendix B) were excavated using hand digging tools.

Photographs and representative sketches of the trial pit profile, and photographs of the spoil heap were taken and are presented following the relevant log.

On completion all trial pits were backfilled with arisings. The ground surface was reinstated.

Two masonry cores, referenced CH01 and CH02, were undertaken within an existing retaining wall adjacent to the road, core locations are shown in Appendix A. Coring was undertaken using water-flush hydraulic coring apparatus. Coring was undertaken using 65mm diamond tipped barrels.
On completion of masonry coring the core holes were backfilled with site mixed mortar. Core logs are presented in Appendix B.

Subsequent to fieldwork, all exploratory hole positions were surveyed and National Grid co-ordinates and levels are presented on the relevant log.

On completion of fieldwork all samples were brought to CCGI's office for storage.

3.2 In Situ Testing

Standard penetration tests (SPT's) were carried out in general accordance with BS EN ISO 22476-3:2005. A split barrel or a solid cone was used depending upon the materials encountered and the split barrel samples retained as small disturbed samples. The SPT N value was taken as the number of blows to penetrate the 300mm test drive following a 150mm seating drive. Where low penetration was recorded the seating drive was terminated at 25 blows and the test drive completed after a further 50 blows. SPT results are summarised as uncorrected N values on the borehole logs. SPT hammer calibration data is presented in Appendix D.

Hand shear vane tests were carried out using a direct read Pilcon Simmons Edeco hand vane tester, different vane sizes were used depending on the consistency of

the soil encountered. The results are presented on the relevant exploratory hole log. (Appendix B)

3.3 Logging

Soil and rock samples from the exploratory holes were logged by an Engineering Geologist in general accordance with BS5930; 2015. Bulk, small disturbed, core and environmental soil samples were taken and retained at a range of depths. Soil and rock descriptions are presented in the borehole logs together with details of sampling, in situ testing and relevant comments on drilling techniques.

3.4 Laboratory Testing

The following laboratory tests were carried out by GSTL (UKAS No. 2788) in accordance with BS1377:1990, Parts 1 to 8, unless otherwise stated. The results are presented in Appendix C.

Test Type	No. of Tests	Remarks
Natural Moisture Content	7	The results are shown on the summary of soil classification tests.
Liquid and Plastic Limits	7	The results are shown on the plasticity chart and summary of soil classification tests.
Effective Stress testing	2	Undertaken on a set of 3no 38mm samples – **testing is ongoing at the time of issue of this report**
BRE SD1 chemical testing suite for soil	4	Testing carried out by Chemical Testing Laboratories in accordance with BRE Special Digest 1.

A range of chemical tests were carried out on soil and water samples by i2 Analytical (UKAS No. 4041). Testing was carried out in accordance with ISO 17025. The results are tabulated and presented in Appendix C.

CC GROUND INVESTIGATIONS LIMITED

Declan O'Donnell BSc (Hons) FGS
Engineering Geologist

Rob Clarke. BSc (Hons) MSc
Director

4. REFERENCES

British Geological Society, Solid and Drift Sheet 235, Cirencester, 1:50,000 scale

BRE Special Digest 1:2003: Concrete in aggressive ground. Part 1.

BS 5930; 2015, Code of Practice for Site Investigations

BS 1377: Parts 1 to 9 (1990), Methods of Tests of Soils for Civil Engineering Purposes

BS EN ISO 14688: Part 1: (2002), Identification and description of soil.

BS EN ISO 14688: Part 2: (2004), Principles for a classification of soil.

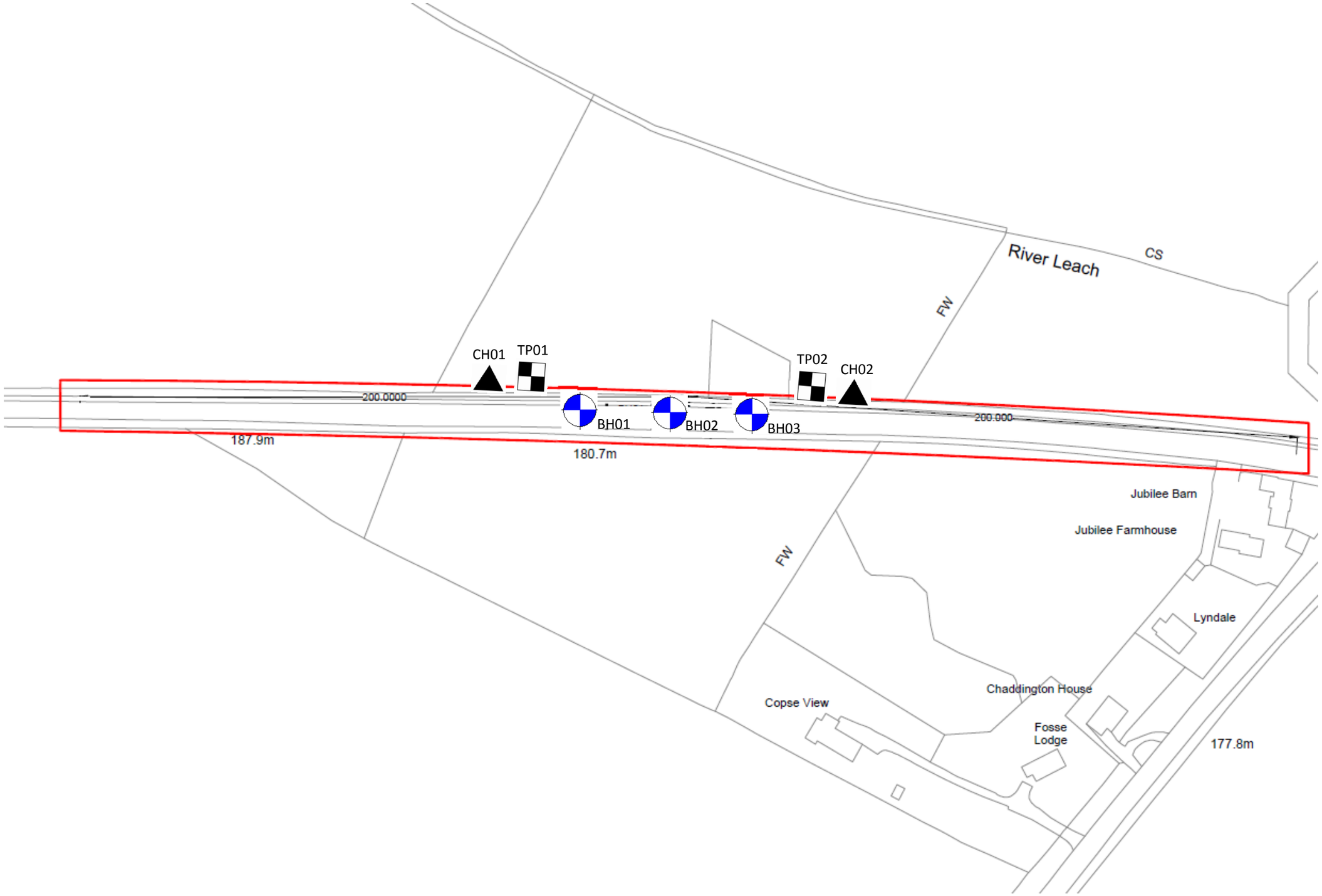
BS EN ISO 14689: Part 1: (2003), Identification and description.

BS EN ISO 22475: Part 1: (2006), Technical principles for execution.

BS EN ISO 22476: Part 3: (2005), Standard penetration test.

APPENDIX A

Appendix A – Site Plan



KEY:

Borehole

Foundation Pits

Corehole

Notes:

Reproduced from base plan provided by Client.

Locations indicative only.

CC Ground Investigations Ltd

Site Layout Plan

Prison Copse Wall

Amey

Appendix A

Contract No: C5530

Drawn by:	Scale:
DO	NTS

APPENDIX B

Appendix B – Exploratory Hole Data

KEY TO EXPLORATORY HOLE LOGS

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Logging

The logging of soils and rocks has been carried out in general accordance with BS 5930:2015.

Sample type

B	Large disturbed sample
C	Core run
CS	Rotary core sub-sample
D	Small disturbed sample
ES	Environmental sample
SPT	Standard penetration test carried out using split spoon (split spoon sample retained)
SPT C	Standard penetration test carried out using solid cone (no sample retained)
U70 or U100	Undisturbed sample followed by nominal diameter of sample. (Taken using thick-walled open-tube sampler – OS-TK/W)
UT100	Undisturbed sample followed by nominal diameter of sample. (Taken using thin-walled open-tube sampler – OS-T/W)
W	Water sample

Water levels

Initial Water Strike

Level after monitoring

3.00m/Dry
Standing Level/No groundwater encountered

Insitu Testing

S 30	Denotes SPT undertaken using split spoon followed by N Value (EN ISO 22476-3:2005+A1:2011)
C 30	Denotes SPT undertaken using solid cone followed by N Value (EN ISO 22476-3:2005+A1:2011)
*240	Denotes SPT where full test drive has not been completed and linearly extrapolated N value reported
**	Denotes no effective penetration (Linearly extrapolated N value > 1000)
H 30	Hand shear vane. Direct reading in kPa

Sample range

Undisturbed sample

Core run

U(T)100 Undisturbed Samples

Rotary core sub-sample

Installation Details

Porous Tip

Screened Standpipe

Bentonite seal

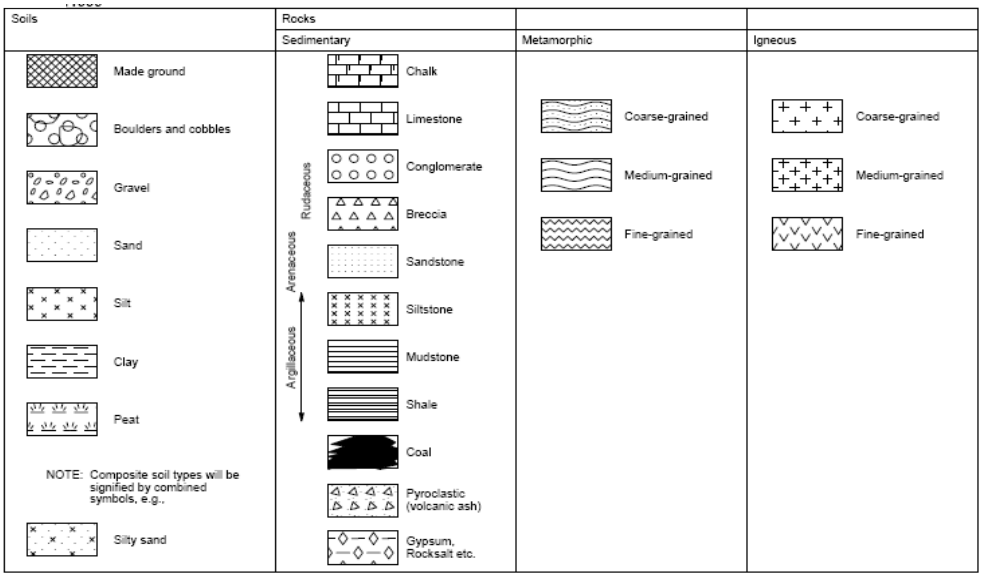
Plain standpipe

Granular response zone

Concrete

Grout

Backfill with arisings



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ROTARY BOREHOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Borehole No. **BH01**

Sheet 1 of 2

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410631 N 214930	Hole Type DS+RC
Location: Northleach		Level: 180.24mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 06/02/2017 End: 07/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing: No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
		B	0.20					MADE GROUND: Tarmacadam. 0.20m: Plastic geotextile. 0.35m: Plastic geotextile.	(0.60)		
		B	0.50						0.60	179.64	
		ES	0.70					MADE GROUND: Greyish brown and dark grey slightly sandy angular to sub-rounded fine to coarse GRAVEL of limestone, concrete and clinker.	0.80	179.44	
1		B	1.00					Light grey and yellowish brown slightly sandy clayey GRAVEL & COBBLES of limestone. [POSSIBLE REWORKED MATERIAL]	1.00	179.24	1
		SPT	1.20 - 1.65	S 6							
		ES	1.50					Soft and very soft orangish brown mottled greyish brown slightly gravelly slightly sandy CLAY with a low cobble content. Gravel and cobbles are sub-angular and sub-rounded fine to coarse of limestone. [POSSIBLE REWORKED MATERIAL]	(1.10)		
		D	1.80	H 42							
2		H						1.40-1.70m: Rare fossil/shell fragments <10mm.	2.10	178.14	2
								Soft extremely closely fissured greenish grey slightly gravelly slightly sandy silty CLAY. Gravel is sub-angular fine to coarse of limestone.			
		D	2.70					2.70-3.20m: Frequent fossil/shell fragments <15mm.	(1.60)		
3	▽										3
		SPT	3.20 - 3.65	S 8							
		H	3.70	H 38				Soft very closely fissured light brownish grey and yellowish brown slightly sandy CLAY.	3.70	176.54	
		D	3.80								
4		SPT	4.00 - 4.45	S 5							4
		H	4.50	H 44				4.40-4.60m: 1 no. sub-angular limestone cobble.	(1.70)		
		UT100	4.60 - 5.05								
5								5.00-5.40m: Rare dark orangish brown staining (<2 x 10mm) penetrating up to 5mm.			5
								Firm extremely closely and very closely fissured bluish grey slightly sandy silty CLAY.	5.40	174.84	
		D	5.60								
		H	5.70	H 79							
6		SPT	6.00 - 6.45	S 16				5.90-6.20m: Locally light brown. Slightly gravelly. Gravel is sub-angular fine to coarse of limestone.			6
								6.50-7.00m: Occasional partings of slightly sandy silty (<10 x 30mm).			
7		D	7.00						(3.40)		7
		SPT	7.30 - 7.75	S 12				7.30-8.00m: Indistinctly thinly laminated.			
8											8

