

# **Environmental Statement: Volume III**

Appendix 11C: Socotec Factual Ground Investigation Report



### **VPI IMMINGHAM**

### **FACTUAL REPORT ON GROUND INVESTIGATION**

## **Report No A8015-18**

August 2018

Client: AECOM Environmental Solutions Ltd, AECOM House, 66-77 Victoria Street, St Albans, AL1 3ER

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### **Report No A8015-18**

### August 2018

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Jul 2018	Draft report	SIGNATURE	SIGNATURE	SIGNATURE
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Aug 2018	report	SIGNATURE	SIGNATURE	SIGNATURE

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#### 1 INTRODUCTION

In March 2018 SOCOTEC UK Limited was commissioned by AECOM Environmental Solutions Ltd (AECOM) on behalf of VPI Immingham, to carry out a ground investigation at Total Lindsey Oil Refinery (TLOR). The investigation was required to obtain geotechnical information for the proposed development.

The scope of the investigation was specified by AECOM and comprised cable percussion and rotary drilled boreholes, trial pits and laboratory testing. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 5 and 20 April.

This report presents the factual records of the fieldwork and laboratory testing. The information is also presented as digital data as defined in AGS (2017).

### 2 SITE SETTING

### 2.1 Location and Description

The site is adjacent to the east side of Total Lindsey Oil Refinery, approximately 4 km north west of Immingham town centre, Lincolnshire. The National Grid reference is TA 167 175, see Site Location Plan in Appendix A.

The site is a L-shaped parcel of land, approximately 350 by 200 m, and generally flat and level.

The majority of the site, the southern portion (about 350 by 120 m), comprises rough grass and scrub land, which is it is boggy in places. There are several soil mounds, up to about 5 m in height.

The north west portion is within the perimeter fence of the adjacent car park, and comprises a compacted generally flat hardcore surface with very little vegetation.

To the north the site is bound by a carpark, belonging to TLOR, and to the west is infrastructure associated with the refinery, including access roads, railway lines, plant and equipment. To the south is VPI Immingham, a power generation facility. To the east is open farmland and the Humber Estuary beyond, approximately 500 m away.

### 2.2 Published Geology

The published geological map for the area, BGS Sheet 90 (1990) and the BGS Geology of Britain Viewer (2018) show the site located on Glacial Till over bedrock of the Burnham Chalk Formation.

### 3 FIELDWORK

### 3.1 General

The exploratory hole locations were selected by AECOM and set out from local features. The coordinates and reduced levels were surveyed by SOCOTEC to National Grid and Ordnance Datum and the locations are shown on the Site Plan in Appendix A

### 3.2 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 1: SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	DEPTH RANGE (m)	REMARKS
Cable Percussion Boring	3	22.34 to 28.66	BH1, BH2 and BH5
Cable Percussion Boring extended by Rotary Core Drilling/Open Hole Drilling	3	28.60 to 34.60	BH3, BH4 and BH6
Dynamic Sampling	8	3.75 to 5.45	WS1 to WS8
Trial Pits/ Trenches	13	2.50 to 4.60	TP1 to TP10 and TT1 to TT3

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information. The logging of soil and rock materials is in accordance with BS 5930 (2015).

Standard penetration tests (SPT) in the boreholes were carried out in accordance with BS EN ISO 22476-3+A1 (2011) and the SPT hammer energy ratio certificate is included in Appendix B. The SPT results are presented on the logs as uncorrected N values.



Photographs of the trial pits and rotary drilled core are presented in Appendix E.

On completion of the fieldwork geotechnical samples were transported to the Doncaster laboratory of SOCOTEC for testing and temporary retention.

#### 3.3 **Groundwater and Gas Monitoring**

Instrumentation installed in the exploratory holes for groundwater and gas monitoring are shown on the logs and summarised in Appendix C. SOCOTEC were not required to undertake any post fieldwork.

#### LABORATORY TESTING 4

Geotechnical laboratory testing was scheduled by AECOM and was carried out in accordance with BS 1377 (1990), unless otherwise stated. The testing is summarised below and the results are presented in Appendix E.

- Moisture Content Determination
- Atterberg Limit Determination
- Particle Density
- Particle Size Distribution Analysis
- **Unconsolidated Undrained Triaxial Compression Testing**
- Consolidated Undrained Triaxial Compression Testing
- One Dimensional Oedometer Consolidation Testing
- Determination of Consolidation Properties Using a Hydraulic Cell
- Dry Density / Moisture Content Relationship
- California Bearing Ratio
- pH, Water Soluble Sulphate, Acid Soluble Sulphate and Total Sulphur Content of Soils Test methods are BS 1377 or others recognised in BRE Special Digest 1 (2005)
- Loss on Ignition
- Organic Matter



#### **REFERENCES**

AGS: 2017: Electronic transfer of geotechnical and geoenvironmental data (Edition 4.0.4 February 2017). Association of Geotechnical and Geoenvironmental Specialists.

BGS England and Wales Sheet 90 : 1990 : Grimsby. 1:50,000 geological map (solid and drift). British Geological Survey.

BGS Geology of Britain Viewer: 2018. www.bgs.ac.uk. British Geological Survey.

BRE Special Digest 1 : 2005 : Concrete in aggressive ground. Building Research Establishment.

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

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS EN ISO 14688-1:2002+A1: 2013: Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1: 2013: Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1: 2003: Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.

BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

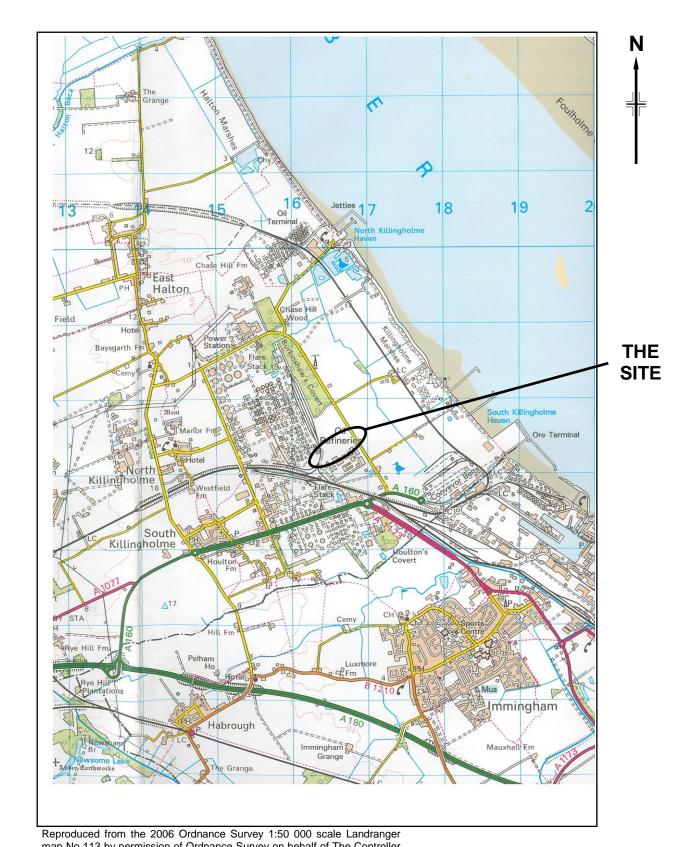


# APPENDIX A FIGURES AND DRAWINGS

Site Location Plan	A1
Site Plan	A2

## **Site Location Plan**





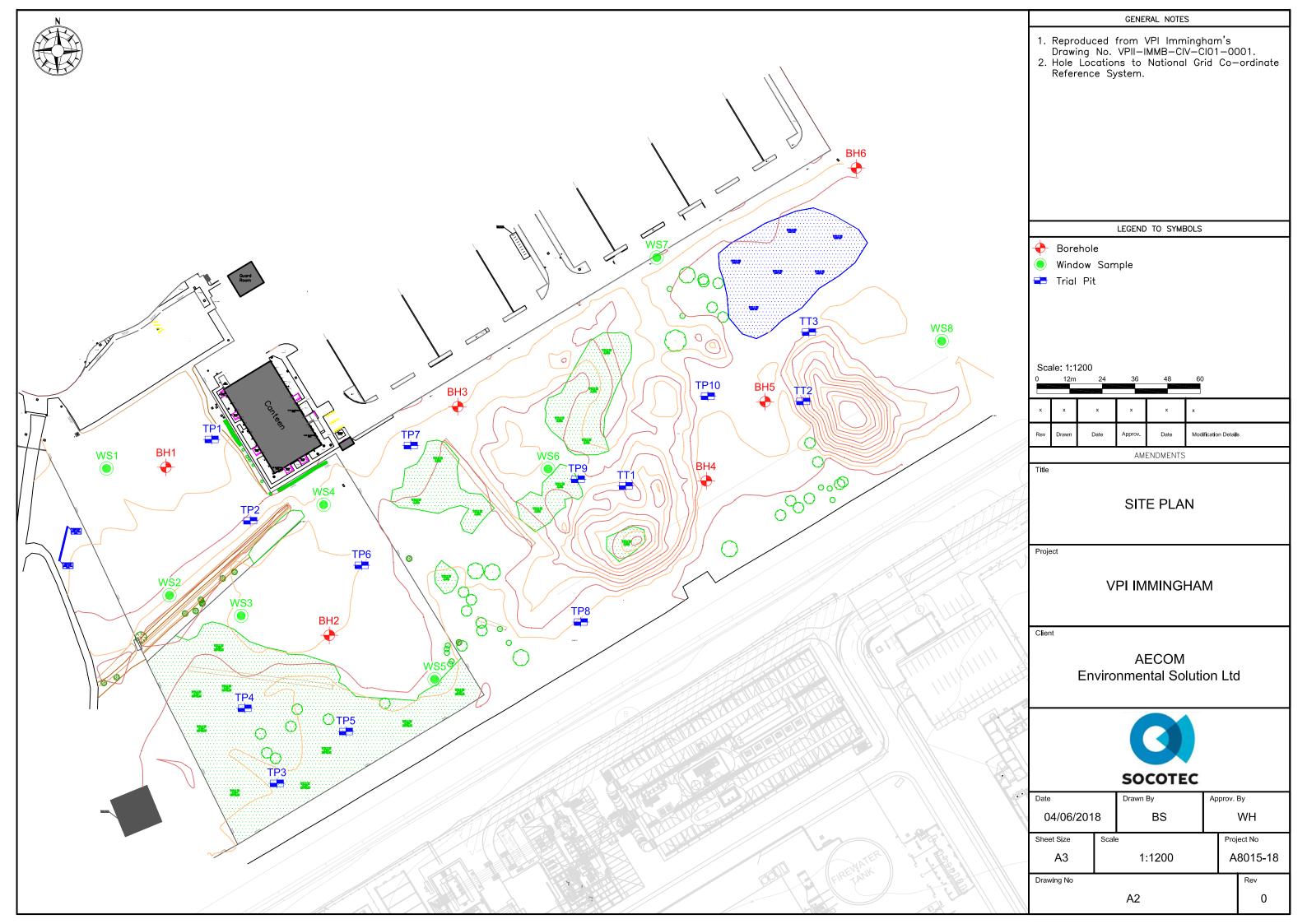
Reproduced from the 2006 Ordnance Survey 1:50 000 scale Landranger map No 113 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

Notes:
Scale 1:50 000

Project VPI IMMINGHAM
Project No. A8015-18
Carried out for AECOM

Figure

A1





# APPENDIX B EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records Key

SPT Hammer Energy Ratio Report SPT Hammer Reference: SW15470

AR2068 DART235

Borehole Logs BH1 to BH6

Borehole Logs (Dynamic Sampling) WS1 to WS8

Trial Pit and Trench Logs TP1 to TP10 and TT1 to TT3

## **Key to Exploratory Hole Records**



#### **SAMPLES**

**Undisturbed** 

U Driven tube sample

UT Driven thin wall tube sample nominally 100 mm diameter and full recovery unless otherwise stated Pushed thin wall tube sample

P Pushed piston sample

L Liner sample from dynamic (windowless) sampling. Full recovery unless otherwise stated

CBR CBR mould sample BLK Block sample

C / CS Core sample (from rotary core) taken for laboratory testing.

AMAL Amalgamated sample

**Disturbed** 

D Small sample B Bulk sample

Other

W Water sample G Gas sample

Environmental chemistry samples (in more than one container where appropriate)

ES Soil sample EW Water sample

Comments Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that, while an

attempt was made to take a tube sample, there was no recovery.

Samples taken from borehole installations (ie water or gas) after hole construction are not shown on the exploratory

hole logs.

Specimens for point load testing undertaken on site (or other non-lab location) are not shown on the log.

**IN SITU TESTS** 

SPT S or SPT C Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011.

The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self-weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = \*\* in the Test column. Where the test drive blows reach 50 the

total blow count beyond the seating drive is given (without the N = prefix).