EQUIPMENT: Hand digging tools. Comacchio MC300 track mounted rig.
METHOD: Waterflush rotary coring using 300mm concrete coring barrel: 0.00-0.60m. Dynamic sampling using 113mm sample barrel: 1.20-8.80m. Waterflush rotary coring using T6-116 coring barrel: 8.80-14.50m.
CASING: PW to 8.80m.
GROUNDWATER: Encountered at 3.10m. No rise recorded after 20 minutes of observation.
INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 1.00-5.00m. Plain 50mm ID HDPE pipe with bentonite pellet seal: 0.20-1.00m. Flush 150mm steel cover set in concrete: 0.00-0.20m. Gas valve fitted.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
06/02/17	3.10		3.10

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
06/02/2017 17:00	4.00	4.00	3.10
07/02/2017 08:00	4.00	4.00	3.10

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ROTARY BOREHOLE LOG

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Borehole No. **BH01**

Sheet 2 of 2

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410631 N 214930	Hole Type DS+RC
Location: Northleach		Level: 180.24mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 06/02/2017 End: 07/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing: No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
		D	8.20					Firm extremely closely and very closely fissured bluish grey slightly sandy silty CLAY. *(continued from previous sheet)* 8.00-8.50m: Rare thin laminae of sandy silt. 8.00-8.80m: Becoming stiff.			
9		C SPT	8.80 - 10.00 8.80 - 9.25	S 41	C	100% 100% 0%		Extremely weak thinly and thickly laminated bluish grey MUDSTONE. Discontinuities are sub-horizontal extremely closely spaced planar and stepped smooth.	8.80	171.44	9
		D	9.80					9.50-10.00m: Discontinuities locally infilled with slightly sandy silt (<5mm).			
10		C SPT C	10.00 - 11.50 10.00 - 10.42	C*57	C	100% 82% 0%			(3.10)		10
		D	10.80					10.50-11.00m: Locally non-intact.			
11		D C SPT C	11.40 11.50 - 13.00 11.50 - 11.83	C*83	C	100% 75% 45%					11
12								Non intact very weak LIMESTONE recovered as yellowish brown and brown sub-angular fine to coarse gravel.	11.90 12.20	168.34 168.04	12
		CS C SPT C	12.85 - 13.00 13.00 - 14.50 13.00 - 13.13	C*500	C	100% 78% 71%		Very weak yellowish brown thinly and thickly bedded LIMESTONE. Discontinuities are sub-horizontal very closely spaced and closely spaced undulating rough. 12.50m: Discontinuity infilled with slightly sandy gravel.	(2.30)		13
14		CS	14.20 - 14.50		C						14
		SPT C	14.50 - 14.56	C*500				Borehole completed at 14.50m	14.50	165.74	
15											15
16											16
17											17

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
07/02/2017 17:00	14.50	8.80	0.80

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH01
Contract Name:	Prison Copse Wall	**Box No:**	01
Client:	Amey	**Depth:**	1.20-4.00m

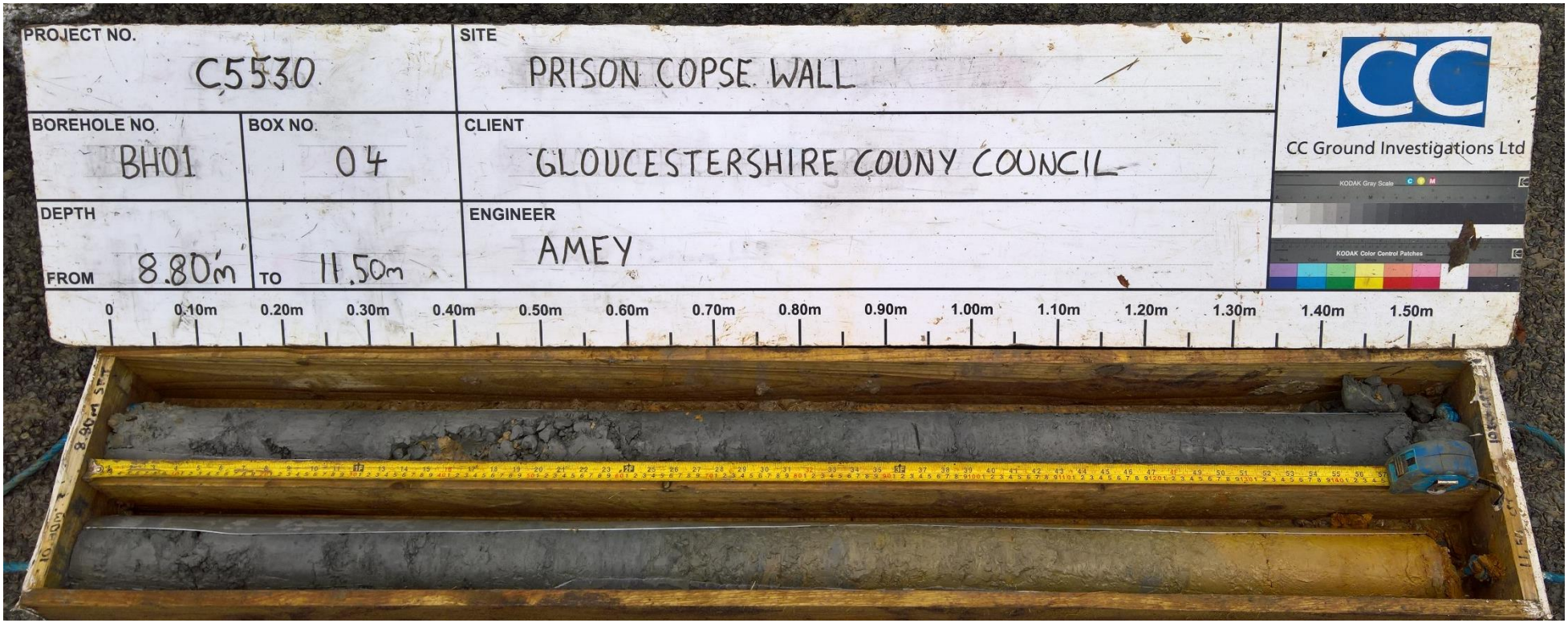
Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH01
Contract Name:	Prison Copse Wall	**Box No:**	02
Client:	Amey	**Depth:**	4.00-6.00m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH01
Contract Name:	Prison Copse Wall	**Box No:**	03
Client:	Amey	**Depth:**	6.00-8.80m

Core Photograph



CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH01
Contract Name:	Prison Copse Wall	**Box No:**	04
Client:	Amey	**Depth:**	8.80-11.50m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH01
Contract Name:	Prison Copse Wall	**Box No:**	05
Client:	Amey	**Depth:**	11.50-14.50m

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ROTARY BOREHOLE LOG

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Borehole No. **BH02**

Sheet 1 of 2

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410640 N 214929	Hole Type DS+RC
Location: Northleach		Level: 179.63mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 08/02/2017 End: 09/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing: No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
								MADE GROUND: Tarmacadam.			
								0.20m: Plastic geotextile. 0.35m: Plastic geotextile.	(0.60)		
								MADE GROUND: Dark grey and greyish brown slightly sandy angular and sub-angular fine to coarse GRAVEL of slag, clinker and ash.	0.60	179.03	
1		B	1.00 - 1.10						(0.60)		1
		ES	1.00	S 16				Medium dense yellowish brown slightly sandy GRAVEL & COBBLES of limestone. [POSSIBLE REWORKED MATERIAL]	1.20	178.43	
		SPT	1.20 - 1.65						(0.40)		
		ES	1.40						1.60	178.03	
		D	1.70					Soft extremely closely fissured orangish brown mottled greyish brown slightly gravelly slightly sandy CLAY. Gravel is sub-angular and sub-rounded fine to coarse of limestone. [POSSIBLE REWORKED MATERIAL]	1.90	177.73	
2		H	1.80	H 31							2
		SPT	2.20 - 2.65	S 2				Very soft and soft very closely fissured greenish grey slightly gravelly slightly sandy silty CLAY. Gravel is sub-angular fine to coarse of limestone. 2.30-2.75m: Rare fossil/shell fragments <20mm. 2.60-3.40m: Slight organic odour.	(1.80)		
		H	2.80	H 41							
3		D	3.00								3
		UT100	3.20 - 3.65						3.70	175.93	
		H	3.80	H 43				Soft extremely closely fissured orangish brown and light orangish brown slightly gravelly slightly sandy CLAY. Gravel is sub-rounded fine and medium of limestone. 4.10-4.20m: Rare partly decomposing organic matter <10mm.			
4		D	4.00								4
		SPT	4.20 - 4.65	S 8							
		H	4.80	H 28					(2.20)		
5		D	5.00								5
		SPT	5.20 - 5.65	S 9							
								Stiff extremely closely fissured bluish grey slightly sandy silty CLAY.	5.90	173.73	
6		D	6.20								6
		H	6.50	H 112							
		SPT	6.70 - 7.15	S 46				6.70-7.30m: Indistinctly thinly laminated. Rare silty lenses (<2x10mm).	(2.00)		
7											7
		D	7.50								
8									7.90	171.73	8

EQUIPMENT: Hand digging tools. Comacchio MC300 track mounted rig.
METHOD: Hand breaker: 0.00-0.60m. Hand dug inspection pit: 0.60-1.20m. Dynamic sampling using 113mm sample barrel: 1.20-8.00m. Waterflush rotary coring using T6-116 coring barrel: 8.00-12.50m.
CASING: PW to 8.00m.
GROUNDWATER: None encountered prior to using water flush to advance casing to 8.00m.
INSTALLATION: 70mm ID HDPE Inclinometer installed to 15.00m with 2:1 grout mix. Flush 150mm steel cover set in concrete: 0.00-0.20m. Bottom and top caps fitted.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)

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ROTARY BOREHOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Borehole No. **BH02**

Sheet 2 of 2

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410640 N 214929	Hole Type DS+RC
Location: Northleach		Level: 179.63mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 08/02/2017 End: 09/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing: No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
		C SPT	8.00 - 9.50 8.00 - 8.45	S 46		100% 65% 0%		Extremely weak thinly and thickly laminated bluish grey MUDSTONE. Discontinuities are sub-horizontal extremely closely spaced planar and stepped smooth. *(continued from previous sheet)*			
		D	8.50					8.60-9.50m: Locally very stiff.			
9									(3.00)		9
		C SPT	9.50 - 11.00 9.50 - 9.45	S 49		100% 60% 0%					
10		D	10.00								10
									10.90	168.73	
11		C SPT C	11.00 - 12.50 11.00 - 11.05	S*750		100% 84% 60%		Non intact very weak LIMESTONE recovered as yellowish brown brown sub-angular fine to coarse gravel.	11.00	168.63	11
								Very weak yellowish brown thinly bedded LIMESTONE. Discontinuities are sub-horizontal very closely spaced and closely spaced undulating rough.	(1.50)		
12		CS	12.00 - 12.20								12
		SPT C	12.50 - 12.56	S*500				Borehole completed at 12.50m	12.50	167.13	
13											13
14											14
15											15
16											16
17											17

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
08/02/2017 17:00	11.00	8.00	1.30
09/02/2017 08:00	11.00	8.00	3.30
09/02/2017 17:00	12.50	8.00	3.30

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH02
Contract Name:	Prison Copse Wall	**Box No:**	01
Client:	Amey	**Depth:**	1.20-4.20m

Core Photograph

CC Ground Investigations Ltd	**Contract ID:**	C5530	**Borehole ID:**	BH02
	Contract Name:	Prison Copse Wall	**Box No:**	02
	Client:	Amey	**Depth:**	4.20-6.70m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH02
Contract Name:	Prison Copse Wall	**Box No:**	03
Client:	Amey	**Depth:**	6.70-9.50m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH02
Contract Name:	Prison Copse Wall	**Box No:**	04
Client:	Amey	**Depth:**	9.50-12.50m

CC Ground Investigations Ltd

ROTARY BOREHOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Borehole No. **BH03**

Sheet 1 of 2

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410648 N 214930	Hole Type DS+RC
Location: Northleach		Level: 179.21mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 09/02/2017 End: 10/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
								MADE GROUND: Tarmacadam.	(0.60)		
								MADE GROUND: Dark grey, orangish brown and greyish brown slightly sandy slightly clayey angular and sub-angular fine to coarse GRAVEL of limestone, clinker and ash. 0.90-1.10m: Low cobble content. Cobbles are sub-angular of limestone.	0.60	178.61	
1		B 1.00 - 1.10 ES 1.00 SPT 1.20 - 1.65 ES 1.40		S 12					(0.50)		1
		D 1.60						Yellowish brown slightly sandy slightly clayey angular to rounded fine to coarse GRAVEL of limestone with a low cobble content. Cobbles are sub-angular of limestone. [POSSIBLE REWORKED MATERIAL]	1.10	178.11	
2		H 1.90 D 2.00 SPT 2.20 - 2.65		H 37 S 8				Soft and very soft orangish brown mottled greyish brown slightly gravelly slightly sandy CLAY with a low cobble content. Gravel and cobbles are sub-angular and sub-rounded fine to coarse of limestone. [POSSIBLE REWORKED MATERIAL] 1.60-1.70m: Frequent fossil/shell fragments <10mm.	1.40	177.81	2
									1.70	177.51	
3	1.1	H 2.90 UT100 3.20 - 3.65		H 42				Soft very closely fissured greenish grey slightly gravelly slightly sandy silty CLAY. Gravel is sub-angular fine to coarse of limestone. 2.50-3.20m: Rare to occasional fossil/shell fragments <10mm. 3.30-4.00m: Frequent dark orangish brown staining (<2x10mm) penetrating up to 2mm.	(2.95)		3
4		D 3.65 H 3.70 SPT 4.20 - 4.65		H 33 S 8					4.65	174.56	4
5		D 5.00 SPT 5.20 - 5.65		S 4				Soft very closely fissured light brownish grey and yellowish brown slightly sandy CLAY.	(2.05)		5
6		D 6.30							6.70	172.51	6
7		SPT 6.70 - 7.15		S 24				Stiff extremely closely and very closely fissured bluish grey slightly sandy silty CLAY.			7
8		D 7.50									8

EQUIPMENT: Hand digging tools. Comacchio MC300 track mounted rig.
METHOD: Hand breaker: 0.00-0.60m. Hand dug inspection pit: 0.60-1.20m. Dynamic sampling using 113mm sample barrel: 1.20-8.20m. Waterflush rotary coring using T6-116 coring barrel: 8.20-12.50m.
CASING: PW to 8.20m.
GROUNDWATER: Encountered at 3.30m. No rise recorded after 20 minutes of observation.
INSTALLATION: 50mm ID HDPE slotted pipe with washed gravel response zone: 7.00-10.00m. Plain 50mm ID HDPE pipe with bentonite pellet seal: 0.20-7.00m. Raised 150mm steel cover set in concrete: 0.00-0.20m. Gas valve fitted.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
09/02/17	3.30		3.30

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)

CC Ground Investigations Ltd

ROTARY BOREHOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Borehole No. **BH03**

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410648 N 214930	Hole Type DS+RC
Location: Northleach		Level: 179.21mAOD	Scale 1 : 50.00
Client: Gloucestershire County Council		Dates: Start: 09/02/2017 End: 10/02/2017	Logged By DO

(m)	Water Levels	Core Run, Samples & Testing: No/Type	Depth (m)	Result	Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAD)	Legend
		SPT	8.20 - 8.65	S 13				Stiff extremely closely and very closely fissured bluish grey slightly sandy silty CLAY. *(continued from previous sheet)*			
								8.20-8.65m: Locally firm.	(3.30)		
		D	8.80					8.60-10.00m: Locally tending to an extremely weak mudstone.			
9		C	9.50 - 11.00	S 23		100% 72% 48%					9
		SPT	9.50 - 9.95		C						
10								Very weak yellowish brown thinly and thickly bedded LIMESTONE. Discontinuities are sub-horizontal very closely spaced and closely spaced undulating rough.	10.00	169.21	10
		CS	10.85 - 11.00								
11		C	11.00 - 12.50	S*750		100% 92% 84%					11
		SPT C	11.00 - 11.11		C				(2.50)		
								11.80-11.85m: Non intact.			
12		CS	12.20 - 12.50								12
		SPT C	12.50 - 12.56	S*500				Borehole completed at 12.50m	12.50	166.71	
13											13
14											14
15											15
16											16
17											17

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
09/02/2017 17:00	8.20	6.70	0.80
10/02/2017 08:00	8.20	6.70	2.20
10/02/2017 17:00	12.50	8.20	0.80

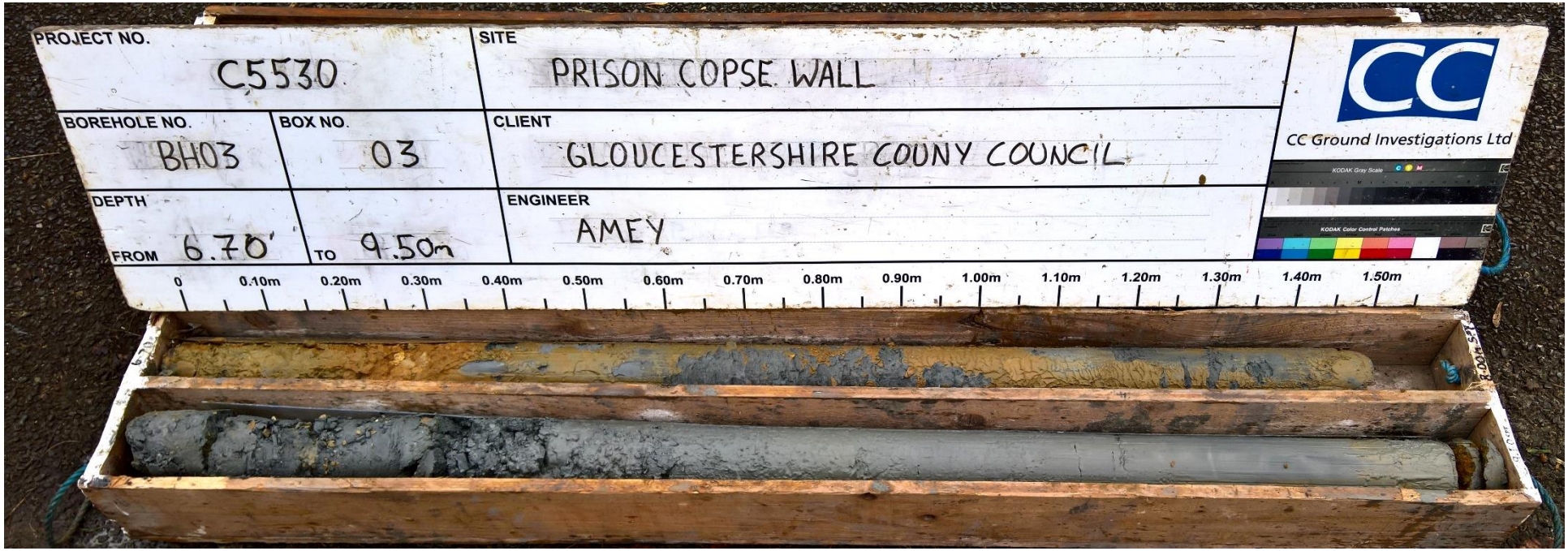
Core Photograph

CC Ground Investigations Ltd	**Contract ID:**	C5530	**Borehole ID:**	BH03
	Contract Name:	Prison Copse Wall	**Box No:**	01
	Client:	Amey	**Depth:**	1.20-4.20m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH03
Contract Name:	Prison Copse Wall	**Box No:**	02
Client:	Amey	**Depth:**	4.20-6.70m

Core Photograph



CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH03
Contract Name:	Prison Copse Wall	**Box No:**	03
Client:	Amey	**Depth:**	6.70-9.50m

Core Photograph

CC Ground Investigations Ltd			
Contract ID:	C5530	**Borehole ID:**	BH03
Contract Name:	Prison Copse Wall	**Box No:**	04
Client:	Amey	**Depth:**	9.50-12.50m

CC Ground Investigations Ltd

TRIAL PIT LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Pit No **TP01**

Sheet 1 of 1

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410607 N 214936 Level: 179.16mAOD	Date 09/02/2017
Location: Northleach		Dimensions: 0.60m Depth 1.10m, 0.65m	Scale 1 : 12.5
Client: Gloucestershire County Council			Logged By DO

(m)	Water Levels	Samples & In Situ Testing No/Type	Depth (m)	Result	Description	Depth (m)	Level (mAD)	Legend
					MADE GROUND: Grass over soft orangish brown and greyish brown slightly gravelly slightly sandy CLAY. Gravel is sub-angular and sub-rounded fine to coarse of limestone, brick fragments and rare clinker.			
					0.20-0.60m: Limestone footing stepping out 120mm.	(0.40)		
					Soft very closely fissured orangish brown slightly gravelly slightly sandy CLAY. Gravel is sub-angular fine to coarse of limestone. [POSSIBLE REWORKED MATERIAL]	0.40	178.76	
						(0.20)		
					Yellowish brown slightly sandy sub-angular and sub-rounded fine to coarse GRAVEL of limestone with a high cobble content and low boulder content. Cobbles and boulders are sub-angular and sub-rounded of limestone. [POSSIBLE REWORKED MATERIAL]	0.60	178.56	
					0.60m: Road pin inserted under footing.	(0.50)		
1	Dry.				Trial pit completed at 1.10m	1.10	178.06	1
2								2

EQUIPMENT: Hand Digging Tools.

METHOD: Trial pits excavated using hand tools.

GROUNDWATER: Not encountered.

STABILITY: Trial pit remained stable and vertical throughout.

BACKFILL: Trial pit backfilled with arisings and compacted by hand.

Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP01

Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP01

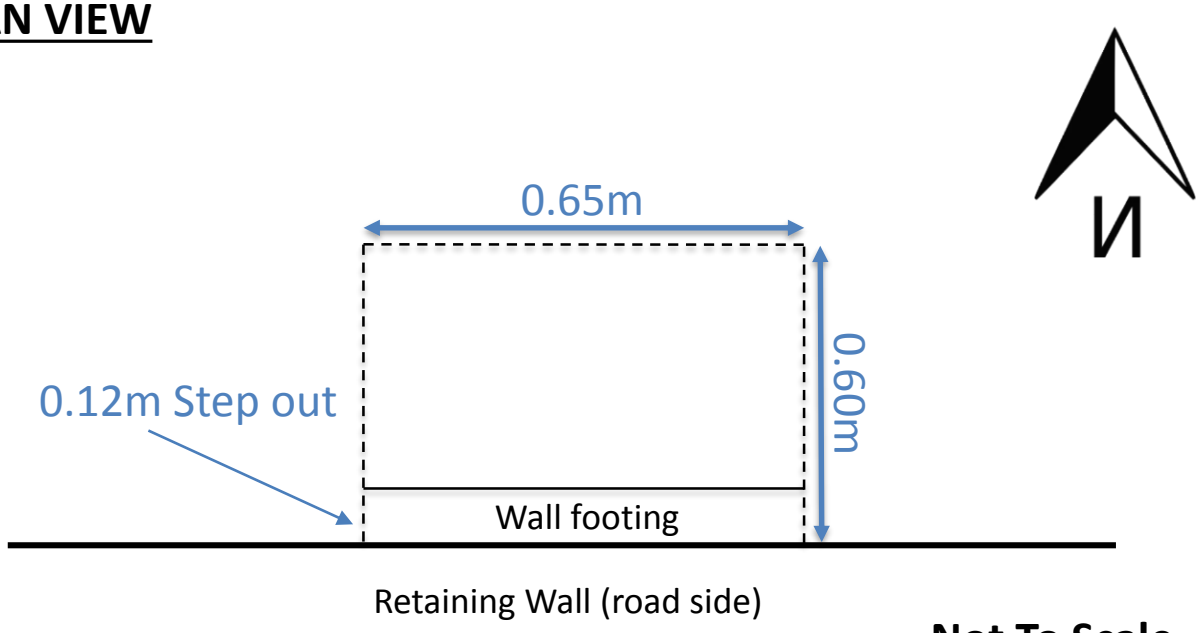
Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP01

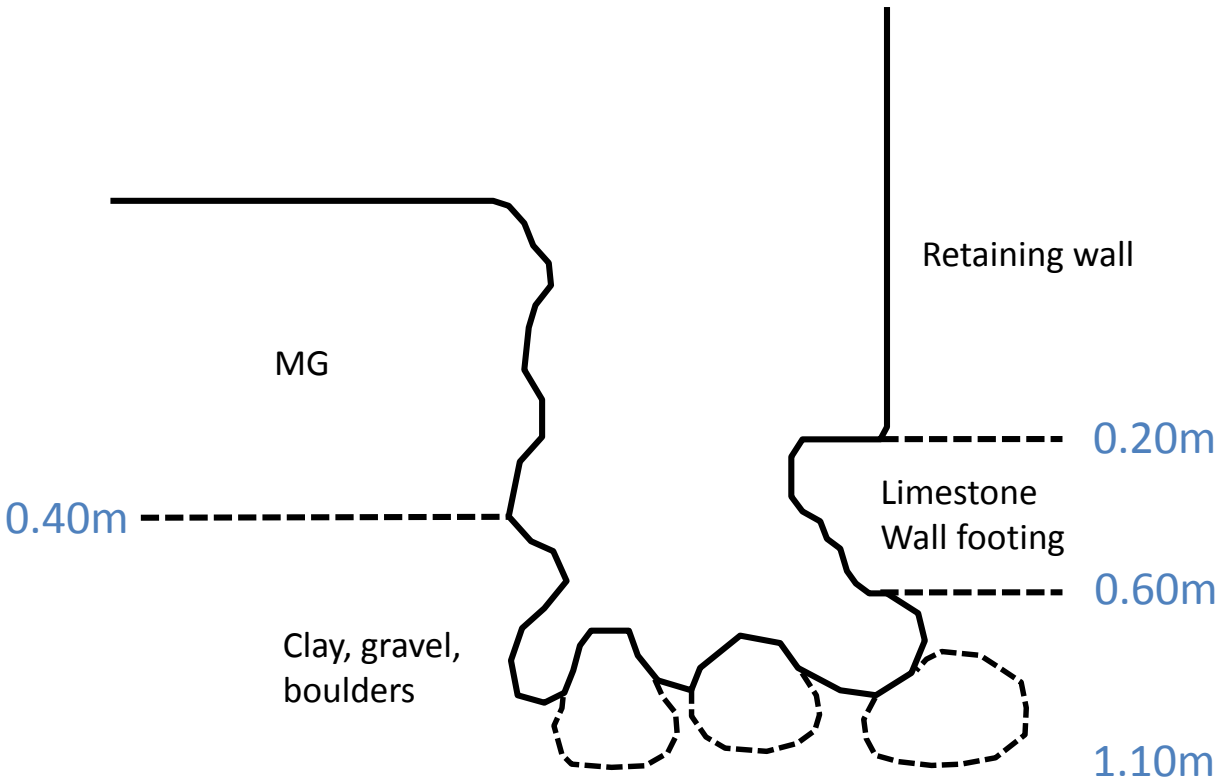
Trial Pit Sketch

PLAN VIEW



Not To Scale
All dimensions in m

CROSS SECTION



CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	GCC
Hole ID:	TP01

CC Ground Investigations Ltd

TRIAL PIT LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Pit No **TP02**

Sheet 1 of 1

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410660 N 214935 Level: 176.18mAOD	Date 09/02/2017
Location: Northleach		Dimensions: 0.60m Depth 0.85m 0.70m	Scale 1 : 12.5
Client: Gloucestershire County Council			Logged By DO

(m)	Water Levels	Samples & In Situ Testing No/Type	Depth (m)	Result	Description	Depth (m)	Level (mAD)	Legend
					MADE GROUND: Grass over soft orangish brown and greyish brown slightly gravelly slightly sandy CLAY. Gravel is sub-angular and sub-rounded fine to coarse of limestone and brick fragments.			
					0.20-0.55m: Limestone footing stepping out 300mm.	(0.55)		
	1 Seepage.				Soft orangish brown very closely fissured slightly gravelly slightly sandy CLAY. Gravel is sub-angular fine to coarse of limestone. [POSSIBLE REWORKED MATERIAL]	0.55	175.63	
					0.55m: Road pin inserted under footing.	(0.30)		
	1				Trial pit completed at 0.85m	0.85	175.33	
1								1
2								2

EQUIPMENT: Hand Digging Tools.