IV in situ vane shear strength, peak (p) and remoulded (r)
HV Hand vane shear strength, peak (p) and remoulded (r)
PP Pocket penetrometer test, converted to shear strength

KFH, KRH, KPI Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow);

results provided in Field Records column (one value per stage for packer tests)

### **DRILLING RECORDS**

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR Total Core Recovery, % SCR Solid Core Recovery, % RQD Rock Quality Designation, %

If Fracture spacing, mm. Minimum, typical and maximum spacing measurements are presented.

NI The term non-intact (NI) is used where the core is fragmented.

NA Used where a measurement is not applicable (eg. If, SCR and RQD in non-rock materials).

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF Core recovered (length in m) in the following run

AZCL Assessed zone of core loss

### GROUNDWATER

Groundwater entry

Depth to groundwater after standing period

Notes:

See report text for full references of standards.

Updated October 2017

Project VPI Immingham

Project No. A8015-18
Carried out for AECOM Environmental Solutions Ltd

Key
Sheet 1 of 3

## **Key to Exploratory Hole Records**



INSTALLATION

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

Standpipe/ piezometer

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

Standpipe

SPIE Standpipe piezometer PPIE Pneumatic piezometer **EPIE** 

Electronic piezometer

Pipe

Slotted

Piezometer qiT

Inclinometer or Slip Indicator

**ICE** 

**PPCE** 

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend

column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing: Biaxial inclinometer

**ICM** Inclinometer tubing for use with probe

SLIP Slip indicator

Settlement Points or **Pressure Cells**  The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the

Legend column.

The type of instrument installed is indicated by a code in the Legend column:

**ESET** Electronic settlement cell/gauge ETM Magnetic extensometer settlement point **EPCE** Electronic embedment pressure cell

Electronic push in pressure cell

**INSTALLATION / BACKFILL LEGENDS** 

A legend describing the installation is shown in the rightmost column. Legend symbols used to describe the backfill materials are indicated below.







Topsoil









**STRATUM LEGENDS** 

The legend symbols used for graphical representation of soils, rocks and other materials on the borehole logs are shown below. For soils with significant proportions of secondary soil types, a combination of two or more symbols may be used.

Macadam
Clay
Mudstone



Concrete





Made Ground / Fill





Void or No Information





Siltstone





Conglomerate

0000

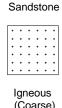




































Notes:

See report text for full references of standards.

Updated October 2017

Project

VPI Immingham

Project No. Carried out for

A8015-18 **AECOM Environmental Solutions Ltd**  Key

Sheet 2 of 3

# **Key to Exploratory Hole Records**



	SOCOTEC
NOTES	
1	Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.
2	For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.
3	Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs. However, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.
4	The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.
5	The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures.
6	Observations of discernible groundwater entries during the advancement of the exploratory hole are given at the foot of the log and in the Legend column. The absence of a recorded groundwater entry should not, however, be interpreted as a groundwater level below the base of the borehole. Under certain conditions groundwater entry may not be observed, for instance, drilling with water flush or overwater, or boring at a rate faster than water can accumulate in the borehole. Similarly, where water entry observations do exist, groundwater may also be present at higher elevations in the ground than where recorded in the borehole. In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.
7	The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.
REFERENCES	
1	BS EN ISO 14688-1:2002+A1: 2013: Geotechnical investigation and testing - Identification and classification of soil. Part 1 Identification and description. British Standards Institution
2	BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock. Part 1 Identification and description. British Standards Institution

	Part 1 Identification and description. British Standards Institution
2	BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock. Part 1 Identification and description. British Standards Institution
3	BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing. Part 3 Standard penetration test. British Standards Institution
4	BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution

## **SPT Hammer Energy Test Report**

in accordance with BSEN ISO 22476-3:2005

**ARCHWAY ENGINEERING AINLEYS INDUSTRIAL ESTATE ELLAND WEST YORKSHIRE** 

**HX5 9JP** 

SPT Hammer Ref: AR1940

Test Date:

21/09/2017

Report Date:

21/09/2017

File Name:

AR1940.spt

Test Operator:

SH

### **Instrumented Rod Data**

Diameter d<sub>r</sub> (mm):

54

Wall Thickness t<sub>r</sub> (mm):

6.0

Assumed Modulus Ea (GPa): 200

7080

Accelerometer No.1: Accelerometer No.2:

11609

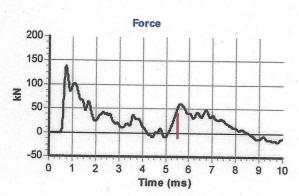
### **SPT Hammer Information**

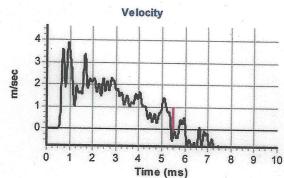
Hammer Mass m (kg): 63.5 Falling Height h (mm): 760

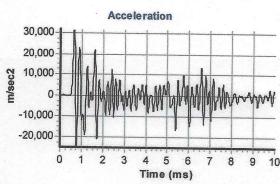
SPT String Length L (m): 10.0

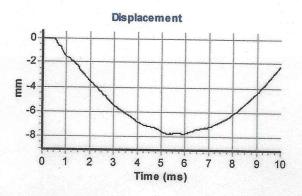
### **Comments / Location**

CALIBRATION









### **Calculations**

Area of Rod A (mm2):

905

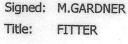
Theoretical Energy E<sub>theor</sub> (J):

473 Measured Energy E<sub>meas</sub> (J): 332

Energy Ratio E<sub>r</sub> (%):

70

The recommended calibration interval is 12 months



### SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING AINLEYS INDUSTRIAL ESTATE ELLAND

WEST YORKSHIRE

**HX5 9JP** 

SPT Hammer Ref: AR2068

Test Date:

15/12/2017

Report Date:

15/12/2017

File Name:

AR2068.spt

Test Operator:

SH

### Instrumented Rod Data

Diameter dr (mm):

54

Wall Thickness t<sub>r</sub> (mm):

6.0

Assumed Modulus Ea (GPa): 200

Accelerometer No.1:

7080

Accelerometer No.2:

11609

### SPT Hammer Information

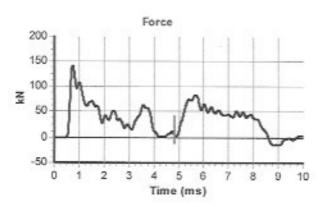
Hammer Mass m (kg): 63.5

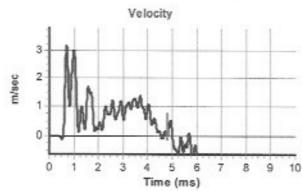
Falling Height h (mm): 760

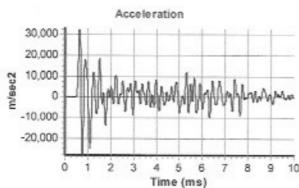
SPT String Length L (m): 10.0

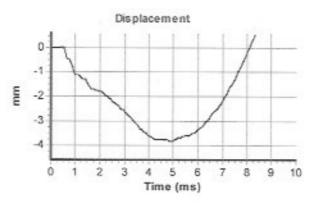
### Comments / Location

CALIBRATION









### Calculations

Area of Rod A (mm2):

905

Theoretical Energy Etheor (J):

473

Measured Energy E<sub>meas</sub> (J):

296

Energy Ratio E, (%):

63

The recommended calibration interval is 12 months

Signed: M.GARDNER

Title: FITTER

### **SPT Hammer Energy Test Report**

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING AINLEYS INDUSTRIAL ESTATE ELLAND

WEST YORKSHIRE HX59JP SPT Hammer Ref: DART235
Test Date: 13/04/2017
Report Date: 13/04/2017

File Name: DART235.spt

Test Operator: SH

### **Instrumented Rod Data**

Diameter  $d_r$  (mm): 54

Wall Thickness  $t_r$  (mm): 6.0

Assumed Modulus  $E_a$  (GPa): 208

Accelerometer No.1: 7080

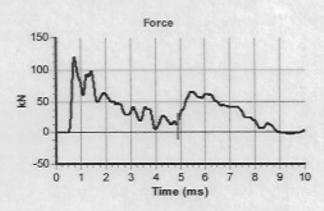
Accelerometer No.2: 11609

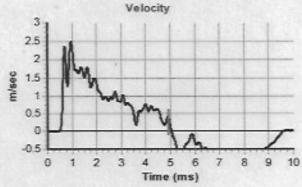
### **SPT Hammer Information**

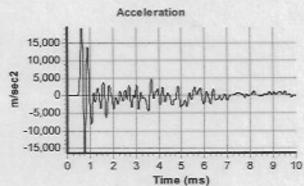
Hammer Mass m (kg): 63.5 Falling Height h (mm): 760 SPT String Length L (m): 10.0

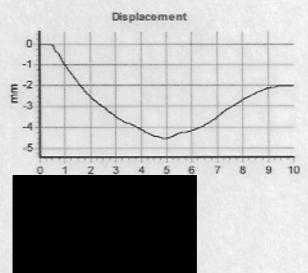
### Comments / Location

CALIBRATION









Signed: S. HOWARTH

FITTER

Title:

### Calculations

Area of Rod A (mm2): 905 Theoretical Energy E<sub>theor</sub> (J): 473 Measured Energy E<sub>meas</sub> (J): 276

Energy Ratio E r (%):

58

The recommended calibration interval is 12 months



Drilled GC Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 1.20 14.00 (m) 14.00 28.50 (mm) 200 150 (m) 14.00 28.50 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. MJS .oaaed 05/04/2018 Coordinates (m) E 516528.04 TC National Grid N 417415.39 Checked End Approved TO 11/04/2018 Samples and Tests Strata Description Backfill Depth, Level Legend Type & No. Records Detail Casing Wate Brown sandy clayey GRAVEL. Gravel is angular 0.10 (0.10) 0.20 - 0.40 B 2 to subangular fine to coarse of chalk and (0.35)limestone. (MADE GROUND) 0.45 +5.91 (IMADE GROUND)

Brown, locally greyish brown, slightly sandy gravelly CLAY. Gravel is angular fine to coarse of chalk and mudstone. Strong hydrocarbon odour. (IMADE GROUND) 0.50 - 0.70 (0.65) 1.00 - 1.20 B 5 05/04/18 Greyish brown, locally dark grey, slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of slag, mudstone, 1.10-1.20 locally 1.10 +5.26 dark grey, occasional rootlets 52 blows 100% rec \_\_\_\_\_ 06/04/18 sandstone and chalk. Strong hydrocarbon odour. (MADE GROUND) Stiff brown, locally mottled light grey, slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartz, mudstone, 2.00 - 2.45 2.00 - 2.45 N=25 (3,4/5,6,7,7) 1.70 sandstone and chalk. (2.70) 56 blows 100% rec 3.00 - 3.45 UT 10 2.80 Dry 3.45 - 3.60 D 11 3.80 W 14 +2.56 4.00 (0.20) 3.80 Thinly laminated brown, locally light grey, CLAY with frequent gravel size pockets of fine to coarse 4.00 - 4.45 SPTS +2.36 3.90 Dry N=14 (2,2/3,3,4,4) D 12 B 13 4.00 - 4.45 Stiff, becoming very stiff, greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk, sandstone, mudstone and quartz. 5.00 - 5.45 UT 15 50 blows 100% rec 4.70 Dry 5.45 - 5.60 D 16 2 平 N=14 (2,2/3,3,4,4) 4.70 Dry 7.00 - 7.50 7.10-8.40 locally 7.20 8.00 - 8.45 38 blows 100% rec 4.70 Dry B 21 W 21A (9.00) 3 7 9.50 - 9.95 9.50 - 9.95 9.50 - 10.00 SPTS N=14 (2,3/3,3,4,4) 9.20 Dry **Groundwater Entries** Depth Related Remarks Depth Strike (m) Remarks Duration (mins) Tools used Depth Sealed (m) Depths (m) Remarks Depths (m) No. Rose to 2.30 m after 20 minutes. Medium inflow Rose to 6.30 m after 20 minutes. Medium 3.80 4.00 8.50 inflow VPI IMMINGHAM Notes: For explanation of symbols and abbreviations Project Borehole

see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. © Copyright SOCOTEC UK Limited AGS