METHOD: Trial pits excavated using hand tools.

GROUNDWATER: Seepage at base rising to 0.57m on completion.

STABILITY: Trial pit remained stable and vertical throughout.

BACKFILL: Trial pit backfilled with arisings and compacted by hand.

Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP02

Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP02

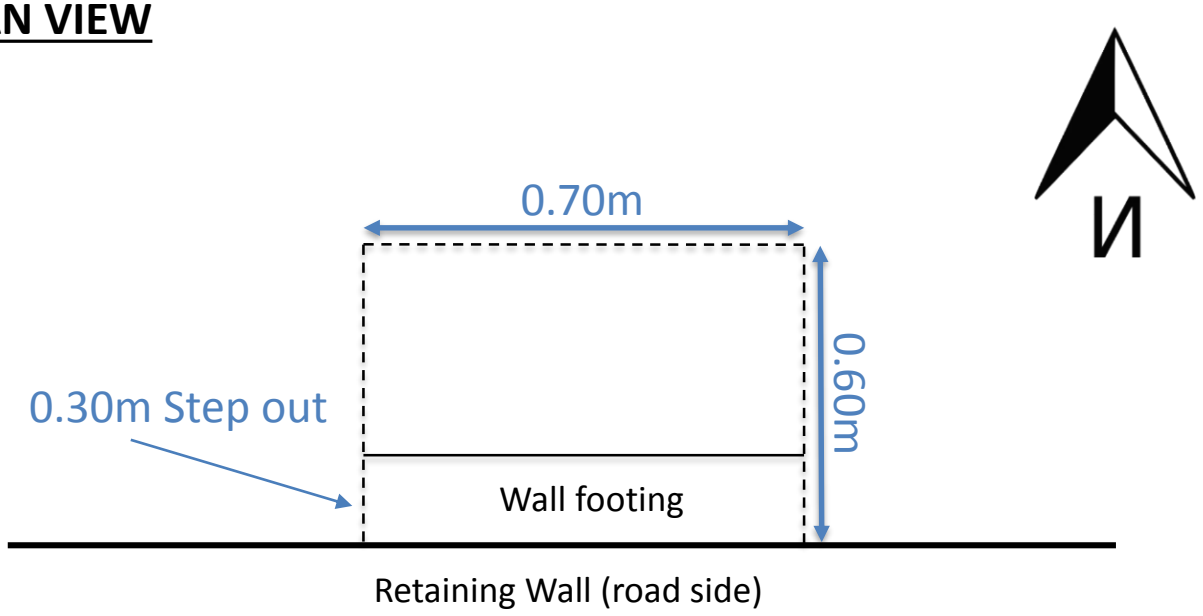
Trial Pit Photographs

CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	Amey
Sample ID:	TP02

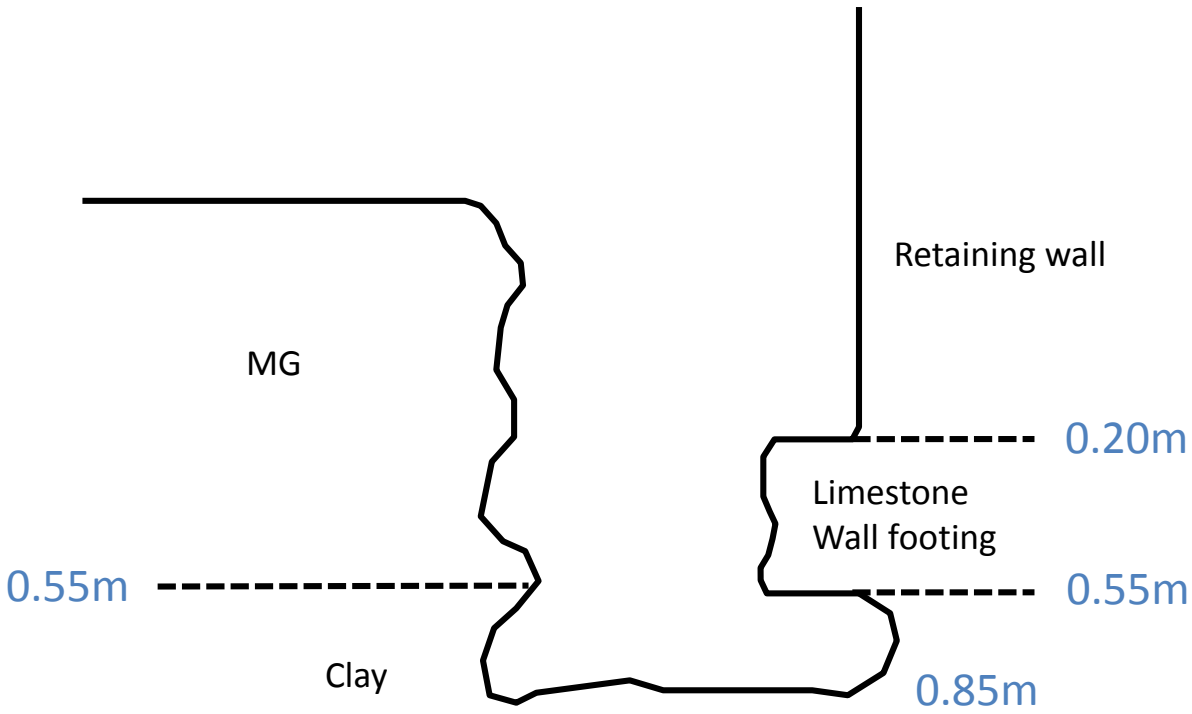
Trial Pit Sketch

PLAN VIEW



Not To Scale
All dimensions in m

CROSS SECTION



CC Ground Investigations Ltd

Contract Name:	Prison Copse Wall
Contract ID:	C5530
Client:	GCC
Hole ID:	TP02

CC Ground Investigations Ltd

CORE HOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Corehole No. **CH01**

Sheet 1 of 1

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410599 N 214936	Hole Type RC
Location: Northleach		Level: 181.31mAD	Scale 1 : 17.54
Client: Gloucestershire County Council		Dates: Start: 09/02/2017 End: 09/02/2017	Logged By DO

(m)	Water Levels	Install	Description	Depth (m)	Level (mAD)	Legend
			Limestone MASONRY.	(0.18)		
			Weak grey CONCRETE. Clasts <20mm of limestone. <10% voids.	0.18	181.13	
				(0.56)		
			Limestone MASONRY.	0.74	180.57	
1				(0.66)		1
			MADE GROUND: Soft brown clay.	1.40	179.91	
			Corehole completed at 1.47m	1.47	179.84	
2						2

EQUIPMENT: Magnum hydraulic coring apparatus.
METHOD: Water flush rotary coring using diamond tipped barrels (65mm diameter): 0.00-1.49m
REINSTATEMENT: Corehole backfilled with site mixed rapid set concrete and surface reinstated.
ORIENTATION: Corehole undertaken at approximately 40 degrees from vertical. All measurements taken relative to long axis of core.

CC Ground Investigations Ltd

CORE HOLE LOG

Telephone: 01452739165 , Fax: 01452739220 , Email: Info@CCGround.co.uk

Corehole No. **CH02**

Sheet 1 of 1

Project Name: Prison Copse Wall	Project No: **C5530**	Co-ords: E 410663 N 214935	Hole Type RC
Location: Northleach		Level: 177.33mAD	Scale 1 : 17.54
Client: Gloucestershire County Council		Dates: Start: 09/02/2017 End: 09/02/2017	Logged By DO

(m)	Water Levels	Install	Description	Depth (m)	Level (mAD)	Legend
			Limestone MASONRY.	(0.20)		
			Weak grey CONCRETE. Clasts <20mm of limestone. <10% voids.	0.20	177.13	
				(0.26)		
			Limestone MASONRY.	0.46	176.87	
				(0.34)		
			Weak grey CONCRETE. Clasts <20mm of limestone. <5% voids.	0.80	176.53	
1				(0.59)		1
			Corehole completed at 1.39m	1.39	175.94	
2						2

EQUIPMENT: Magnum hydraulic coring apparatus.
METHOD: Water flush rotary coring using diamond tipped barrels (65mm diameter): 0.00-1.39m
REINSTATEMENT: Corehole backfilled with site mixed rapid set concrete and surface reinstated.
ORIENTATION: Corehole undertaken horizontally. All measurements taken relative to long axis of core.

APPENDIX C

Appendix C – Laboratory Test Results

Laboratory Report

UKAS TESTING
2788

GSTL
GEO Site & Testing Services Ltd

Contract Number: 34689

Client's Reference: **C5530**

Report Date: **21-04-2017**

Client **CC Ground Investigations Gloucester**
Unit 15A
Innsworth Lane
Gloucester
GL3 1DL

Contract Title: **Prison Copse Wall**

For the attention of: **Chris Scrivens**

Date Received: **28-03-2017**

Date Commenced: **28-03-2017**

Date Completed: **21-04-2017**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	7
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	7
BRE Suite D Ph Total Sulphate, Aqueous Sulphate, Total Sulphur, Aqueous Nitrate, Aqueous Mag, Chloride, - @ Non Accredited Test	4
CUD 38mm Consolidated undrained triaxial compression test on a set of three x 38 mm diameter specimens with the measurement of pore water pressure including saturation and consolidation, test duration four days. 1377 : 1990 Part 8 : 7 - @ Non Accredited Test	2
Extra over items for test duration in excess of four days.	12
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Quality Assistant)
Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd
Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

Client ref: C5530

Location: Prison Copse Wall

Contract Number: 34689

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
BH01		D	1.80	Brown slightly fine to medium gravelly clayey SILT
BH01		D	3.20 - 3.65	Brown fine to medium gravelly clayey SILT
BH01		D	7.00	Grey slightly fine to medium gravelly clayey SILT
BH02		D	2.20 - 2.65	Brown fine to medium gravelly silty CLAY
BH02		D	4.00	Brown slightly fine to medium gravelly slightly sandy clayey SILT
BH02		D	7.50	Grey silty CLAY
BH03		D	2.00	Brown slightly fine to coarse gravelly clayey SILT

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Sean Penn (Administrative/Quality Assistant)

Date: 12.4.17

UKAS TESTING 2788

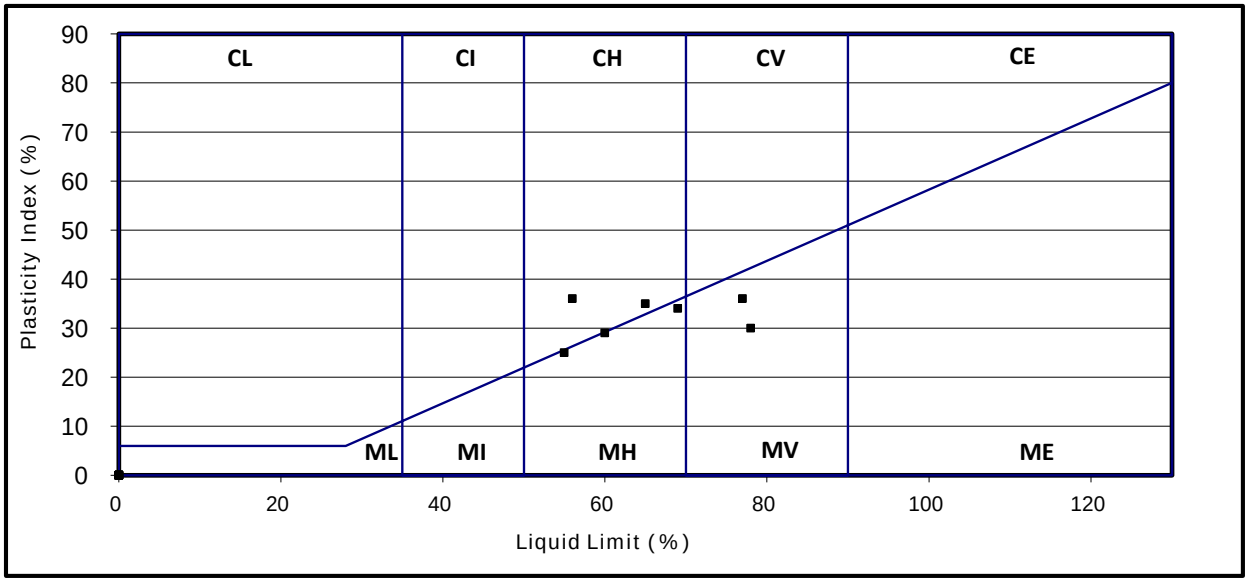
Test Report: Method of the Determination of the plastic limit and plasticity index
BS 1377 : Part 2 : 1990 Method 5

Client ref: C5530
Location: Prison Copse Wall
Contract Number: 34689

Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
BH01	D	1.80	66	78	48	30	93	MV Very High Plasticity
BH01	D	3.20 - 3.65	30	69	35	34	85	MH High Plasticity
BH01	D	7.00	27	55	30	25	92	MH High Plasticity
BH02	D	2.20 - 2.65	36	65	30	35	70	CH High Plasticity
BH02	D	4.00	47	77	41	36	91	MV Very High Plasticity
BH02	D	7.50	17	56	20	36	100	CH High Plasticity
BH03	D	2.00	33	60	31	29	92	MH High Plasticity

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Sean Penn (Administrative/Quality Assistant)
Date: 12.4.17

UKAS TESTING 2788

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Carmarthenshire
SA14 8QN
Tel: 01554 784040
01554 750752
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01554 784041
Web: www.geo.uk.com

Certificate of Analysis

Date:	08/04/2017
Client:	CC Ground Investigations
Our Reference:	34689
Client Reference:	C5530
Contract Title:	Prison Copse Wall
Description: (Total Samples)	4
Date Received:	28/03/2017
Date Started:	07/04/2017
Date Completed:	08/04/2017
Test Procedures:	(BRE BR 279)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks after the date of issue of this test certificate

Approved By:

Authorised Signatories:

Emma Sharp	Ben Sharp	Paul Evans
Laboratory Office Manager	Contracts Manager	Quality Manager

Contract No: 34689
Client Ref: C5530
Location: Prison Copse Wall
Date: 08/04/2017

Summary of Chemical Analysis

(BRE BR 279)

Hole Number	Sample Number	Sample Type	Depth m	Sulphate Content as SO_4			Chloride Content		pH Value @ 25°C	Total Sulphur % S	Magnesium g/l	Nitrate NO_3 mg/l
				Acid Soluble Sulphate as % SO_4	Aqueous Extract Sulphate as g/l SO_4	Ground-water g/l	Semi Quantative Test Strip mg Cl/l	Quantative g/l				
				BR 279	BR 279	BR 279	BR 279	BR 279	BR 279		BR 279	BR 279
BH02		D	6.20	0.24	0.03		NCP		8.23	0.08	<1	10
BH03		UT100	3.2-3.65	0.24	0.02		NCP		8.06	0.08	<1	<10
BH01		D	2.70	0.22	0.03		NCP		8.12	0.08	<1	<10
BH01		SPT	6.0-6.45	0.34	0.04		NCP		8.22	0.11	<1	<10

NCP - No Chloride present

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990 : 38mm Set of Three

Specimen Details

Borehole		BH2
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65
Date		21/04/2017
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Brown sl silty soft CLAY

Initial Specimen Conditions

Height	mm	76.00	76.00	76.00
Diameter	mm	38.00	38.00	38.00
Area	mm^2	1134.11	1134.11	1134.11
Volume	cm^3	86.19	86.19	86.19
Mass	g	136.70	138.40	138.40
Dry Mass	g	89.90	37.00	82.30
Density	Mg/m^3	1.59	1.61	1.61
Dry Density	Mg/m^3	1.04	1.01	0.95
Moisture Content	%	52	59	68
Specific Gravity	kN/m^3	2.65	2.65	2.65
(assumed/measured)		assumed	assumed	assumed

Final Specimen Conditions

Moisture Content	%	53	51	54
Density	Mg/m^3	1.77	193.00	1.93
Dry Density	Mg/m^3	1.16	128.00	1.25

D P Evans

Checked and Approved By

21/04/17
Date

Client Ref
C5530

Prison Copse Wall

Contract No
34689

GSTL
GEO SITE & TESTING SERVICES LTD

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990 : 38mm Set of Three

Specimen Details

Borehole		BH2
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Test Setup

Date started	13/04/2017	00/01/1900	00/01/1900
Date Finished	20/04/2017	00/01/1900	00/01/1900
Top Drain Used	y	y	y
Base Drain Used	y	y	y
Side Drains Used	y	y	y
Pressure System Number	P12	P13	P11
Cell Number	C12	C13	C11

Saturation

Cell Pressure Incr.	kPa	100.00	100.00	100.00
Back Pressure Incr.	kPa	95.00	95.00	95.00
Differential Pressure	kPa	5.00	5.00	5.00
Final Cell Pressure	kPa	200.00	300.00	300.00
Final Pore Pressure	kPa	198.00	247.50	297.00
Final B Value		0.98	0.95	0.98

Consolidation

Effective Pressure	kPa	70.00	120.00	220.00
Cell Pressure	kPa	200.00	300.00	300.00
Back Pressure	kPa	130.00	180.00	80.00
Excess Pore Pressure	kPa	68.00	120.00	219.00
Pore Pressure at End	kPa	130.00	180.00	80.00
Consolidated Volume	cm^3	77.39	72.99	65.69
Consolidated Height	mm	73.41	72.12	69.97
Consolidated Area	mm^2	1056.92	1018.33	954.29
Vol. Compressibility	m^2/MN	0.78536	0.85081	2.97299
Consolidation Coef.	$m^2/yr.$	6.46418	0.02043	0.06779

D P Evans

Checked and Approved By

21/04/17
Date

Client Ref
C5530

Prison Copse Wall

Contract No
34689

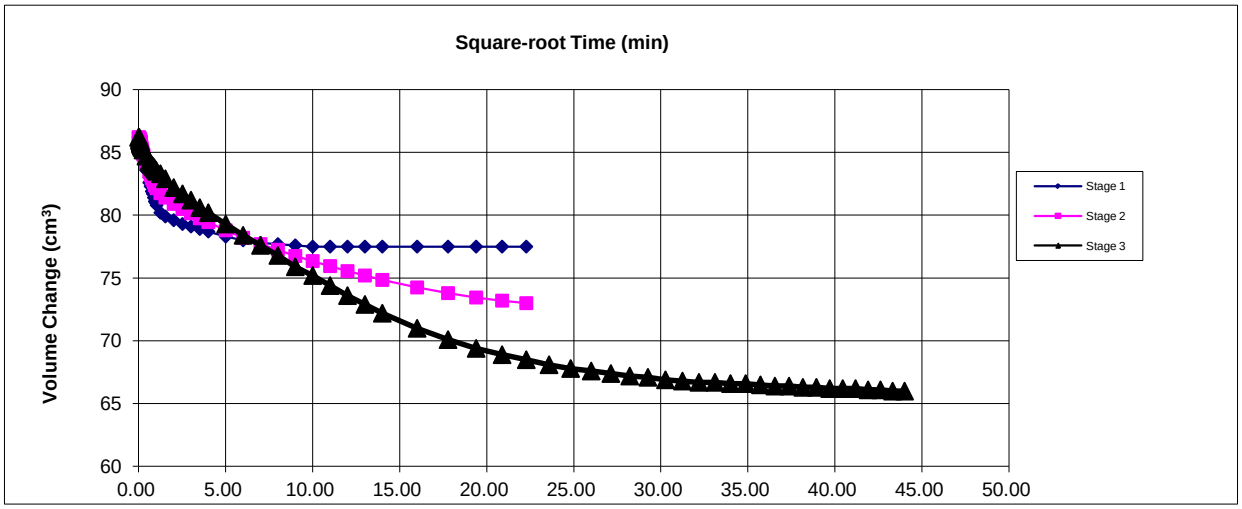
GSTL
GEO SITE & TESTING SERVICES LTD

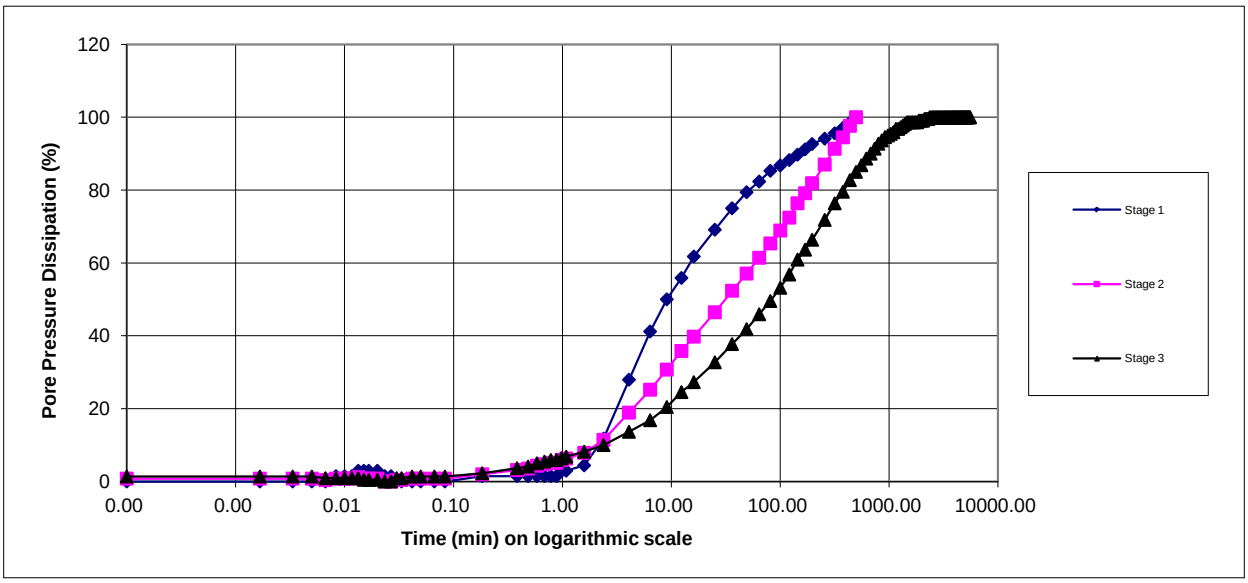
Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990 : 38mm Set of Three

Specimen Details

Borehole		BH2
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Consolidation Stage





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21/04/17
Date

Client Ref
C5530

Prison Copse Wall

Contract No
34689

GSTL
GEO SITE & TESTING SERVICES LTD

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990 : 38mm Set of Three

Specimen Details

Borehole		BH2
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Shearing

Initial Cell Pressure	kPa	200	300	300
Initial Pore Pressure	kPa	130	180	80
Rate of Strain	mm/min	0.3464	0.0011	0.0035
Max Deviator Stress				
Axial Strain		5.653	5.844	6.088
Axial Stress	kPa	92.837	115.92	210.60
Cor. Deviator stress	kPa	82.277	104.32	198.75
Effective Major Stress	kPa	130.277	167.82	330.75
Effective Minor Stress	kPa	49.000	63.50	132.00
Effective Stress Ratio		2.659	2.643	2.51
s'	kPa	89.638	115.66	231.38
t'	kPa	40.638	52.16	99.38
Max Effective Priciple Stress Ratio				
Axial Strain		13.690	9.519	10.489
Axial Stress	kPa	88.195	114.043	205.418
Cor. Deviator stress	kPa	74.989	101.691	192.868
Effective Major Stress	kPa	111.989	158.691	315.868
Effective Minor Stress	kPa	37.000	57.000	123.000
Effective Stress Ratio		3.027	2.784	2.568
s'	kPa	74.495	107.846	219.434
t'	kPa	37.495	50.846	96.434
Shear Resistance Angle	degs			24.0
Cohesion c'	kPa			8