Project No A8015-18 Carried out for AECOM

BH1 Sheet 1 of 3

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A8015-18

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Drilled GC Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 14.00 28.50 (m) 1.20 14.00 (mm) 200 150 (m) 14.00 28.50 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. MJS .oaaed 05/04/2018 Coordinates (m) E 516528.04 TC National Grid N 417415.39 Checked End Approved TO 11/04/2018 Samples and Tests Strata Description Depth, Level Backfill Legend Type & No. Records Detail Casing Wate Stiff, becoming very stiff, greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk, sandstone, mudstone and quartz. 11.00 - 11.45 40 blows 100% rec 9.20 12.50 - 12.95 12.50 - 12.95 N=31 (5,5/6,7,8,10) 9.20 Dry <del>Б</del>, 13.00 -6.64 13.00 D 28 B 27 Medium dense brown gravelly very silty fine to coarse SAND. Gravel is angular to subrounded fine to coarse of chalk and flint. Ō 13.00 - 13.50 Ö 0 3 🕏 13.50 W 30 Ö (1.80)SPTS N=10 (3,3/2,3,2,3) 9.20 10.00 14.00 - 14.45 14.00 - 14.45 Ö 06/04/18 1800 9.20 10.00 О 09/04/18 0 0800 Ö 14 80 D 31 14 80 -8 44 Ö Medium dense brown sandy slightly clayey GRAVEL. Gravel is angular to subangular fine to 15.00 - 15.50 B 32 coarse of flint and chalk. (0.90)15.50 - 15.95 15.50 - 15.95 N=28 (3,3/5,5,8,10) 15.00 10.00 15.70 -9.34 Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of chalk and rare flint. 16.00 - 17.00 17.00 - 17.45 78 blows 100% rec 15.00 greyish brown 17.45 - 17.60 D 36 18.50 - 18.77 18.50 - 18.77 18.50 - 19.00 SPTS D 37 B 38 50 (15,10 for 50mm/23,27 for 70mm) 18.00 17.00 (5.80) Depth Related Remarks **Groundwater Entries** No. Depth Strike (m) Remarks Depth Sealed (m) Depths (m) Depths (m) Remarks Duration (mins) Tools used Rose to 9.00 m after 20 minutes. Fast inflow 14.50 - 14.80 60 Notes: For explanation of symbols and abbreviations VPI IMMINGHAM Project Borehole see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. BH1



Depth from (m) 1.20 14.00 Diameter (mm) 200 150 Casing Depth (m) 14.00 28.50 Drilled GC Start Equipment, Methods and Remarks Ground Level to (m) 14.00 28.50 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. Logged MJS 05/04/2018 Coordinates (m) E 516528.04 Checked TC End National Grid N 417415.39

Approved TC	11/04/2018								
Samples and	Tests		Date	Time	Strata Description			1.	
Depth	Type & No.	Records	Casing	Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
20.00 - 20.40 - - 20.40 - 20.50	UT 39	100 blows 56% rec	19.50	19.50	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of chalk and rare flint.	-			
	B 41	-					- - - - -	4	
- 21.50 - 21.79 - 21.50 - 21.79 	SPTS D 42	50 (10,15 for 60mm/22,25,3 for 5mm)	19.50	20.00	Very stiff light grey slightly sandy gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of chalk.		21.50 -15.1	4	
	SPTS UT NR	50 (25 for 75mm/28,22 for 55mm)	09/04/18 19.50	1800 20.00		=		× × ×	
22.50 - 22.70	D 43	100 blows No Recovery	10/04/18	0800		=	_	× × ×	
23.00 - 24.00 	B 44	-	19.50	9.00				X - X	
24.00 - 24.28 - 24.00 - 24.28 	SPTS D 45	50 (15,10 for 45mm/20,27,3 for 5mm)	23.50	10.00			(6.00)	X - X X - X X - X X - X X - X	
25.00 - 25.22 25.00 - 25.22      	SPTS D 46	50 (20,5 for 15mm/25,25 for 60mm)	24.90	8.00		25.50 recovered as – clayey angular fine – to coarse gravel		X - X X - X X - X X - X X - X	
26.00 - 26.22 - 26.00 - 26.22 - 26.00 - 27.00	SPTS D 47 B 48	50 (25 for 75mm/27,23 for 65mm)	25.90 10/04/18 25.90 11/04/18 25.90	8.00 1700 8.00 0800 4.00					
27.50 - 27.78 - 27.50 - 27.78 - 27.50 - 28.50	SPTS D 49 B 50	50 (15,10 for 50mm/22,24,4 for 5mm)	27.50	7.00	Extremely weak to very weak white CHALK. Recovered as gravelly clay. Gravel is angular to subangular fine to coarse.	- - -	27.50 -21.1 (1.16)	4	
- - 28.50 - 28.66 - 28.50 - 28.66	SPTS D 51	50 (25 for 60mm/38,12 for 20mm)	11/04/18 28.50	1500 9.00		-			
- - - - - - - - - - -					END OF EXPLORATORY HOLE		28.66 -22.3		
						-	1		
Groundwater Entrie	•				Donth Polated Pomarks		Hard Boring		
No. Depth Strike 4 21.00	(m) Remarks	n after 20 minutes. Medium	Depth Sealed	d (m)	Depth Related Remarks Depths (m) Remarks		Hard Boring Depths (m) 24.50 - 26.00 26.50 - 27.50	Duration (mins) 180 120	Tools used Chisel Chisel
Notes: For explanation see Key to Explorator	Hole Records. All o	lepths and		VPI	IMMINGHAM		Borehole		
reduced levels in metr brackets in depth colu © Col Scale 1:50	mn. oyright SOCOTEC U	K Limited AGS		A80 AEC	15-18 COM			BH1 Sheet 3 of 3	
- 1.JU	14/08/2	018 13:42:20					!	OTHERE OF OLD	



Drilled GC Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 1.20 14.50 (m) 14.50 22.20 (mm) 200 150 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. WH .oaaed 11/04/2018 Coordinates (m) E 516588.10 22.20 TC National Grid N 417353.62 Checked End Approved TO Samples and Tests Strata Description Backfill Depth, Level Legend Depth Type & No. Records Detail Casing Wate Dark brown sandy very gravelly CLAY with high cobble content. Gravel is subrounded fine to 0.20 0.30 - 0.50 (0.50)coarse of various lithologies including chalk, macadam and sandstone. Cobbles are 0.50 +4.93 0.60 0.60 - 1.00 (MADE GROUND) (0.50)Dark brown and black very gravelly very silty fine to coarse SAND. Gravel is subangular fine to 1.00 1.00 - 1.20 1.20 - 1.65 D 5 B 6 UT 7 1.00 +4.43 coarse of chalk and sandstone. Strong hydrocarbon odour. 30 blows 100% rec (MADE GROUND) Firm dark greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular medium of flint 1.65 - 1.80 D 8 and chalk. 1.80 - 2.25 SPTS N=13 (2,2/2,3,4,4) D 9 B 10 1.80 - 2.25 1.80 - 2.25 11/04/18 1800 1.50 28 blows No Recovery 2.00 (3.20) 2.70 - 2.80 2.80 - 3.25 2.80 - 3.25 D 12 SPTS D 14 1.70 N=15 (1,2/3,3,4,5) Dry UT 15 45 blows 100% rec 1.70 3.30 - 3.75 Dry 3.75 - 3.90 D 16 2 ₹ SPTS D 17 3.90 - 4.35 3.90 - 4.35 N=15 (6.7/4.3.3.5) 2.90 3.90 Dry Dry 4.20 +1.23 36 blows No Recovery Brown mottled grey CLAY. 4.45 slightly gravelly sandy, gravel is subangular fine of chalk and mudstone 4.45 - 4.60 D 20 (0.50)4 60 - 5 05 SPTS N=17 (2.2/3.4.4.6) 4 50 4 00 4.70 +0.73 Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone and chalk. 5.10 - 5.55 UT 28 38 blows 100% rec 5.00 4.80 5.55 - 5.70 D 29 5.70 - 6.15 5.70 - 6.15 5.70 - 6.15 SPTS N=25 (3,4/5,6,7,7) 5.60 Dr 48 blows No Recovery 6.00 Dry 7.10 - 7.55 7.10 - 7.55 7.10 - 7.55 N=22 (3,4/4,5,6,7) Dry 8.00 - 8.45 UT 36 60 blows 100% rec 6.00 Dry 8.45 - 8.60 D 37 8.60 - 9.05 8.60 - 9.05 8.60 - 9.05 SPTS N=27 (3,4/5,7,7,8) 6.00 Dry D 38 B 39 (9.40)9.50 - 9.95 UT 40 62 blows 100% rec 6.00 Drv 9.95 - 10.10 D 41 Groundwater Entries Depth Related Remarks Depth Strike (m) Remarks Depth Sealed (m) Depths (m) Remarks Depths (m) Duration (mins) Tools used No. Rose to 1.50 m after 20 minutes. Slow inflow Rose to 3.80 m after 20 minutes. Slow inflow VPI IMMINGHAM Notes: For explanation of symbols and abbreviations Project Borehole see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. BH2 © Copyright SOCOTEC UK Limited
1:50 Project No. A8015-18

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Project No

Carried out for

A8015-18

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Drilled GC quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 14.50 22.20 (m) 1.20 14.50 (mm) 200 150 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. WH .oaaed 11/04/2018 Coordinates (m) E 516588.10 22.20 TC lational Grid N 417353.62 Checked End Approved TO Samples and Tests Strata Description Backfill Depth, Level Legend Type & No. Records Detail Casing Wate Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine to D 42 B 43 11.00 - 11.45 64 blows 100% rec 6.00 11.45 - 11.60 D 45 11.60 - 12.05 11.60 - 12.05 11.60 - 12.05 SPTS D 46 B 47 N=23 (3,4/4,5,6,8) 6.00 70 blows 100% rec 6.00 Dry 12.95 - 13.10 D 49 SPTS D 50 B 51 13.10 - 13.55 13.10 - 13.55 13.10 - 13.55 N=30 (4,6/6,7,8,9) 6.00 Dry 14.00 - 14.45 14.00 - 14.60 14.10 UT NR Dn 80 blows No Recovery 6.00 B 53 W 59 14.10 -8.67 3 Firm light brown sandy very gravelly CLAY. Gravel is subangular to subrounded fine to coarse of 0 (0.30)О chalk and mudstone. 14.40 -8.97 Firm to stiff light brown sandy gravelly CLAY. 0 14.60 - 15.05 14.60 - 15.05 SPTS N=39 (7.8/10.10.9.10) 14 50 10.00 Gravel is subangular to subrounded fine to coarse of chalk, mudstone and flint. Occasional gravel O 0 size pockets of fine to medium sand. 15.20 D 55 (2.00)15.50 - 15.95 UT 56 70 blows 33% rec 14.50 10.00 16.20 - 16.65 16.20 - 16.65 16.40 - 17.00 N=37 (6,8/8,9,10,10) 15.50 16.40 -10.97 Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of chalk. 12/04/18 16.50 1800 7.00 17.00 - 17.45 55 blows 56% rec 13/04/18 17.45-18.05 light grey silty fine to 17.45 - 17.60 D 61 SPTS D 62 N=35 (3,5/7,8,10,10) 16.50 5.00 17.60 - 18.05 17.60 - 18.05 (3.10)18.50 - 18.95 18.50 - 19.00 UT NR 60 blows No Recovery 18.40 9.00 19.10 - 19.55 19.10 - 19.55 SPTS N=35 (4,6/7,8,9,11) 18.40 9.00 19.50 D 65 19.50 -14.07 Stiff to very stiff brownish grey slightly sandy CLAY with occasional gravel. Gravel is subangular fine to medium of chalk **Groundwater Entries** Depth Related Remarks Hard Boring Depth Strike (m) Remarks Depth Sealed (m) Depths (m) Remarks Depths (m) Duration (mins) Tools used Rose to 10.00 m after 20 minutes. Medium inflow 14.10 Notes: For explanation of symbols and abbreviations VPI IMMINGHAM Project Borehole see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. BH<sub>2</sub>



Drilled GC Start quipment, Methods and Remarks Casing Depth Ground Level Depth from to (m) 14.50 22.20 (m) 1.20 14.50 (mm) 200 150 (m) 14.50 22.20 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. WH 11/04/2018 Coordinates (m) E 516588.10 .oaaed TC National Grid N 417353.62 Checked End Approved TC Strata Description Samples and Tests Depth, Level (Thickness) Backfill Legend Records Detail Casing Wate Stiff to very stiff brownish grey slightly sandy CLAY with occasional gravel. Gravel is subangular 20.00 - 20.45 50 (12,13 for 65mm/17,21,12 for 40mm) 20.00 11.00 (2.84)21.50 - 21.64 21.50 - 21.64 50 (25 for 50mm/42,8 for 10mm) 21.00 13/04/18 21.50 1800 11.00 16/04/18 21.50 16/04/18 0800 6.00 1000 50 (25 for 50mm/39,11 for 15mm) END OF EXPLORATORY HOLE Depth Related Remarks Hard Boring No. Depth Strike (m) Remarks Depth Sealed (m) Depths (m) Depths (m) Remarks Duration (mins) Tools used 180 60 Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. VPI IMMINGHAM Project Borehole BH<sub>2</sub> © Copyright SOCOTEC UK Limited
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Carried out for