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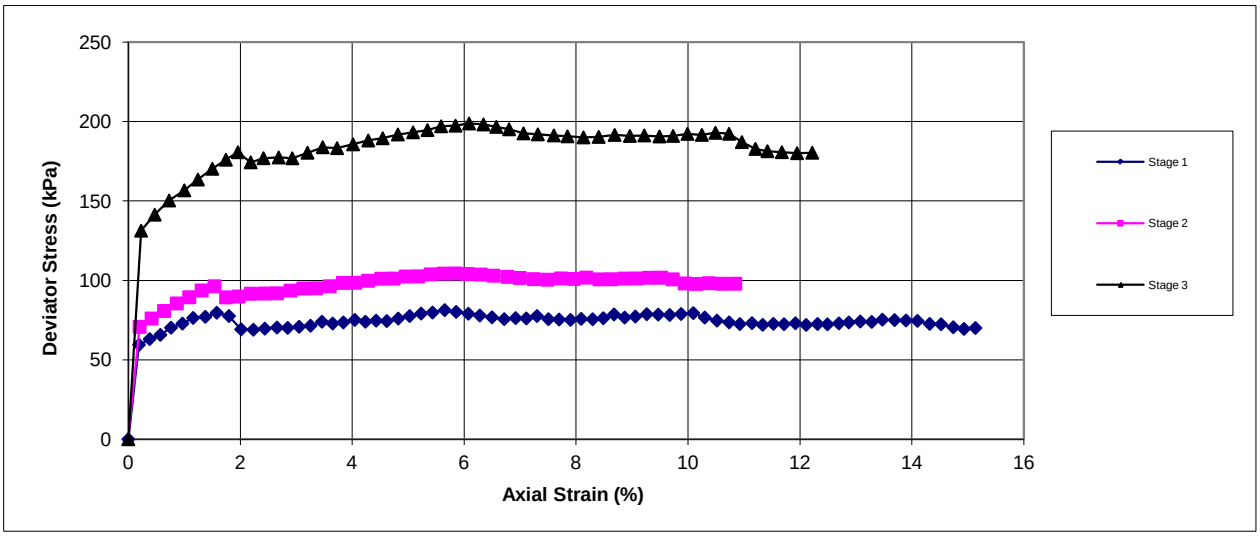
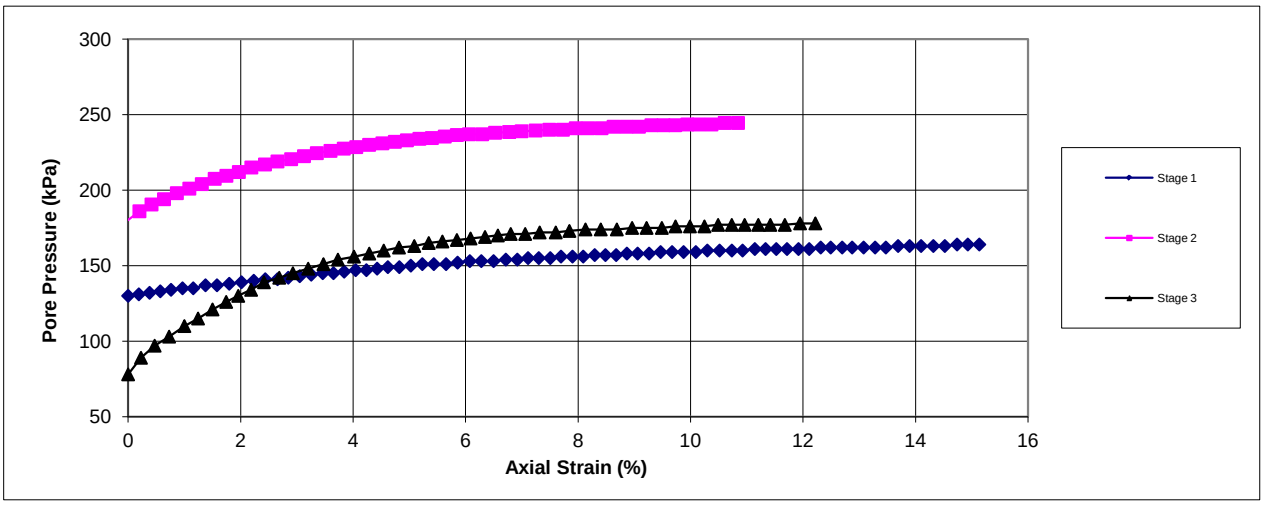
Borehole		BH2
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Shearing Stage





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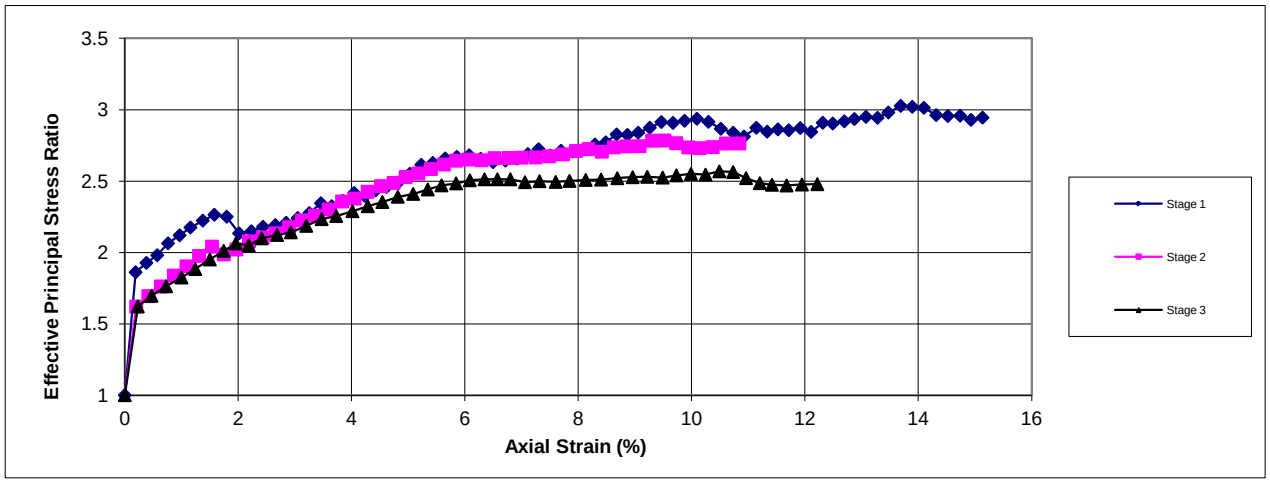
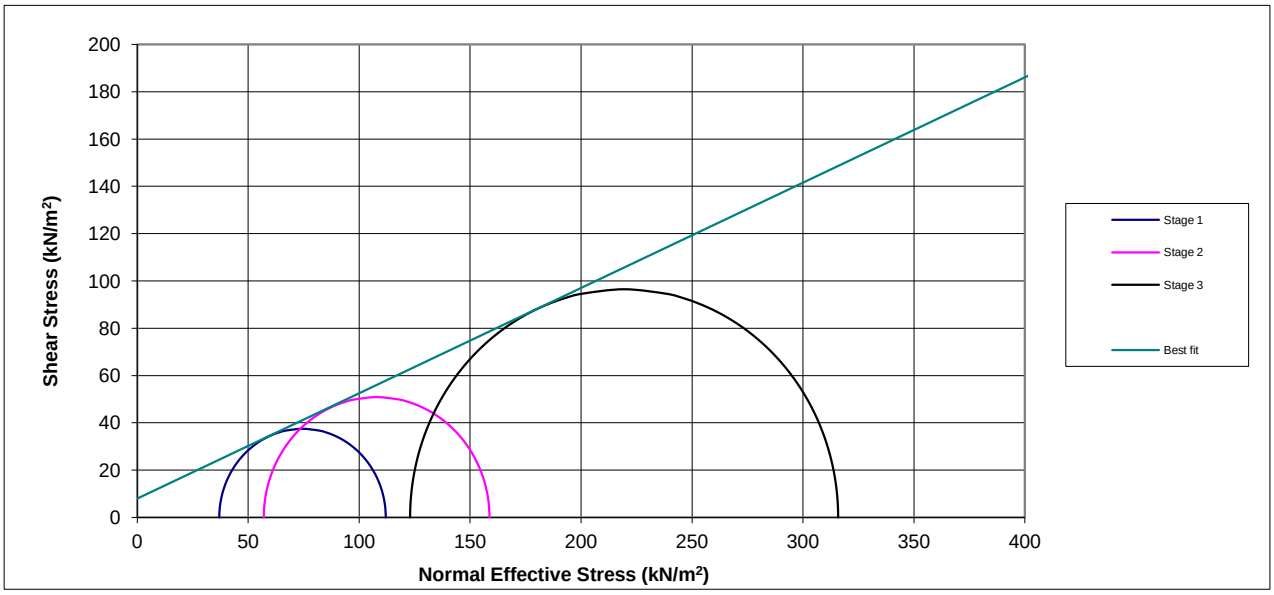
Depth	to(m)	3.65

Shearing Stage





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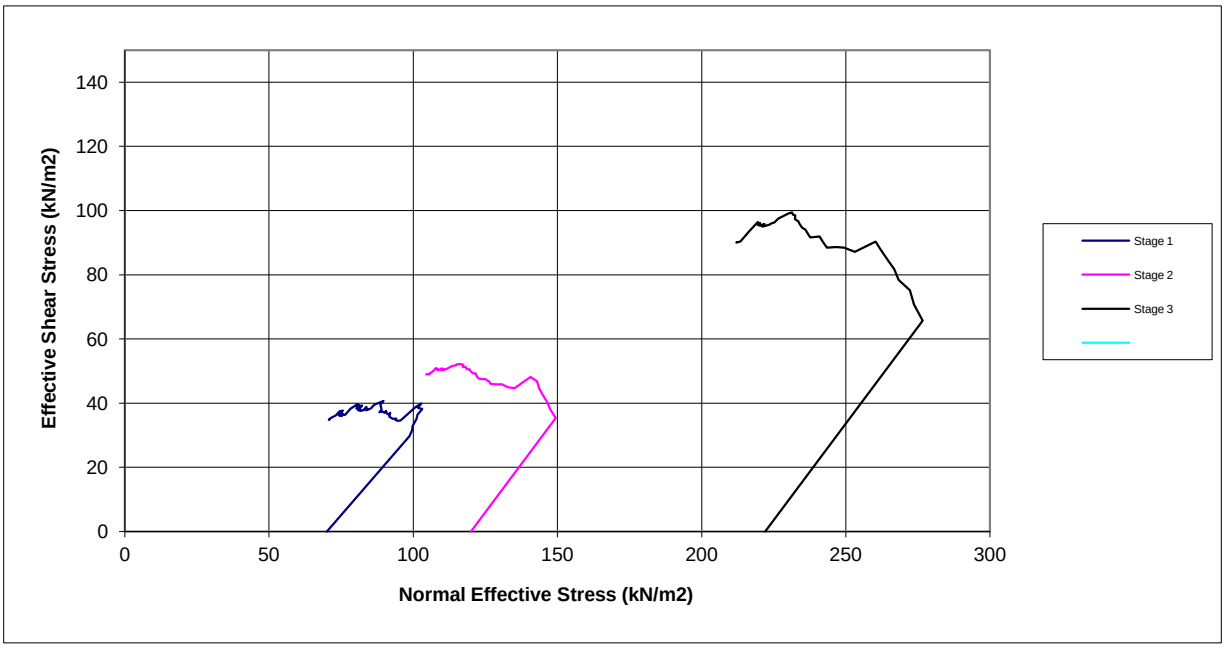
Shearing Stage



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Specimen Details

Borehole		BH2
Sample No.		
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Specimen Details

Borehole		BH3
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65
Date		21/04/2017
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Brown sl silty soft CLAY

Initial Specimen Conditions

Height	mm	76.00	76.00	76.00
Diameter	mm	38.00	38.00	38.00
Area	mm^2	1134.11	1134.11	1134.11
Volume	cm^3	86.19	86.19	86.19
Mass	g	129.10	130.90	131.70
Dry Mass	g	79.40	83.50	78.30
Density	Mg/m^3	1.50	1.52	1.53
Dry Density	Mg/m^3	0.92	0.97	0.91
Moisture Content	%	63	57	68
Specific Gravity	kN/m^3	2.65	2.65	2.65
(assumed/measured)		assumed	assumed	assumed

Final Specimen Conditions

Moisture Content	%	64	57	57
Density	Mg/m^3	1.82	1.93	1.94
Dry Density	Mg/m^3	1.10	1.23	1.24

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Specimen Details

Borehole		BH3
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Test Setup

Date started	13/04/2017	00/01/1900	00/01/1900
Date Finished	20/04/2017	00/01/1900	00/01/1900
Top Drain Used	y	y	y
Base Drain Used	y	y	y
Side Drains Used	y	y	y
Pressure System Number	P12	P13	P11
Cell Number	C12	C13	C11

Saturation

Cell Pressure Incr.	kPa	100.00	100.00	100.00
Back Pressure Incr.	kPa	95.00	95.00	95.00
Differential Pressure	kPa	5.00	5.00	5.00
Final Cell Pressure	kPa	300.00	500.00	300.00
Final Pore Pressure	kPa	296.00	296.50	297.00
Final B Value		0.97	0.95	0.97

Consolidation

Effective Pressure	kPa	70.00	120.00	220.00
Cell Pressure	kPa	300.00	300.00	300.00
Back Pressure	kPa	230.00	180.00	80.00
Excess Pore Pressure	kPa	67.00	116.00	217.00
Pore Pressure at End	kPa	230.00	180.00	80.00
Consolidated Volume	cm^3	71.89	67.69	63.39
Consolidated Height	mm	71.80	70.56	69.30
Consolidated Area	mm^2	1008.68	971.83	934.11
Vol. Compressibility	m^2/MN	0.72134	1.19242	3.30654
Consolidation Coef.	$m^2/yr.$	0.39467	0.02043	0.48599