Depth from (m) 1.20 28.00 Diameter (mm) 200 146 Casing Depth (m) 28.00 28.00 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 28.00 28.60 Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged MJS/PC Coordinates (m) 11/04/2018 E 516635.31 Checked TC National Grid N 417437.68 End Approved TC 16/04/2018

pproved TC Samples and	16/04/2018 <b>Tests</b>				Strata Description		1		
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfil
		0.00-1.20 Hand excavate		vvater	Firm brown, locally mottled light grey, slightly	0.00-1.20 _			° ] [
		inspection pit.			sandy slightly gravelly CLAY. Gravel is angular to	0.00-1.20 occasional rootlets  7.10-7.40 foreman reports reddish			اا
0.40 - 1.20	B 1	-			subrounded fine to coarse of quartz, sandstone, chalk and mudstone.				
						]			
									-1 $A$ $1$
						]		1	rľ]ľ
1.20 - 1.65 1.20 - 1.65	SPTS D 2	N=16 (3,4/4,4,4,4)	1.20	Dry					
_						]	(3.00)		ШЛ
1.65 - 2.00	В3	-					(***)		LYJI
						]			
- 2.00 - 2.45	SPTS	N=13 (3,3/3,4,3,3)	1.50	Dry		_			
2.00 - 2.45	D 4	-				<b> </b>			l ľ Jľ
2.50 - 3.00	B 5	-				1			ШЛ
									LYJY
- 3.00 - 3.45 3.00 - 3.45	SPTS D 6	N=8 (1,2/2,2,2,2)	1.50	1.10	Firm thinly laminated brown CLAY with frequent	-	3.00 +2.4	131	▝▕▕▕
0.00 0.40					partings of fine to medium sand.	]			- C
							(0.70)	<u> </u>	-1/1
3.50 - 4.00	B 7	-				1			
					Medium dense brown slightly gravelly very silty	1	3.70 +1.	73	-VH
400 445	ODTO	N 40 (0.0/0.0 0.4)	4.00	D	fine to medium SAND. Gravel is angular to			$\times_{\times}$	-1/11
- 4.00 - 4.45 4.00 - 4.45	SPTS D 8	N=13 (2,2/3,3,3,4)	4.00	Dry	subrounded fine to medium of various lithologies.	-	(0.80)	× × ×	R I
								* * * * 1 <sup>2</sup>	
4.50 5.00	D.O.					]	4.50 +0.5	, (XXX)	ПИЦ
4.50 - 5.00	B 9	-			Stiff brown slightly sandy slightly gravelly CLAY.	] [	4.50 +0.9	93	i r i r
					Gravel is subangular to subrounded fine to coarse of chalk, mudstone, quartz and sandstone.	]			
- 5.00 - 5.45	UT 10	39 blows 100% rec	4.50	Dry	or origin, muscione, quarte and carractorie.				ПЛ
5.00 - 5.45	01 10	39 DIOWS 100 /6 TeC	4.50	Diy					IPI
									$\square \square \square$
5.45 - 5.65	D 11	-				_			$\square \square$
5.65 - 6.00	B 12	-							Y
									ПΔЦ
- 6.00 - 6.45	SPTS	N=22 (3,3/4,6,6,6)	6.00	Dry		_			1141
6.00 - 6.45	D 13	-		-				3	<b>P</b> ///
									HЛL
6.50 - 7.10	B 14	-				]			
									$\  V \  $
									$\mathbb{H}A\mathbb{I}$
-						7 10 7 40 foroman			<b></b> [///
						reports reddish		2	TVH
						brown sand = 7.40 becoming =			1141
7.50 - 7.95	UT 15	49 blows 100% rec	7.50	Dry		greyish brown			11/11
						] =	1		V
7.95 - 8.15	D 16	_					1		$\prod M$
8.15 - 8.60	SPTS	N=23 /3 3/4 E 6 0\	7.50	Dry		=	1		
8.15 - 8.60 8.15 - 8.60	D 17	N=23 (3,3/4,5,6,8)	7.50	ыy					$\parallel \mid \mid$
						brown sand 7.40 becoming greyish brown -			$\prod J \prod$
8.60 - 9.00	B 18	-					1		1   Y
						=		4	<b>*</b>  /
- 9.00 - 9.45	UT 19	59 blows 100% rec	9.00	Dry		]	(8.80)		$\ \ A\ $
2.30 0.40	3.10	11 11 10 100 100	1	Diy		=			#Y [
							1		$\ A\ $
9.45 - 9.65	D 20	-				] =	1		$\  \  \  \ $
9.65 - 10.10	SPTS	N=29 (3,5/7,7,8,7)	9.50	Dry					$\                     $
9.65 - 10.10	D 21	-				=	1		$\ A\ $
							-		
roundwater Entries					Depth Related Remarks		Hard Boring		
lo. Depth Strike (n		after 20 minutes	Depth Sea		Depths (m) Remarks		Depths (m)	Duration (mins)	Tools use
1 3.00 2 7.10		after 20 minutes. after 20 minutes.	3.6 7.4	0					
too. For overleady	of oursels	hyaviations Ir :	-4	\ <i>t</i> e-	IMMINGUAM		Baraha':		
tes: For explanation of e Key to Exploratory	Hole Records. All	depths and	CI	VPI	IMMINGHAM		Borehole		
duced levels in metre ackets in depth colum	<ul> <li>Stratum thickne</li> </ul>	ss given in	ct No.	A80	15-18			BH3	
© Copy	right SOCOTEC U	JK Limited AGS	ed out for	AEC					
cale 1:50	14/08/2	2018 13:42:22	.a out 101	AEC	- III		I	Sheet 1 of 3	



Depth from (m) 1.20 28.00 Diameter (mm) 200 146 Casing Depth (m) 28.00 28.00 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 28.00 28.60 Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged MJS/PC Coordinates (m) E 516635.31 11/04/2018 Checked TC National Grid N 417437.68 End Approved TC 16/04/2018

Approved TC	16/04/2018				0: : :		4			
Samples and			Date	Time	Strata Description		Depth, Level	Legend	Back	fil!
Depth	Type & No.	Records	Casing	Water	Main	Detail	(Thickness)	Legend	Dack	
10.00 - 10.50	B 22				Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		=			
- - 10.50 - 10.95	UT 23	76 blows 100% rec	10.50	Dry	of chalk, mudstone, quartz and sandstone.		13.30 -7.81 (0.80) 14.10 -8.61 (1.00) 15.10 -9.61		$\ A\ $	
10.50 - 10.95	0123	76 blows 100 % rec	10.50	Diy					II A	
10.95 - 11.15	D 24						<b>=</b>		II J	Ľ
11.00 - 12.00 11.15 - 11.60	B 26 SPTS	N=36 (4,6/7,9,11,9)	11.00	Dry		=				Ľ.
11.15 - 11.60	D 25	=		•			3			Y
<u>-</u> :									11/1	V
									$\ A\ $	
12.00 - 12.45	UT 27	69 blows 100% rec	12.00	Dry		-	=		$\ A\ $	/
									II A	[
12.45 - 12.65	D 28	-					1		II J	Ľ
12.65 - 13.10 12.65 - 13.10	SPTS D 29	N=30 (3,5/5,7,9,9)	12.00	Dry						K.
12.80 - 13.30	B 30	-				_	₫			V
										$\vee$
					Medium dense greenish brown gravelly clayey		13.30 -7.87	3	* /	
- 13.50 - 13.95 13.50	SPTS D 31	N=11 (1,2/2,3,3,3)	12.00	7.90	subrounded fine to coarse of various lithologies.	-	(0.00)		$\  \cdot \ _{\mathcal{A}}$	$\mathbb{Z}$
13.50 - 13.95	D 32	-			Occasional gravel size pockets of clay.		(0.80)		II J	Ľ
– 14.10 - 15.00	B 33	-				-	14.10 -8.67	, 🛨	IY)	Ľ,
					Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to		1			K.
-					coarse of chalk, quartz, sandstone and mudstone.		4.00		М	V
			11/04/18	1700			(1.00)			
- 15.00 - 15.45	SPTS	N=11 (2,3/2,2,3,4)	15.00	7.00		_			$\  \  \lambda \ $	/
15.00 - 15.45	D 34	(=,=,=,=,, ,,	12/04/18 15.00	0800 3.30	Medium dense yellowish brown gravelly fine to		15.10 -9.67	7	II J	Ľ
					medium SAND. Gravel is angular to subrounded fine to coarse of various lithologies. Occasional		3			Ľ,
•					gravel size pockets of clay.		(0.90)			Y
							3		М	V
- 16.00 - 16.50	B 35	-			Grey slightly sandy clayey SILT. Rare subangular	-	16.00 -10.5	7 ***	$\parallel A \parallel$	
					fine to medium gravel of chalk.			xxxx	$\  \  \ $	/
- 16.50 - 16.77 16.50 - 16.80	SPTS D 36	57 (10,15 for 60mm/28,29	16.50	5.10				$\times \times \times \times$	ľД	$I_{\geq}$
10.50 - 10.60	D 30	for 60mm)						$\times \times \times \times \times$	II J	Ľ
- 17.00 - 18.00	B 37	-				_		$\times \times \times \times \times$	V	Ľ.
							1	(	М	V
_						_	(2.70)	X X X X X X X X X X X X X X X X X X X	$\ A\ $	$\vee$
							∃	X X X X X X	$\ A\ $	
40.00 45.55	2077	50 (45 40 5 50 175 5	40.00	-			╡	× × × ×	$\  \cdot \ $	
- 18.00 - 18.20 18.00 - 18.30	SPTS D 38	50 (15,10 for 50mm/50 for 70mm)	18.00	Dry		_		$\times \times $	$\ \cdot\ $	
							=	(XXXX)	$\ \cdot\ $	Ľ
18.60 - 19.50	B 39	-				-	(2.70)	<del>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</del>		K.
					Very stiff light grey slightly sandy slightly gravelly		18.70 -13.2	7	М	V
_					CLAY. Gravel is subangular to subrounded fine to coarse of chalk with rare flint. Locally silty.	-	=		$\ A\ $	/
							=		$\  \lambda \ $	
19.50 - 19.75	SPTS	50 (11,14 for 50mm/22,28	19.50	Dry			3		$\ \cdot\ $	
19.50 - 19.80	D 40	for 50mm)					=		$\ \cdot\ $	Ľ
							‡		$\mathbb{K}$	L
Groundwater Entries			Daniel Co. 1	ad (v:\	Depth Related Remarks		Hard Boring	Dunation (mile)	Tarir	
No. Depth Strike (r 3 13.30		after 20 minutes.	Depth Seal		Depths (m) Remarks		Depths (m)	Duration (mins)	100ls u	sed
otes: For explanation				VPI	IMMINGHAM		Borehole			
e Key to Exploratory duced levels in metre	Hole Records. All ones. Stratum thickness	depths and ss given in						вн3		
ackets in depth colum	nn. yright SOCOTEC U	JK Limited AGS			15-18					
Scale 1:50	14/08/2	018 13:42:22 Carried	out ior	AEC	COM		ļ	Sheet 2 of 3		



Depth from (m) 1.20 28.00 Diameter (mm) 200 146 Casing Depth (m) 28.00 28.00 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 28.00 28.60 Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged MJS/PC Coordinates (m) E 516635.31 11/04/2018 Checked TC National Grid N 417437.68 End Approved TC 16/04/2018