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Sample No.		
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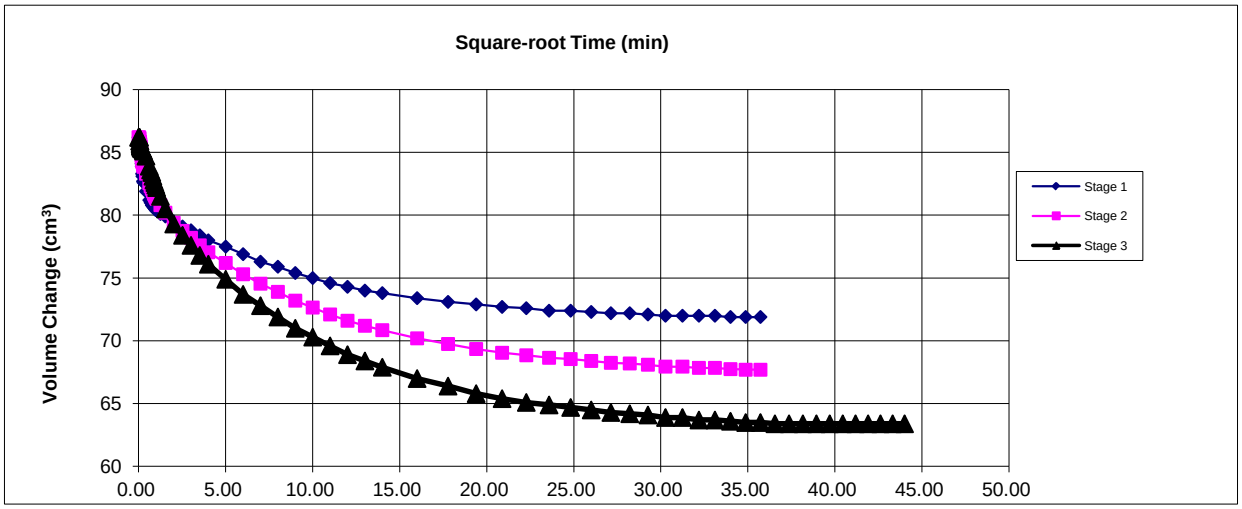
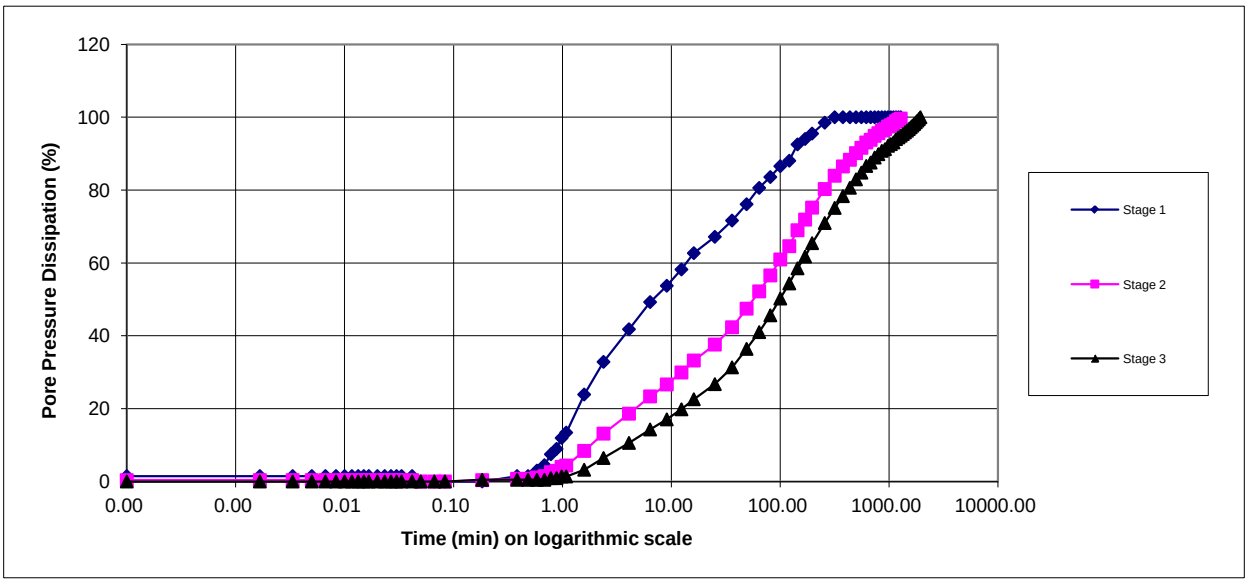
Consolidation Stage





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Specimen Details

Borehole		BH3
Sample No.		
Depth	from(m)	3.20
Depth	to(m)	3.65

Shearing

Initial Cell Pressure	kPa	300	300	300
Initial Pore Pressure	kPa	230	180	80
Rate of Strain	mm/min	0.0207	0.0011	0.0246
Max Deviator Stress				
Axial Strain		8.761	8.935	9.351
Axial Stress	kPa	129.350	189.16	326.81
Cor. Deviator stress	kPa	118.154	176.93	314.44
Effective Major Stress	kPa	156.154	245.93	459.44
Effective Minor Stress	kPa	39.000	69.00	145.00
Effective Stress Ratio		4.004	3.564	3.17
s'	kPa	97.577	157.47	302.22
t'	kPa	58.577	88.47	157.22
Max Effective Priciple Stress Ratio				
Axial Strain		8.761	10.225	10.231
Axial Stress	kPa	129.350	186.047	325.925
Cor. Deviator stress	kPa	117.154	173.551	313.417
Effective Major Stress	kPa	156.154	241.051	455.417
Effective Minor Stress	kPa	39.000	67.500	142.000
Effective Stress Ratio		4.004	3.571	3.207
s'	kPa	97.577	154.275	298.708
t'	kPa	58.577	86.775	156.708
Shear Resistance Angle	degs			29.0
Cohesion c'	kPa			14

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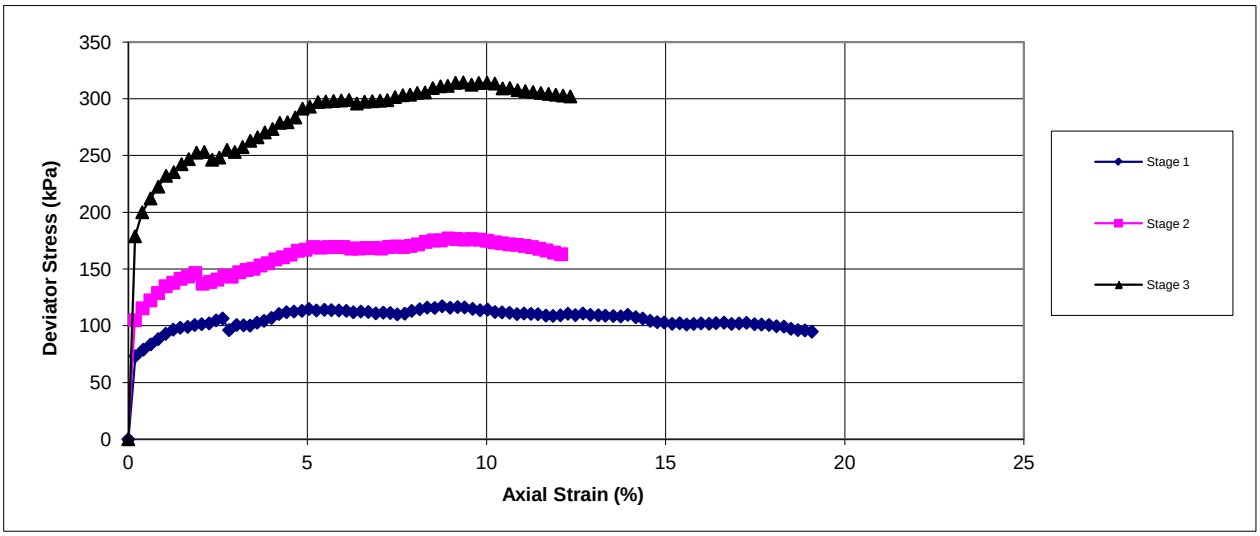

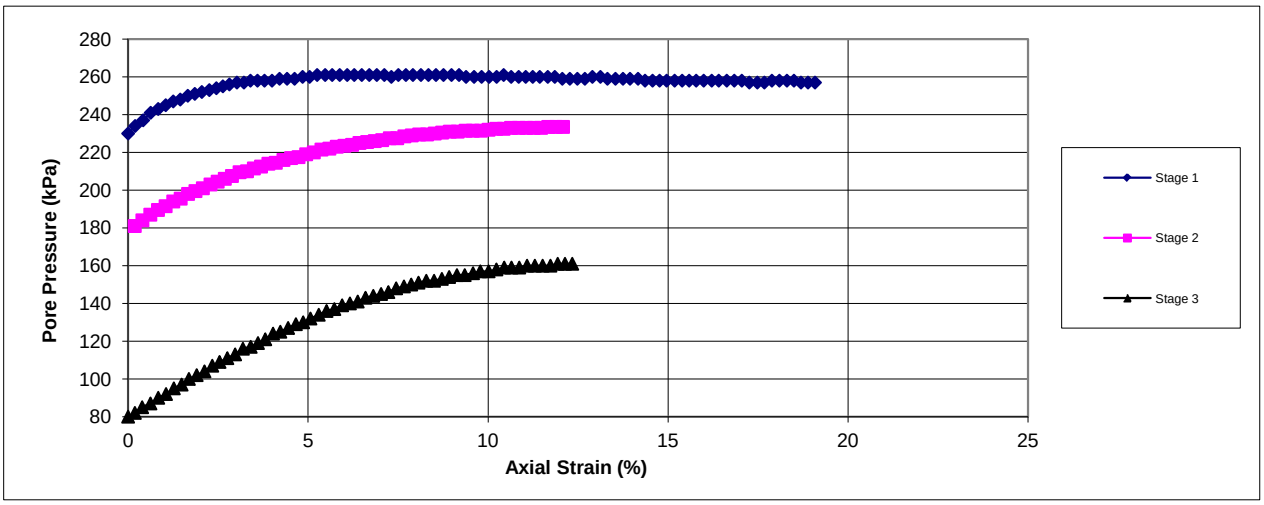

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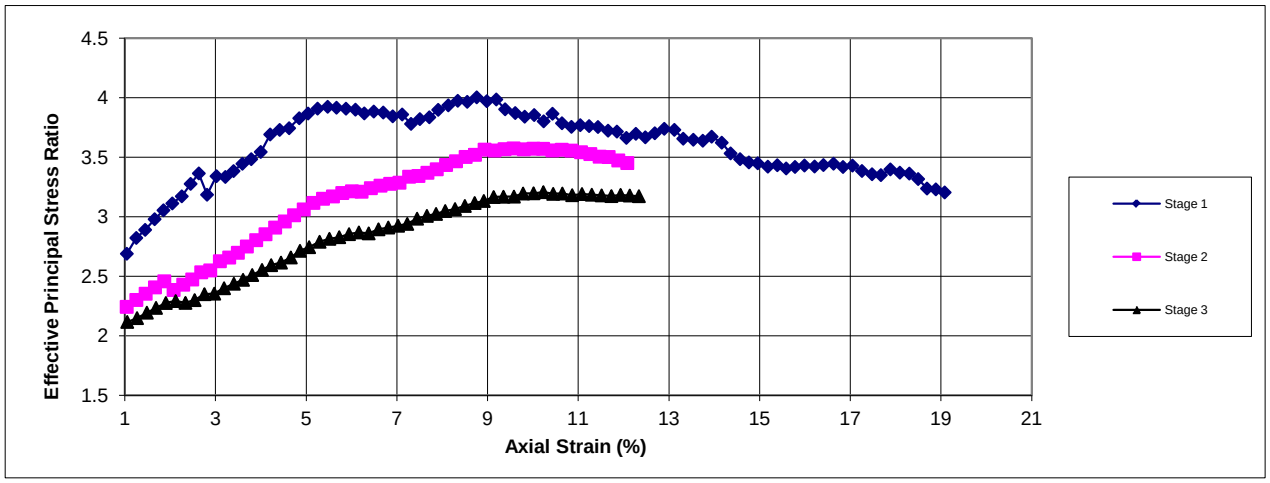

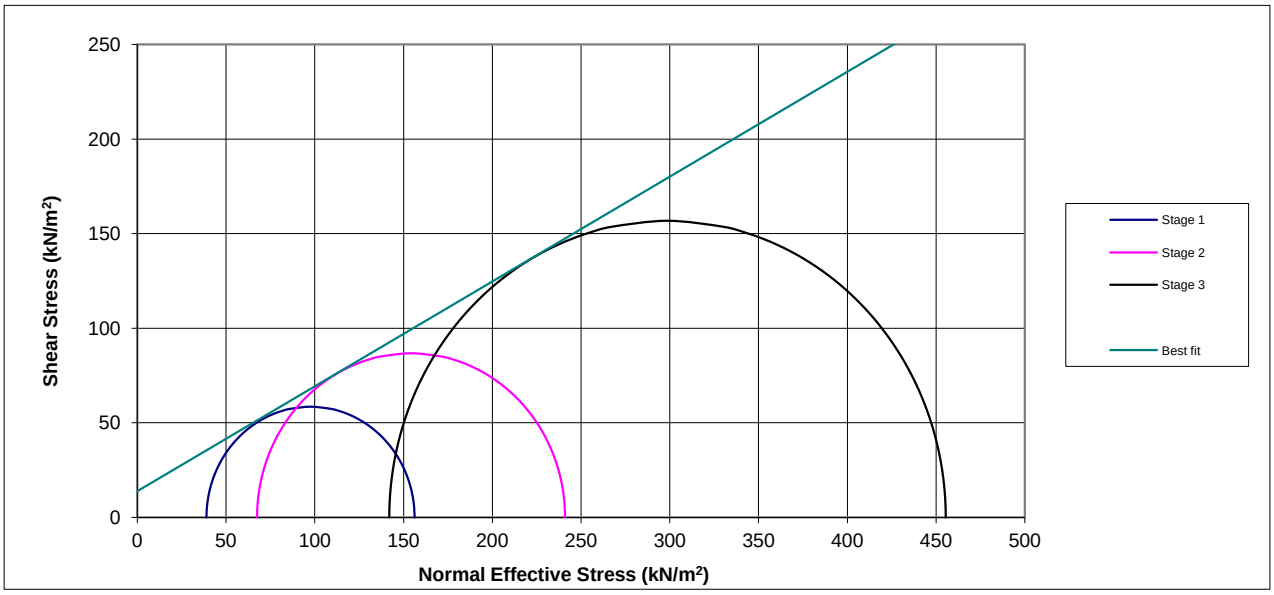

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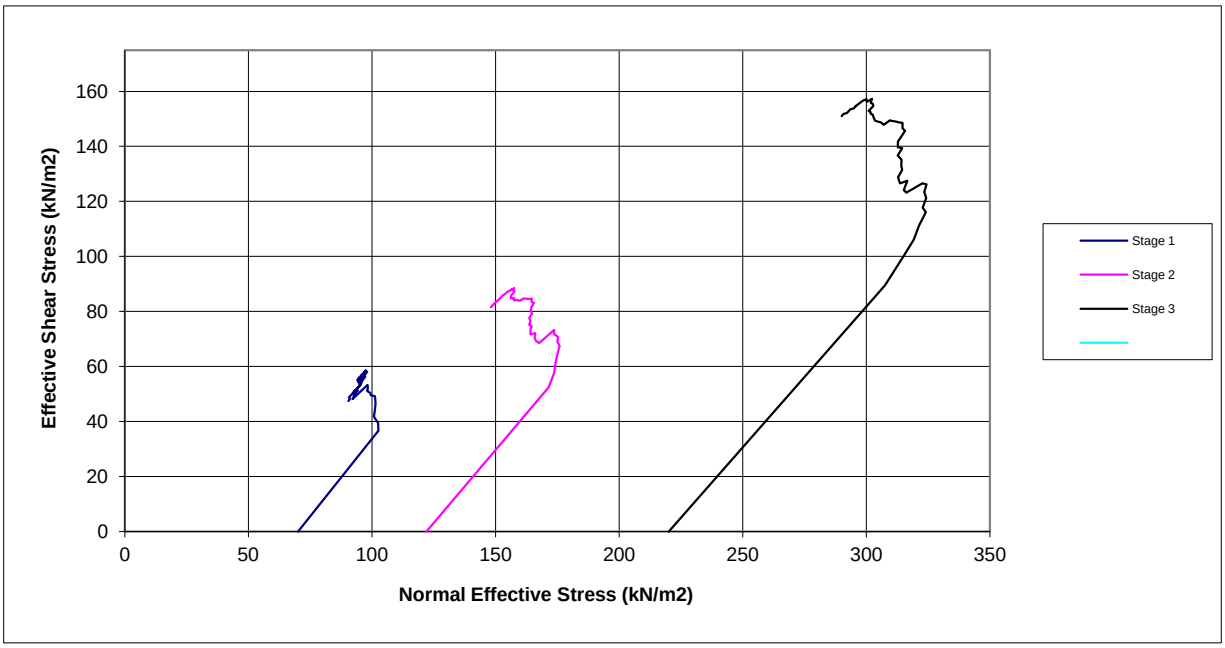

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Prison Copse Wall

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Analytical Report Number : 17-43772

Project / Site name:	Prison Copse Wall	**Samples received on:**	27/03/2017
Your job number:	C5530	**Samples instructed on:**	27/03/2017
Your order number:		**Analysis completed by:**	04/04/2017
Report Issue Number:	1	**Report issued on:**	04/04/2017
Samples Analysed:	3 leachate samples - 6 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 17-43772

Project / Site name: Prison Copse Wall

Lab Sample Number				724037	724038	724039	724040	724041
Sample Reference				BH01	BH01	BH02	BH02	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	1.50	1.00	1.40	1.00
Date Sampled				06/02/2017	06/02/2017	08/02/2017	08/02/2017	09/02/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	5.9	20	14	17	18
Total mass of sample received	kg	0.001	NONE	2.0	1.4	1.8	1.6	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	Not-detected
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.35
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	0.17	< 0.10	< 0.10	< 0.10	0.53
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	0.30	< 0.10	< 0.10	< 0.10	0.40
Pyrene	mg/kg	0.1	MCERTS	0.33	< 0.10	< 0.10	< 0.10	0.39
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.20	< 0.10	< 0.10	< 0.10	0.21
Chrysene	mg/kg	0.05	MCERTS	0.23	< 0.05	< 0.05	< 0.05	0.26
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.29	< 0.10	< 0.10	< 0.10	0.31
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.18	< 0.10	< 0.10	< 0.10	0.16
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.23	< 0.10	< 0.10	< 0.10	0.15
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.18	< 0.05	< 0.05	< 0.05	0.34
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	2.11	< 1.60	< 1.60	< 1.60	3.10
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	10	9.2	23	37
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	36	31	30	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	36	28	21	42	46
Lead (aqua regia extractable)	mg/kg	1	MCERTS	57	14	20	50	24
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	45	34	28	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51	56	49	110	33

Analytical Report Number: 17-43772

Project / Site name: Prison Copse Wall

Lab Sample Number				724037	724038	724039	724040	724041
Sample Reference				BH01	BH01	BH02	BH02	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	1.50	1.00	1.40	1.00
Date Sampled				06/02/2017	06/02/2017	08/02/2017	08/02/2017	09/02/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.5
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	6.7
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	13	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	34	< 8.0	< 8.0	< 8.0	8.8
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	49	< 10	< 10	< 10	19
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	2.1
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 17-43772

Project / Site name: Prison Copse Wall

Lab Sample Number				724042				
Sample Reference				BH03				
Sample Number				None Supplied				
Depth (m)				1.40				
Date Sampled				09/02/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	17				
Total mass of sample received	kg	0.001	NONE	1.8				
Asbestos in Soil	Type	N/A	ISO 17025	-				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10				
Anthracene	mg/kg	0.1	MCERTS	< 0.10				
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Pyrene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	52				

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Project / Site name: Prison Copse Wall

Lab Sample Number				724042				
Sample Reference				BH03				
Sample Number				None Supplied				
Depth (m)				1.40				
Date Sampled				09/02/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	0.2				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	14				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	170				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	380				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	82				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	41				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	690				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	57				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	240				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	59				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	52				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	410				

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Lab Sample Number				724043	724044	724045		
Sample Reference				BH01	BH02	BH03		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.70	1.00	1.00		
Date Sampled				06/02/2017	08/02/2017	09/02/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Speciated PAHs								
Naphthalene	µg/l	0.01	NONE	< 0.01	0.24	< 0.01		
Acenaphthylene	µg/l	0.01	NONE	< 0.01	0.24	< 0.01		
Acenaphthene	µg/l	0.01	NONE	< 0.01	4.1	< 0.01		
Fluorene	µg/l	0.01	NONE	< 0.01	1.9	< 0.01		
Phenanthrene	µg/l	0.01	NONE	< 0.01	1.8	< 0.01		
Anthracene	µg/l	0.01	NONE	< 0.01	0.42	< 0.01		
Fluoranthene	µg/l	0.01	NONE	< 0.01	0.68	< 0.01		
Pyrene	µg/l	0.01	NONE	< 0.01	0.45	< 0.01		
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	9.8	< 0.2		
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	4.3	< 1.1		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	0.95		
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.4	1.3	3.6		
Copper (dissolved)	µg/l	0.7	ISO 17025	9.6	7.3	68		
Lead (dissolved)	µg/l	1	ISO 17025	2.7	1.7	6.0		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	< 0.3	< 0.3	130		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0		
Zinc (dissolved)	µg/l	0.4	ISO 17025	3.2	3.5	110		

Analytical Report Number: 17-43772

Project / Site name: Prison Copse Wall

Lab Sample Number				724043	724044	724045		
Sample Reference				BH01	BH02	BH03		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.70	1.00	1.00		
Date Sampled				06/02/2017	08/02/2017	09/02/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
724037	BH01	None Supplied	0.70	Brown loam and sand with gravel.
724038	BH01	None Supplied	1.50	Grey clay.
724039	BH02	None Supplied	1.00	Brown clay and sand with gravel.
724040	BH02	None Supplied	1.40	Brown sandy clay.
724041	BH03	None Supplied	1.00	Black clay and sand.
724042	BH03	None Supplied	1.40	Brown clay.

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Project / Site name: Prison Copse Wall

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH01		S	17-43772	724037	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH01		S	17-43772	724037	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH01		S	17-43772	724037	c	TPHCWG (Soil)	L076-PL	c
BH01		S	17-43772	724038	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH01		S	17-43772	724038	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH01		S	17-43772	724038	c	TPHCWG (Soil)	L076-PL	c
BH02		S	17-43772	724039	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH02		S	17-43772	724039	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH02		S	17-43772	724039	c	TPHCWG (Soil)	L076-PL	c
BH02		S	17-43772	724040	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH02		S	17-43772	724040	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH02		S	17-43772	724040	c	TPHCWG (Soil)	L076-PL	c
BH03		S	17-43772	724041	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH03		S	17-43772	724041	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH03		S	17-43772	724041	c	TPHCWG (Soil)	L076-PL	c
BH03		S	17-43772	724042	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
BH03		S	17-43772	724042	c	Speciated EPA-16 PAHs in soil	L064-PL	c
BH03		S	17-43772	724042	c	TPHCWG (Soil)	L076-PL	c

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

APPENDIX D

Appendix D – SPT Calibration Data

SPT Calibration Report

EQUIPE GROUP
www.equipegroup.com

Hammer Energy Measurement Report

Type of Hammer	SPT HAMMER
Client	CC GROUND INVESTIGATIONS LTD
Test No	EQU1700
Test Depth (m)	8.50
Date of Test	03 January 2017
Valid until	03 January 2018
Hammer ID	CC05

Mass of the hammer	m = 63.5kg
Falling height	h = 0.76m
E_{theor} =	$m \times g \times h$ = 473J

Characteristics of the instrumented rod

Diameter	d_r = 0.052 m
Length of the instrumented rod	0.558 m
Area	A = 11.61 cm²
Modulus	E_a = 206843 MPa

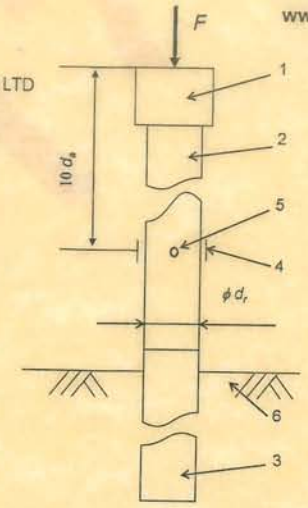
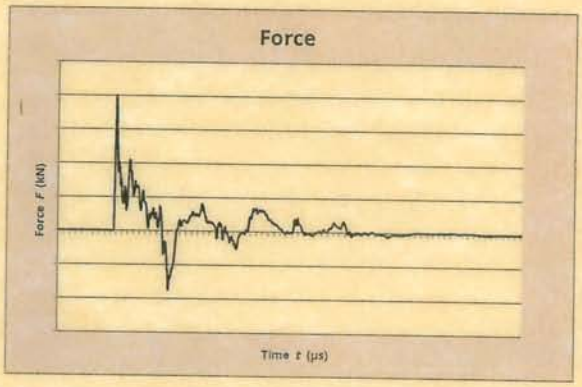
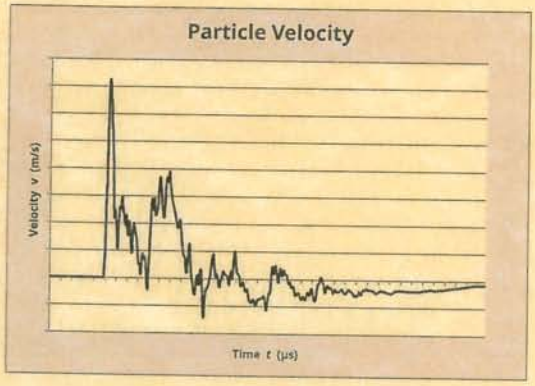
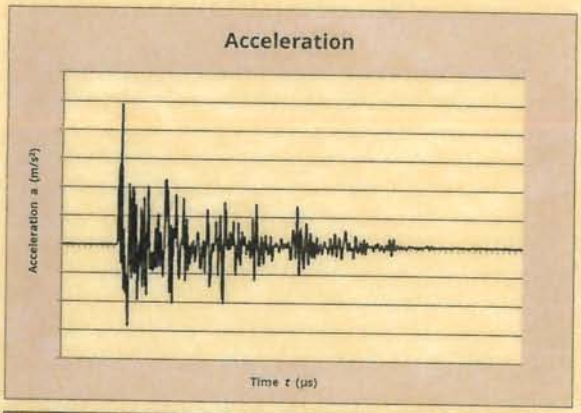
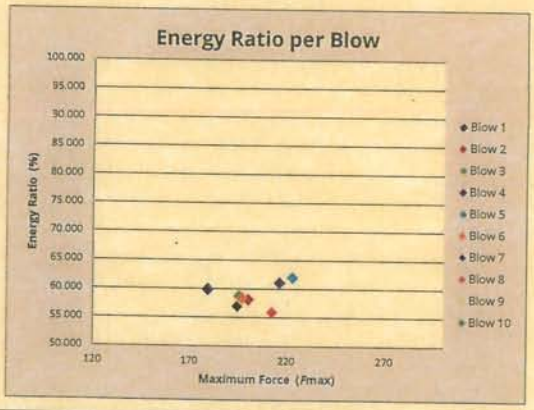


Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011









Observations:
1.

E_{meas} =	0.282 kN-m	
E_{theor} =	0.473 kN-m	
Energy Ratio (E_r) = $\frac{E_{meas}}{E_{theor}}$		59.65%

Equipe SPT Analyzer Operators: AF

Prepared by: Checked by: Date 01/02/2017

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