	16/04/2018				<u> </u>				
Samples and			Date	Time	Strata Description		Depth, Level	Legend	Backfill
Depth 20.00 - 21.00	Type & No.	Records	Casing	Water		Detail	(Thickness)		
21.00 - 21.20 21.00 - 21.30	SPTS D42	50 (19,6 for 10mm/31,19 for 40mm)	21.00	Dry	Very stiff light grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of chalk with rare flint. Locally sitty.	24.00 becoming- locally gravelly			
22.00 - 22.50	B 43								
- 22.50 - 22.62 22.50 - 22.70	SPTS D 44	50 (25 for 75mm/50 for 40mm)	22.50	Dry			(8.10)		
23.00 - 24.00 	B 45 SPTS D 46		12/04/18 24.00 13/04/18 24.00	1700 Dry 0800 19.30		24.00 becoming- locally gravelly			
- 25.00 - 25.50	B 47								
25.50 - 25.62 25.50 - 25.62 - 26.00 - 26.50	SPTS D 48 B 49	50 (25 for 75mm/50 for 50mm)	25.50	Dry					
26.80 - 27.02 26.80 - 27.02 - 27.00 - 27.50	SPTS D 50 B 51	50 (18,7 for 10mm/28,22 for 60mm)	26.50	8.70	Extremely weak white CHALK. Recovered as gravelly clay. Gravel is angular to subangular fine to coarse of chalk with rare flint.	27.00 becoming recovered as clayey		7 4 3	
- 28.00 - 28.10 28.00 - 28.60	42 - 0 NI 0 -	50 (25 for 60mm/50 for 40mm) Flush: 28.00 - 28.60 Air/ mist 100%	13/04/18 28.00 16/04/18 28.00 16/04/18 28.00	1630 4.10 1300 0.70 1700 0.70	Medium strong white CHALK. Recovered as subangular to subrounded fine to coarse gravel.		28.00 -22.5		
-					END OF EXPLORATORY HOLE	coarse gravel	28.60 -23.1		
_	TCR		Date	Time					
Froundwater Entries No. Depth Strike (m 4 26.80	scr if RQD If RQD	Records after 20 minutes.	Casing  Depth Seal	Water	Depth Related Remarks Depths (m) Remarks		Hard Boring Depths (m) 27.60 - 28.00	Duration (mins) 60	Tools used Chisel
otes: For explanation of the Key to Exploratory F Educed levels in metres reackets in depth columi © Copyl Scale 1:50	Hole Records. All on the Records of	depths and ss given in Project	No.	A80	IMMINGHAM 15-18 COM		Borehole	BH3 Sheet 3 of 3	



Depth from (m) 1.20 24.00 Diameter (mm) 200 146 Casing Depth (m) 16.50 28.60 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 24.00 34.60 Dando 175/Beretta T44.
Cable percussion boring./Rotary open hole drilling to 28.50m followed by rotary core drilling (SWF size) using air mist flush.
SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged WH/PC Coordinates (m) E 516726.70 16/04/2018 Checked TC National Grid N 417410.38 End

App	roved	TC	20/04/2018	T Hammer ID. AR2006, RO	. с.					
Sa	mple	s and	Tests	ı	Date	Time	Strata Description			T
	De	pth	Type & No.	Records	Casing	Water	Main	Detail	Depth, Level (Thickness)	Legend Backfill
	0.50	- 1.20	B 1	0.00-1.20 Hand excavate inspection pit.	ed		Light brown, mottled grey, slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to medium of chalk and sandstone with frequent rootlets.  (TOPSOIL)  Firm brown, mottled grey and light brown, slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of chalk, flint and		(0.30) 0.30 +3.8	
		- 1.65 - 1.65	SPTS D 2	N=16 (2,3/4,4,4,4)	1.20	Dry	sandstone.	= = = = = = = = = = = = = = = = = = =		2 4 1 × / /
E	1.65	- 2.00	В 3	-					(2.90)	
	2.00	- 2.45	UT 4	59 blows 100% rec	1.50	Dry		_ <u>=</u>		2 🗵
		- 2.65 - 3.10	D 5 SPTS	N=15 (2,3/3,4,3,5)	1.50	Dry				
		- 3.10	D 6	10 (2,3/3,4,3,5)	1.50	Diy				
	3.10	- 3.55	UT 7	51 blows 100% rec	3.00	Dry	Soft brown very sandy CLAY.			1 4
hamanah	3.75	- 4.20 - 4.20 - 4.50	SPTS D 8 B 9	N=6 (1,2/1,2,1,2)	3.00	1.00		3.55 brown clayey = sand =	(0.95)	
	4.50	- 4.95	UT 10	47 blows 100% rec	4.50	Dry	Stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of chalk and sandstone.		4.15 +0.0	04 4 7
	5.15	- 5.15 - 5.60 - 5.60	D 11 SPTS D 12	N=22 (2,3/4,6,6,6)	4.50	Dry				
		- 6.00 - 6.45	B 13 UT 14	42 blows 100% rec	6.00	Dry		3.55 brown clayey sand	(2.95)	
	6.65	- 6.65 - 7.10 - 7.10	D 15 SPTS D 16	N=24 (2,3/4,6,6,8)	6.00 16/04/18 6.00	Dry 1700 2.10		7.10-7.20 fine sand		3 7
		- 7.50 - 7.95	B 17 UT 18	51 blows 100% rec	17/04/18 6.00 7.50	0800 2.00 Dry		and gravel -	4	2 *
	8.15	- 8.15 - 8.60 - 8.60	D 19 SPTS D 20	N=25 (4,4/5,6,7,7)	7.50	Dry		and graver		
	8.50	- 9.00	B 21							
	9.00	- 9.45	UT 22	42 blows 100% rec	9.00	Dry				
		10.10 10.10	SPTS D 23	N=23 (3,4/5,5,7,6)	9.00	Damp		= = = = = = = = = = = = = = = = = = = =	(4.90)	6 \$
Gro No 1 2		er Entries th Strike ( 3.20 7.40	m) Remarks Rose to 1.00 m	after 20 minutes. after 20 minutes.	<b>Depth Seal</b> 4.15 7.20		Depth Related Remarks Depths (m) Remarks		Hard Boring Depths (m)	Duration (mins) Tools use
Note	s: For e	xplanation	of symbols and abl	breviations Proje	ect	VPI	IMMINGHAM		Borehole	
redu	ced leve	els in metre lepth colun	Hole Records. All ones. Stratum thickness nn.	ss given in	ect No.	A80	15-18			BH4
Sca	ale 1:	© Cop 50	yright SOCOTEC U 14/08/2	IK Limited AGS 018 13:42:23 Carri	ed out for	AEC	сом			Sheet 1 of 4



Depth from (m) 1.20 24.00 Diameter (mm) 200 146 Casing Depth (m) 16.50 28.60 Equipment, Methods and Remarks Drilled SS/MB Start Ground Level to (m) 24.00 34.60 Dando 175./Beretta T44.
Cable percussion boring./Rotary open hole drilling to 28.50m followed by rotary core drilling (SWF size) using air mist flush.
SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged WH/PC Coordinates (m) 16/04/2018 E 516726.70 Checked TC National Grid N 417410.38 End Approved TC 20/04/2018

Samples and	20/04/2018 Tests				Strata Description		1		
Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.50	B 24	-	- Juliania		Stiff to very stiff dark brown slightly sandy slightly		(**************************************		ШИТ
					gravelly CLAY. Gravel is subangular to subrounded fine to medium of chalk and				WY JY
10.50 - 10.95	UT 25	40 blows 100% rec	10.50	Dry	sandstone.				
									$\mathbb{I}/AV$
10.95 - 11.15	D 26	-							$\mathbb{H}AL$
11.15 - 11.60	SPTS	N=24 (3,4/5,6,6,7)	10.50	Dry					
11.15 - 11.60	D 27	-							⊪⊬]ľ
11.50 - 12.00	B 28	-				=			
									$\mathbb{I}$
- 12.00 - 12.45	SPTS	N=33 (4,4/6,7,9,11)	10.50	7.20	Brown slightly sandy slightly gravelly CLAY.	12.00-12.30 driller	12.00 -7.8	3	#[ / L
12.00 - 12.45	D 29	-			Gravel is subrounded fine to coarse of chalk,	notes reddish brown fine sand			/
					sandstone and flint.	l			111/11/
12.50 - 13.00	B 30	-				12.50 becomes light brown sandy	(4.40)		111/11/
							(1.40)		$\  A  $
						-			
									/  /
13 50 13 05	CDTO	N=37 (5 5/7 10 0 11)	12 50	2 40	Stiff to very stiff light yellowish brown slightly	1 3	13.40 -9.2°		*1/1/
13.50 - 13.95 13.50 - 13.95	SPTS D 31	N=37 (5,5/7,10,9,11)	13.50	2.10	sandy slightly gravelly CLAY. Gravel is subangular	] 3			$\ A\ $
					to subrounded fine to coarse of chalk, mudstone, sandstone and flint.				$\  \  \  \  \ $
14.00 - 15.00	B 32	-				14.00-15.00 becoming slightly			
						gravelly clayey sand			11/11/
						]			11/11/
									JY JY
15.00 - 15.45 15.00 - 15.45	SPTS D 33	N=16 (3,3/4,3,4,5)	15.00	1.10		-		5	1/1/
13.00 - 13.43	D 33						(3.70)		$\mathbb{I}_{Ab}$
15.50 - 16.00	B 34					15.50-16.00 sandy —			<b>#</b> 7[.
10.00 10.00	2 04					clayey gravel			-⊮/]Y
									1/1/
-						-			$\mathbb{I}/\mathbb{I}/\mathbb{I}$
16.50 - 16.95	SPTS	N=44 (6,8/7,11,13,13)	16.50	1.30		]			-⊮/]/
		(4,4,7,7,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4							-₩/1¥
			17/04/18 16.50	1700 1.30					
17.10 - 17.50	B 36	_	18/04/18	0800	Dody horses a limbally a south a limbally assessably OLAY	=	17.10 -12.9	1	$\mathbb{I}AL$
			16.50	1.30	Gravel is subrounded fine to medium of chalk and				- IK JIY
					sandstone.		(0.70)		-\ / \/
									<b>1</b> 1/11/
					Very stiff greyish brown slightly sandy slightly	<u> </u>	17.80 -13.6	1 5	<b>1</b>
18.00 - 18.45 18.00 - 18.45	SPTS D 37	N=13 (2,3/2,3,3,5)			gravelly CLAY. Gravel is subrounded fine to medium of chalk and sandstone.	-			
18.00 - 19.00	B 38	-							$\mathbb{R}^{  Y  }$
						-	(1.30)		11/11/
					Very stiff greyish brown slightly sandy slightly	1 =	19.10 -14.9	1	
					gravelly CLAY with pockets of coarse gravel size	-			$\parallel / 1 \mid /$
19.50 - 19.74	SPTS D 39	-			extremely weak weathered chalk. Gravel is subrounded fine to coarse of chalk.	-			$\ A\ $
19.50 - 19.70	D 39								1/ /[
						=			
roundwater Entries	1				Depth Related Remarks		Hard Boring		
Io. Depth Strike (r 3 12.00		offer 20 minutes	Depth Seal		Depths (m) Remarks 13.50 - 16.50 Water added to assist boring.		Depths (m)	Duration (mins)	Tools use
3 12.00 4 13.40 5 17.80	Rose to 4.10 m	after 20 minutes. after 20 minutes. mafter 20 minutes.	12.30		10.00 - 10.00 Water added to assist DUTING.				
tes: For explanation	of symbols and ab	breviations Project	et	VPI	IMMINGHAM		Borehole		
e Key to Exploratory luced levels in metre	es. Stratum thickne	ss given in	et No	400	15-18			BH4	
ckets in depth colun © Copy	ııı. yright SOCOTEC l	JK Limited AGS	t No. d out for	A80 AE0					
cale 1:50	14/08/2	2018 13:42:23 Carrie	u OUL IOF	AEC	.Сm			Sheet 2 of 4	



Depth from (m) 1.20 24.00 Diameter (mm) 200 146 Casing Depth (m) 16.50 28.60 Drilled SS/MB Start quipment, Methods and Remarks Ground Level to (m) 24.00 34.60 Dando 175/Beretta T44.

Cable percussion boring/Rotary open hole drilling to 28.50m followed by rotary core drilling (SWF size) using air mist flush.

SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. Logged WH/PC Coordinates (m) 16/04/2018 E 516726.70 Checked TC National Grid N 417410.38 End 20/04/2018 Approved TC

Ė	amples and	Tests					Strata Description					
	Depth	Type &	No.	Records	Date Casing	Time Water	Banin .	Detail	Depth, Level (Thickness)	Legend	Back	dill
	20.00 - 21.00	B 40	0				Very stiff greyish brown slightly sandy slightly gravelly CLAY with pockets of coarse gravel size extremely weak weathered chalk. Gravel is subrounded fine to coarse of chalk.	21.00-21.25 white- chalk, possible cobble	(2.30)			///
	21.00 - 21.22 21.00 - 21.25	SPT D 4					Very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to medium of chalk.	1 =				
	22.00 - 22.50	B 42	2									
	22.50 - 22.64 22.50 - 22.60	SPT D 4		50 (18,7 for 10mm/50 for 60mm)					(2.00)			
	23.00 - 24.00	B 44	4						00.40			
					18/04/18 16.50	1700	Very stiff light grey slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to medium of chalk and flint.	_		21		
<u>-</u>	24.00 - 24.15 24.00 - 24.15	SPT D 4	S 5	50 (25/50 for 60mm)	19/04/18 19/94/18 16.50	0800 <b>0886</b> 0.85	Stiff grey clay. (Rotary open hole drilling) (Drillers description)	24.00-24.15 light	-	6		/ /
								grey clayey silt				/
								=				
								=	(4.50)			
							Medium strong to strong white CHALK. Fractures are: 1) subhorizontal, very closely spaced, undulating, rough with occasional grey staining.	28.60-28.72 recovered as subangular gravel with rare angular	28.50 -24.3		0	
	28.50 - 30.00	90 6 0	NI NI 80				subvertical, undulating, rough with occasional grey staining.	28.60-28.72 recovered as subangular gravel with rare angular finit. 28.86-28.96 grey fint nodule 29.30-30.00 recovered as gravel 29.44-29.47 soft cream mottled greyish green clay with frequent angular fine gravel of chalk	(0.45)			
		TCR		B	Date	Time			(2.15)		0	
	Depth  Coundwater Entries  O. Depth Strike (  Coundwater 24.00	m) Remarks		Records after 20 minutes.	Casing  Depth Seal	Water	Depth Related Remarks Depths (m) Remarks	30.00-30.27 AZCL	Hard Boring Depths (m) 21.40 - 21.90 23.40 - 24.00	Duration (mins) 40 60	Tools ι	used
see	tes: For explanation Key to Exploratory	Hole Record	ds. All d	epths and		VPI	IMMINGHAM		Borehole			_
ora	uced levels in metre ckets in depth colur © Cop	es. Stratum tl	hicknes	s given in  K Limited AGS			)15-18			BH4		
S	cale 1:50		14/08/20	18 13:42:23 Carried	out for	AEC	СОМ			Sheet 3 of 4		



Sheet 4 of 4

Drilled quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 24.00 34.60 (m) 1.20 24.00 (mm) 200 146 (m) 16.50 28.60 Dando 175. Beretta T44. Cable percussion boring. Rotary open hole drilling to 28.50m followed by rotary core drilling (SWF size) using air mist flush. SPT Hammer ID: AR2068, Rod type: 54mm Whitworth. WH/PC Coordinates (m) .oaaed 16/04/2018 E 516726.70 TC lational Grid N 417410.38 Checked End Approved TO Samples and Tests Strata Description Depth, Level (Thickness) Backfill Legend Records/Samples Detail Casing Wate 30.27-30.37 0 1) subhorizontal, very closely spaced, undulating, rough with occasional grey staining.
2) subvertical, undulating, rough with occasional recovered as subangular coarse Ö gravel 30.51-30.57 recovered as subangular coarse 30.65 grey staining. Strong white CHALK 30.00 - 31.50 Fractures are subhorizontal, very closely spaced, Ö undulating, rough with brownish grey staining and rare infill of very soft greyish brown CLAY. O 0 31.50-31.81 AZCL Flush: 28.50 - 34.60 Air/ mist 100% 20/04/18 28.60 0 31.50 - 32.10 Ō О 32.42-32.46 | recovered as | ngular coarse | gravel | 32.64-32.75 | recovered as | ngular medium 0 recovered as subangular coarse gravel 32.64-32.75 32.10 - 33.10 (3.95)O recovered as subangular medium Ō to coarse gravel to coarse gravel including flint 32.77-33.00 subvertical undulating smooth fracture with clay infill Ö 0 33.10 - 34.10 Ō 33.00-33.02 recovered as grey angular to subangular gravel of 0 34.10 - 34.60 flint 33.40-33.42 rare O 20/04/18 1700 subangular coarse gravel of flint -30 41 END OF EXPLORATORY HOLE gravel of flint 33.80-33.82 Groundwater Entries Depth Related Remarks Chiselling Details Depth Sealed Depth Strike Remarks Duration (mins) Tools used Depths (m) Remarks Depths (m) Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. VPI IMMINGHAM Project Borehole BH4 © Copyright SOCOTEC UK Limited 1:50 Project No. A8015-18

Carried out for



Drilled GC Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 1.20 13.00 (m) 13.00 26.10 (mm) 200 150 (m) 13.00 26.00 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. WH .oaaed 17/04/2018 Coordinates (m) E 516748.31 TC National Grid N 417439.50 Checked End Approved TC Samples and Tests Strata Description Depth, Level Backfill Legend Depth Type & No. Records Detail Casing Wate Dark brown slightly sandy slightly gravelly CLAY 0.10 0.10 - 0.40 Gravel is subangular to subrounded fine to (0.40)medium of chalk and sandstone. 0.40 (TOPSOIL) 0.50 irm dark brown slightly sandy slightly gravelly 0.50 - 0.80 (0.50)CLAY. Gravel is angular to subangular fine to 0.90 +3.75 Firm brown, mottled light grey, slightly sandy 1.00 1.00 - 1.20 1.20 - 1.65 D 5 B 6 UT 7 slightly gravelly CLAY. Gravel is subrounded fine to coarse of chalk, flint and mudstone. 35 blows 89% rec 1.65 - 1.80 D 8 1.80 - 2.25 SPTS N=16 (2,3/3,4,4,5) D 9 B 10 1.80 - 2.25 1.80 - 2.25 38 blows 100% rec 1.70 Dry (3.60) 2.75 - 2.90 D 12 SPTS D 13 B 14 N=19 (3,4/4,5,5,5) 1.70 2.90-4.45 gravel is Dry 2.90 - 3.35 subrounded UT 15 3.40 - 3.85 32 blows 100% rec 3.00 Dry 3.85 - 3.90D 16 SPTS D 17 B 18 3.00 4.00 - 4.45 4.00 - 4.45 N=17 (2,3/4,4,4,5) Dry 4.00 - 4.45 4.50 - 4.95 4.50 40 blows 100% rec 4.40 Dry 4.50 +0.15 Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine of chalk, sandstone and mudstone. 4.95 - 5.10 D 21 5.10 - 5.55 5.10 - 5.55 5.10 - 5.55 SPTS N=13 (2,2/3,3,3,4) 4.40 Dr 6.50 - 6.95 UT 23 46 blows 100% rec 4.60 6.95 - 7.10 D 24 7.10 - 7.55 7.10 - 7.55 7.10 - 7.55 SPTS N=15 (2,3/3,4,4,4) Dry 8.00 - 8.45 UT 27 60 blows 100% rec 4.60 Dry 8.45 - 8.60 D 28 (7.90)8.60 - 9.05 8.60 - 9.05 8.60 - 9.05 SPTS N=29 (3,5/6,7,8,8) 4.60 Dry D 29 B 30 9.50 - 9.95 UT 31 50 blows 100% rec 4.60 Dry 9.95 - 10.10 D 32 **Groundwater Entries** Depth Related Remarks Depth Sealed (m) No. Depth Strike (m) Remarks Duration (mins) Tools used Depths (m) Remarks Depths (m) VPI IMMINGHAM Notes: For explanation of symbols and abbreviations Project Borehole see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. BH5 © Copyright SOCOTEC UK Limited AGS Project No. A8015-18

Carried out for



Drilled GC Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 1.20 13.00 (m) 13.00 26.10 (mm) 200 150 (m) 13.00 26.00 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. WH .oaaed 17/04/2018 Coordinates (m) E 516748.31 TC National Grid N 417439.50 Checked End Approved TO Samples and Tests Strata Description Backfill Depth, Level Legend Type & No. Records Detail Casing Wate Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine of chalk, 11.00 - 11.45 60 blows 100% rec 4.60 D 36 11.45-12.05 dark brown, gravel is fine to medium 11.60 - 12.05 11.60 - 12.05 11.60 - 12.05 SPTS D 37 B 38 N=31 (4,6/7,7,8,9) 4.60 12.40 12.50 - 12.95 12.50 - 12.95 12.50 - 12.95 W 41 SPTS D 39 B 40 Stiff light brown slightly sandy gravelly CLAY. N=32 (4,6/7,7,8,10) 4.60 Gravel is subrounded fine to medium of chalk, sandstone and mudstone. 17/04/18 4.60 13.00 18/04/18 0800 (2.10)UT 43 70 blows 100% rec 13.50 14.00 - 14.45 14.45 - 14.60 D 44 14.50 -9.85 Stiff to very stiff brown slightly sandy slightly 14.60 - 15.05 14.60 - 15.05 14.60 - 15.05 SPTS N=46 (7.8/9.10.13.14) 13.50 D 45 B 46 gravelly CLAY. Gravel is subrounded fine to coarse of chalk and mudstone. 15.50 - 15.95 UT 47 100 blows 100% rec 15.00 15.95 - 16.10 D 48 (3.10) 16.10 - 16.48 16.10 - 16.48 16.10 - 16.48 SPTS D 49 B 50 50 (8,10/13,18,19 for 75mm) 15.00 Dry 16.10 becoming 2 平 50 (10,12/14,17,19 for 65mm) 15.00 Dry 17.60 0 Very stiff light grey slightly sandy slightly gravelly CLAY with coarse gravel size pockets of 17.70 17.70 - 18.50 D 53 B 54 0 extremely weak chalk. Gravel is subrounded fine O to medium of chalk. (0.90)18.50 - 18.86 18.50 - 18.86 18.50 - 18.86 SPTS 50 (11.13/15.18.17 for 18.00 18.00 18.50 -13.85 Very stiff light grey slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to coarse of D 55 Groundwater Entries Depth Related Remarks Hard Boring Depth Strike (m) Remarks No. Depth Sealed (m) Depths (m) Remarks Depths (m) Duration (mins) Tools used Rose to 12.10 m after 20 minutes. Slow inflow Rose to 16.70 m after 20 minutes. Medium VPI IMMINGHAM Notes: For explanation of symbols and abbreviations Project Borehole see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. BH<sub>5</sub> © Copyright SOCOTEC UK Limited
1:50 Project No. A8015-18

Carried out for



Depth from (m) 1.20 13.00 Diameter (mm) 200 150 Casing Depth (m) 13.00 26.00 Drilled GC Start Equipment, Methods and Remarks Ground Level to (m) 13.00 26.10 Dando 2000. Cable percussion boring. SPT Hammer ID: AR1940, Rod type: 54mm Whitworth. Logged WH Coordinates (m) E 516748.31 17/04/2018 Checked TC National Grid N 417439.50 End Approved TC 19/04/2018

	19/04/2018								
Samples and	Tests	1	Date	Time	Strata Description		Don'th Louis	1	DLeu
Depth	Type & No.	Records	Casing	Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
20.00 - 20.28 20.00 - 20.28 20.00 - 20.28	SPTS D 57 B 58	50 (12,13 for 55mm/20,30 for 75mm)	19.50	19.50	Very stiff light grey slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to coarse of chalk.	-			
21.50 - 21.74 - 21.50 - 21.74 - 21.50 - 21.74	SPTS D 59 B 60	50 (20,5 for 15mm/26,24 for 70mm)	21.00	21.00		- - - - - - - - - - - - - - - - - - -	(7.65)		
23.00 - 23.21 23.00 - 23.21 23.00 - 23.21 23.00 - 23.21	SPTS D 61 B 62	50 (18,2 for 20mm/30,20 for 40mm)	22.50	22.00		23.00-23.30 including gravel of sandstone			
- 24.50 - 24.62 - 24.50 - 24.62 - 24.50 - 24.62 - 24.50 - 24.62	SPTS D 63 B 64	45 (25 for 20mm/33,12 for 25mm)	23.50	24.00		-			
25.60 - 25.72 - 25.60 - 25.72 - 25.60 - 25.72 26.10 - 26.15	SPTS D 65 SPTC	50 (25 for 50mm/50 for 70mm) 50 (25 for 20mm/50 for	18/04/18 25.00 19/04/18 25.00 19/04/18	1800 24.00 0800 21.00 1530		- -	-		
		30mm)	26.00	23.00	END OF EXPLORATORY HOLE		26.15 21.5		
								1	
Groundwater Entries No. Depth Strike (m	n) Remarks		Depth Sealed	i (m)	Depth Related Remarks Depths (m) Remarks		Hard Boring Depths (m) 25.40 - 25.60 25.70 - 26.10	Duration (mins) 60 180	Tools used Chisel Chisel
Notes: For explanation of see Key to Exploratory Forduced levels in metres brackets in depth column © Copyring Copyring Scale 1:50	Hole Records. All do s. Stratum thicknes n. right SOCOTEC UI	epths and s given in			IMMINGHAM 15-18 COM		Borehole	BH5 Sheet 3 of 3	



Drilled	SS/MB	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	4.71 mOD
Logged	MJS/IH	05/04/2018	Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush.	(m) 1.20 24.60	(m) 24.60 34.50	(mm) 200 146	(m) 24.60 24.60	Coordinates (m)	E 516781.85
Checked	TC	End	SPT Hammer ID AR2068, Rod type: 54mm Whitworth.	24.00	34.50	140		National Grid	N 417525.42
Approved	TC	16/04/2018							

Double   Type & No.   Records   Septim   Type   Main   Castrol	pproved TC	16/04/2018						4		
Section   Company   Comp	amples and	Tests		Date	Time	Strata Description		Don'th Louis	1	D1-611
1/30   1/30				Casing			Detail		Legena	Васктііі
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	0.00 - 0.30	B 1		ed		Gravel is angular to subrounded fine to coarse of		(0.30)		°. a 0
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	0.30 - 0.55	B 2	-					0.30 +4.4	1 **********	P.   2
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	0.55 - 1.20	В3	-			Firm brown, locally greyish brown, slightly sandy		0.60 +4.1	1	
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark						subrounded fine to coarse of chalk, mudstone and		3		Y/Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	_					Stiff to very stiff brown slightly sandy slightly	-	=		I V
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark			N=14 (1,2/2,4,4,4)	1.20	Dry	gravelly CLAY. Gravel is subangular to rounded fine to coarse of predominantly chalk, mudstone,		3		1/1/
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark						quartz and sandstone and rare coal.		₫		147
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	1.65 - 2.00	B 5	-					=		
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	- 200-245	LIT 6	71 blows 100% rec	1.50			_	3		Y   Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	2.00 - 2.43	010	71 blows 100 % lec	1.50				=		Y Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	2.45 2.65	D.7						=		1/1
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	2.45 - 2.65	D7						(4.05)		
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								] (****)		
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark			N=16 (3,4/3,4,4,5)	3.00	Dry		-	4		, Y J Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	3.00 - 3.45	D 8						=	2	<b>`</b>  /  /
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	3 50 - 4 00	R Q						3		M
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	0.00 4.00							1		1/1/
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								=		IAL
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	4.00 - 4.45	UT 10	60 blows 100% rec	4.00			-	<u> </u>		rjr
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark										Y Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	4.45 - 4.65	D 11	-					크		MV
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark					0800	Firm thinly laminated CLAY with occasional		4.65 +0.0	1	*  <i> </i>
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	5 00 - 5 45	SPTS	N=10 (1 1/1 2 3 4)				_	(0.65)	[ <del>-</del> ]	$\mathbb{I}_{AL}$
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark			-		2.00			<b>1</b>	<u> </u>	rjr
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								5.30 -0.59	) <u> </u>	Y Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	5.50 - 6.00	B 13	-			slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of chalk, mudstone and		₫		-1/1
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								3		147
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	6.00 - 6.45	UT 14	71 blows 100% rec	6.00			-	=		
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								=		ΥJY
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	6.45 - 6.65	D 15	-					3		Y Y
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								=		A
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark								=		
7.50 - 7.95 SPTS D 17  7.50 - 7.95 D 17  8.00 - 9.00 B 18  9.00 - 9.45 UT 19 61 blows 100% rec 9.00  9.45 - 9.65 D 20  Depth Related Remarks  Depth Strike (m) Remarks  A 5. Ros to 2.50 m after 20 minutes.  Depth Strike (m) Remarks  A 65 Ros to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks  Depth Strike (m) Remark	7.00 - 7.50	B 16	-				-	1		
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use								1		rjr
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use			N=18 (3,3/4,4,5,5)	7.50	Dry			╡		$\mathbb{Z}[Y]$
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use	7.50 - 7.95	D 17	-					3		I
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use	8.00 - 9.00	B 18					_	₫		
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use								=		
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use										III
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use										Y Y
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use								=		V V
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use	9.00 - 9.45	UT 19	61 blows 100% rec	9.00			-	(7.60)		-1/1
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use								(1.00)		
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use	9.45 - 9.65	D 20	-					∄		
Depth Strike (m) Remarks Depth Strike (m) Remarks A.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) Sealed (m) Remarks Depths (m) Remarks Depths (m) Duration (mins) Tools use  Depths (m) Remarks Depths (m) Duration (mins) Tools use								3		Y IY
Depth Strike (m) Remarks 4.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) 5.30  Depths (m) Remarks  Depths (m) Duration (mins) Tools use										Y Y
Depth Strike (m) Remarks 4.65 Rose to 2.50 m after 20 minutes.  Depth Sealed (m) 5.30  Depths (m) Remarks  Depths (m) Duration (mins) Tools use							_			
4.65 Rose to 2.50 m after 20 minutes.  5.30  ss: For explanation of symbols and abbreviations Key to Exploratory Hole Records. All depths and iced levels in metres. Stratum thickness given in kets in depth column.  © Copyright SOCOTEC UK Limited  Project No.  AB015-18  Carried out for AECOM	oundwater Entries		1							
Key to Exploratory Hole Records. All depths and loced levels in metres. Stratum thickness given in skets in depth foolumn.  © Copyright SOCOTEC UK Limited  © Copyright SOCOTEC UK Limited  © Carried out for AFFORM			after 20 minutes.			Depths (m) Remarks		Depths (m)	Duration (mins)	Tools used
Key to Exploratory Hole Records. All depths and loced levels in metres. Stratum thickness given in skets in depth foolumn.  © Copyright SOCOTEC UK Limited  © Copyright SOCOTEC UK Limited  © Carried out for AFFORM										
uced levels in metres. Stratum thickness given in kets in depth column.  Project No. A8015-18  Carried out for AFCOM				ct	VPI	MMINGHAM		Borehole		
© Copyright SOCOTEC UK Limited AGS	uced levels in metre	s. Stratum thickne	ss given in	ct No	A 0 A	15.18		1		
	© Copy	yright SOCOTEC l	JK Limited AGS							



Depth from (m) 1.20 24.60 Diameter (mm) 200 146 Casing Depth (m) 24.60 24.60 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 24.60 34.50 Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID AR2068, Rod type: 54mm Whitworth. Logged MJS/IH Coordinates (m) 05/04/2018 E 516781.85 Checked TC National Grid N 417525.42 End Approved TC 16/04/2018

pproved TC	16/04/2018						4		
Samples and	Tests		Date	Time	Strata Description		Depth, Level	Legend	Backfill
Depth	Type & No.	Records	Casing	Water	Main	Detail	(Thiskness)	Legend	Dackilli
10.00 - 10.50	B 21				Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to	11.80-12.00 occasional gravel size pockets of- gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of chalk			
				_	rounded fine to coarse of chalk, mudstone and sandstone.				$\mathbb{I}_{A}$
10.50 - 10.95 10.50 - 10.95	SPTS D 22	N=18 (3,3/4,5,4,5)	10.50	Dry		1	1		TH
									Y Y
- 11.00 - 11.80	B 23	-				-	1		
									A
						-	1		
						11 80-12 00		2	•[]]
- 12.00 - 12.45	SPTS	N=21 (3,4/5,4,6,6)	12.00	4.10		occasional gravel			TH
12.00 - 12.45	D 24	-				gravelly fine to	1		Y Y
						is angular to			V V
						coarse of chalk			$\square\square$
							12.90 -8.19		
- 13.00 - 13.50	B 25	-			Brown gravelly clayey fine to coarse SAND.  Gravel is subangular to subrounded fine to coarse	] -	12.90 -0.13		TH.
					of chalk and flint.		1		Y Y
13.50 - 13.95	SPTS	N=4 (1,0/1,1,1,1)	13.50	9.10		13.50 SPT may be	1		Y Y
13.70	D 26					affected by groundwater	1		A
- 14.00 - 15.00	B 27					13.50 SPT may be— affected by groundwater disturbance at base of hole (piping)	1		
- 14.00 - 15.00	621						(2.30)		
									TAL.
								7	Y Y
			06/04/18	1630			1		
- 15.00 - 15.45 15.00 - 15.45	SPTS D 28	N=34 (6,6/7,9,10,8)	15.00 09/04/18	9.10		-			$\square\square$
15.00 - 15.45	D 20		15.00	10.40	Stiff to very stiff light grey slightly sandy gravelly	-	15.20 -10.4	19	
15.50 - 16.50	B 29				CLAY. Gravel is angular to subangular fine to coarse of chalk and rare flint.	]	1		141
									TIT
							1		Y Y
_						1		4	7///
16.50 - 16.95	SPTS	N=28 (7,7/7,7,7,7)	16.50	14.10		1		3	
16.70	D 30								#1 A [.
-						-	1		#K J K
									$\                                       $
17.50 - 18.00	B 31					]	-		
				_					
18.00 - 18.45 18.00 - 18.45	SPTS D 32	N=28 (6,7/6,7,7,8)	18.00	Dry			1		#K#I
							(6.30)		
18.50 - 19.50	B 33	-				1	1	3	<b>∦</b>  ∕  /
									11/11/
						=	1		$\ A\ $
									HH.
19.50 - 19.95	SPTS	N=39 (7,8/9,10,10,10)	19.50	Dry			1		ITAT
19.50 - 19.95 19.50 - 21.00	D 34 B 35	-		,					IZJY
							1		Y Y
roundwater Entries		_			Depth Related Remarks		Hard Boring		
lo. Depth Strike (i 2 11.80		after 20 minutes.	Depth Seal	led (m)	Depths (m) Remarks		Depths (m)	Duration (mins)	Tools use
3 18.60		m after 20 minutes.	18.70	0					
	_						<u> </u>		
tes: For explanation Key to Exploratory	Hole Records. All of	depths and	t	VPI	IMMINGHAM		Borehole		
duced levels in metre ackets in depth colun	nn.	Projec	t No.	A80	15-18			BH6	
© Cop	yright SOCOTEC L 14/08/2	DK Limited AGS 2018 13:42:25 Carried	d out for	AEC	ОМ		Ī	Sheet 2 of 4	



Depth from (m) 1.20 24.60 Diameter (mm) 200 146 Casing Depth (m) 24.60 24.60 Drilled SS/MB Start Equipment, Methods and Remarks Ground Level to (m) 24.60 34.50 Dando 175./Beretta T44. Cable percussion boring./Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID AR2068, Rod type: 54mm Whitworth. Logged MJS/IH Coordinates (m) E 516781.85 05/04/2018 Checked TC National Grid N 417525.42 End Approved TC 16/04/2018

pproved TC	16/04/201					[D. 1 D. 1 II		4		
Samples and				Date	Time	Strata Description		Depth, Level	Legend	Backfil
Depth	Туре	& No.	Records	Casing	Water	Main	Detail	(Thickness)	Logona	Duckiii
-						Stiff to very stiff light grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of chalk and rare flint.				
- 21.00 - 21.45 21.00 - 21.45 - 21.50 - 22.50	SP D:	36	N=33 (4,5/5,9,9,10)	21.00	Dry	Extremely weak cream CHALK. Recovered as		21.50 -16.7	79 4 :	
-						gravelly clay.	_	(1.00)		
- 22.50 - 22.95 22.50 - 22.95 - 23.00 - 23.80	SP D:	38	N=44 (7,8/9,10,13,12)	22.00 09/04/18 22.00 10/04/18	13.00 1700 13.00 0800	Very weak white, locally orangish brown, CHALK. Recovered as subangular fine to coarse gravel to cobbles.		22.50 -17.7	79	
				22.00	4.00			(2.10)		
23.80 - 23.91 - 24.25 - 24.30	SP SP		50 (25 for 60mm/50 for 50mm) 50 (25 for 30mm/50 for	22.50	4.00					
		-	20mm)	10/04/18 22.50 13/04/18 22.50	1010 4.00 0800 2.60	Weak cream CHALK. Fractures are:		24.60 -19.8	39	
24.60 - 25.60	95 46 30					Subhorizontal, closely spaced, undulating, rough with dark brown staining.     Subvertical, planar, smooth with yellowish brown staining.     Incipient fractures are very closely spaced, stepped, striated.				0
- 25.60 - 27.10 -	95 49 37	NI 100 196					26.85-26.98 1No. subangular cobble_	(2.95)		
27.10 - 28.40	80 21					Weak cream, occasionally speckled black, CHALK. Recovered as slightly silty subangular	of flint : 27.02-27.30 AZCL :		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
-	8	NI NI 90				fine to coarse gravel. Fractures are subhorizontal, closely spaced, undulating, rough with yellowish brown staining.	28.34-28.60 AZCL	(1.15)		
- 28.40 - 29.90	77 30 17	NI 120 170	Flush: 24.60 - 34.50 Air/ mist 100%			Weak cream CHALK. Fractures are:  1. Subhorizontal, closely spaced, planar, rough with dark greyish brown staining.  2. Occasionally subvertical, planar, smooth.  3. Incipient fractures are subhorizontal, extremely closely spaced, stepped, rough with occasional dark grey staining.	28.55 rare subangular coarse gravel of flint 29.59-30.66 1 No. cobble of flint 29.75-29.95 AZCL	28.70 -23.5		
	TCR			Date	Time		20.70-20.00 AZOL	(2.20)	1	1 <u>0</u> H
Depth roundwater Entries lo. Depth Strike (n 4 21.50	scr RQD m) Remark		Records after 20 minutes.	Casing  Depth Seal	Water	Depth Related Remarks Depths (m) Remarks		Hard Boring Depths (m) 23.80 - 24.25	Duration (mins)	Tools use Chisel
otes: For explanation of the Key to Exploratory of the Exploratory of the Exploratory of the Exploration of	Hole Reco s. Stratum	rds. All de thicknes	epths and s given in Project	No.		IMMINGHAM 15-18 COM		Borehole	BH6 Sheet 3 of 4	



Sheet 4 of 4

Drilled SS/MB Start quipment, Methods and Remarks Depth from Casing Depth Ground Level (m) 24.60 34.50 (m) 1.20 24.60 (mm) 200 146 (m) 24.60 24.60 MJS/IH Coordinates (m) .oaaed 05/04/2018 E 516781.85 Cable percussion boring. Rotary core drilling (SWF size) using air mist flush. SPT Hammer ID AR2068, Rod type: 54mm Whitworth. TC lational Grid N 417525.42 Checked End Approved TO Samples and Tests Strata Description Backfill Depth, Level Legend Records/Samples Detail Casing Wate Fractures are: 0 1. Subhorizontal, closely spaced, planar, rough with dark greyish brown staining.
2. Occasionally subvertical, planar, smooth. Ö 29.90 - 31.40 3. Incipient fractures are subhorizontal, extremely closely spaced, stepped, rough with occasional 30.90-33.80 dark 30.90 -26.19 dark grey staining.

Weak to medium strong cream CHALK. 0 grey staining is-possible mudstone O Fractures are: partings (<5mm 1. Subhorizontal, closely spaced, undulating, rough and planar, rough with dark grey staining.
2. Rare 45 degree, undulating, rough with dark 32.90-34.50 rare angular to 0 thick) 0 grey staining.
3. Incipient fractures are subhorizontal, very closely to closely spaced, undulating, striated, stepped, rough. Ō 31.40 - 32.90 О 0 Ö 13/04/18 24.60 1630 2.60 (3.60) 16/04/18 24.60 angular to subangular fine to coarse gravel of flint, rare incipient fractures are closely Ō 2.60 Ö 0 32.90 - 34.50 Ö 33.80-33.89 1No. cobble of chalk and flint conglomerate 0 16/04/18 1300 O 34.50 -29.79 END OF EXPLORATORY HOLE Depth Related Remarks Chiselling Details Depth Sealed Depth Strike Remarks Duration (mins) Tools used Depths (m) Remarks Depths (m) Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. VPI IMMINGHAM Project Borehole BH<sub>6</sub> © Copyright SOCOTEC UK Limited AGS Project No. A8015-18

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								S	OCOTE
illed MB	Start	Equipment, Methods and Rem	arks				Ground Level		6.49 mOI
gged IH	06/04/2018	Archway Dart.			(m) (m) 1.20 3.60	(mm) (m) 87	Coordinates (m)		E 516506.2
ecked TC	End	Dynamic sampling. SPT Hammer ID: DART235, Roo	type: quick th	read	3.60 4.60	55	National Grid		N 417414.9
		or Trialillion ID. Dritti200, 100	rypo. quion ii	rouu.			National Grid		14 17 17 17.5
roved TC	06/04/2018						4		
mples and				_	Strata Description				
Depth	TCR SCR RQD	If Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfi
0.00 - 0.50	D 2		Casing	vvalei	Dark brown slightly sandy slightly gravelly CLAY		(THICKHESS)	***************************************	٥
0.00 - 0.50	B 1	- 400kD N/A			with low cobble content. Gravel is subangular to		(0.50)		٠. A
0.25	HV	p 120kPa, r N/A			rounded fine to medium, rarely coarse, of chalk		(0.50)		9
0.50	HV	p 120kPa, r N/A			and mudstone with occasional concrete, quartz and flint. Cobbles are subangular of chalk.	0.50 rare rootlets -	0.50 +5.99		-VL
0.50 - 1.20 0.50 - 1.20	D 4 B 3				(MADE GROUND)	<i>_</i> /  :			
					Dark brown, locally mottled black, slightly sandy slightly gravelly CLAY. Gravel is subangular to		(0.00)		
1.00	HV	p 120kPa, r N/A			subrounded fine to medium of chalk, mudstone	_	(0.90)		
1.20 - 1.65	SPTS	N=10 (2,2/2,2,3,3)			and rare flint. Strong hydrocarbon odour.				
1.20 - 1.65 1.20 - 1.70	D 5 B 7				(MADE GROUND)	_ :	1.40 +5.09		
1.20 - 2.00 1.30 - 1.50	L D6	100% rec, diameter 87mm			Firm reddish brown, occasionally mottled red, slightly sandy slightly gravelly CLAY. Gravel is	-	(0.35)		
					angular to subrounded fine to coarse of chalk and		1.75 +4.74		
1.80 - 2.00	D 8				mudstone with occasional flint and rare sandstone.	1	(0.25)		- K /
2.00 - 2.45 2.00 - 2.20	SPTS D 10	N=26 (3,5/4,5,8,9)			Firm grey, mottled brown, slightly sandy slightly		2.00 +4.49		
2.00 - 2.45	D 9				gravelly CLAY. Gravel is angular to subrounded	fibrous rock/material			
2.00 - 2.80 2.00 - 2.80	B 12 L	100% rec, diameter 87mm			fine to coarse of chalk and mudstone with occasional flint and rare sandstone.	2.40 occasional			- / <sub>/</sub>
2.30 - 2.50	D 11	-			Firm to stiff indistinctly laminated reddish brown,	pockets of reddish - pink clayey fine	]		
2.80 - 3.25	SPTS	N=20 (4,4/4,4,5,7)			mottled grey, slightly sandy slightly gravelly CLAY.	sand	(1.60)		1/
2.80 - 3.25	D 13	-			Gravel is angular to subrounded fine to coarse of chalk and mudstone with occasional flint and rare		(1.00)		
2.80 - 3.60 3.00 - 3.20	L D 14	100% rec, diameter 87mm			sandstone.		1		
0.00 0.20									
3.40 - 3.60	D 15						-		
3.60 - 4.05	SPTS	N=20 (4,5/4,4,5,7)			Firm dowly brown alightly appear alightly aroughly		3.60 +2.89		
3.60 - 3.80 3.60 - 4.05	D 16 D 17				Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to				
3.60 - 4.60	L'	75% rec, diameter 55mm			medium of chalk.		(0.60)		
							-		$\exists$
4.20 - 4.40	D 18				Brown fine to medium SAND.	-	4.20 +2.29	1	록 / /
4.50 - 4.60	D 19					4.50-4.60 brown -	(0.40)		
4.60 - 5.05	SPTS	N=16 (3,3/3,4,4,5)			Firm dark brown slightly gravelly sandy CLAY.	slightly gravelly fine -	4.60 +1.89		_ / /
4.60 - 5.05	D 20			4000	Gravel is subangular to rounded fine to medium of	to coarse sand.	(0.45)		
			06/04/18	1200	chalk.	subangular to well			-1/
					END OF EXPLORATORY HOLE	rounded fine to medium of chalk	5.05 +1.44		
						and rare quartz			
							-		
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									1
Indwater Entrie					Depth Related Remarks		Chiselling Detail		<del>_</del> _
Depth Strik 4.20	e Remarks		Depth Sea	aled	Depths (m) Remarks 0.00 - 1.20 Hand excavated inspection pit.		Depths (m)	Duration (mins	) Tools u
4.20					1.20 Trand excavated inspection pit.				
· For evolence	n of symbols s-	d abbreviations		\/D:	IMMINGHAM		Borobolo		
ey to Exploratory	y Hole Records.	d abbreviations . All depths and		VPI	IIVIIVITAVI		Borehole		
ed levels in metrets in depth colu	res. Stratum thio mn.	ckness given in Project	No.	A80	15-18			WS1	
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e 1:50	14	4/08/2018 13:47:31 Carried	out for	AEC	· · · · ·		1	Sheet 1 of 1	



									so	COTEC
rilled MB	Start	Equipment, Methods and Rema	arks				ameter Casing Depth mm) (m)	Ground Level		5.46 mOD
gged IH	10/04/2018	Archway Dart. Dynamic sampling.				(m) (m) ( 1.20 1.70 1.70 2.50	87 77	Coordinates (m)		E 516529.35
ecked TC	End	SPT Hammer ID: DART235, Rod	type: quick th	read.		2.50 3.30	67	National Grid		N 417368.31
proved TC	10/04/2018									
amples and	l Tests				Strata Description	า				
Depth	TCR SCR RQD	If Records/Samples	Date Casing	Time Water	Ma	ain	Detail	Depth, Level (Thickness)	Legend	Backfil
0.00 - 0.50	D 2	-			Brown, mottled orange ar		-			۰
0.00 - 0.50 0.25	B 1 HV	p 120kPa, r N/A			slightly gravelly CLAY. Gr rounded fine to coarse of		-			H
0.50	HV	p 120kPa, r N/A			sandstone. Strong oil/hyd		0.50 rare angular to -			
0.50 - 1.20 0.50 - 1.20	D 4 B 3	,			(MADE GROUND)		subrounded fine to - medium gravel of -	(1.20)		
0.00 1.20							flint and sandstone with rare chalk			$\Box$
1.00	HV	p 120kPa, r N/A					with rare chair.			
1.20 - 1.65 1.20 - 1.40	SPTS D 5	N=16 (2,2/3,3,5,5)			Firm orangish brown, mo		1 :	1.20 +4.26		PH
1.20 - 1.65 1.20 - 1.70	D 6 B 8				slightly gravelly CLAY wit subangular to subrounde		1.50-2.50 indistinctly –			
1.20 - 1.70 1.50 - 1.70	L D7	100% rec, diameter 87mm			and mudstone with rare f		laminated -			$\mathbb{Z}_{2}$
1.70 - 2.15 1.70 - 2.15	SPTS D 9	N=28 (3,3/5,8,7,8)					-	(1.30)		//
1.70 - 2.50	B 11						_			
1.70 - 2.50 2.20 - 2.40	L D 10	100% rec, diameter 77mm					2.30 gravel size -			
2.40 - 2.50 2.50 - 2.95	D 12 SPTS	N=22 (2,4/4,5,6,7)			F:		pocket of dark grey - fine sand -	2.50 +2.96		$\perp$
2.50 - 2.95 2.50 - 3.10	D 13 B 16				Firm indistinctly laminated grey, CLAY.	d dark brown, mottled	-		F_=_1	//
2.50 - 3.30 2.85 - 3.10	L D 14	100% rec, diameter 67mm					2.85-3.10 gravel	(0.60)		
3.10 - 3.30	D 15				F:		size pockets of finesand	3.10 +2.36		
3.30 - 3.75	SPTS	N=26 (3,5/5,5,8,8)			Firm yellowish dark brow sandy slightly gravelly CL	AY. Gravel is angular to	] =	(0.20) - 3.30 +2.16		
3.30 - 3.75	D 17		10/04/18	1100	subangular fine to medium sandstone.	m of chalk, flint and	-	(0.45)		//
			10/04/16	1100	Firm dark brown slightly of		-			
					Gravel is subangular to s medium of chalk and san			3.75 +1.71		
						RATORY HOLE	_			
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oundwater Entries	Remarks		Depth Sea	aled	Depth Related Remarks Depths (m) Remarks			Chiselling Detail Depths (m)	s Duration (mins)	Toole us
o. Depth Strike	Remarks		թեհա 269	uicu	0.00 - 1.20 Hand excava	ated inspection pit.		Debuis (iii)	varauvii (IIIIIIS)	เบบเธ นร
					0.00 - 3.75 No groundwa	ater encountered during drilling.				
es: For explanation	of symbols and	d abbreviations Project		VPI	IMMINGHAM			Borehole		
Key to Exploratory iced levels in metre	Hole Records. es. Stratum thick	All depths and kness given in	No						WS2	
kets in depth colur © Cop	nn. yright SOCOTE	EC UK Limited AGS		AEC	15-18					
cale 1:50		/08/2018 13:47:32 Carried	out ior	AEC	, OIM			I	Sheet 1 of 1	



		•						S	COTE
rilled MB	Start	Equipment, Methods and Rema	arks				Ground Level		5.52 mO
gged IH	10/04/2018	Archway Dart. Dynamic sampling.			1.20 2.00	(mm) (m) 87	Coordinates (m)		E 516555.6
ecked TC	End	SPT Hammer ID: DART235, Rod	d type: quick thread		2.00 3.00 3.00 4.00	77 67	National Grid		N 417360.7
roved TC	10/04/2018								
mples an	d Tests			Strata Descripti	on				
Depth	TCR	If Records/Samples		ne	Main	Detail	Depth, Level	Legend	Backfi
0.00 - 1.20	RQD D 2		Casing W	iter	and grey and rarely orangish		(Thickness)	************	0 1
0.00 - 1.20	B 1			brown, slightly sandy s frequent roots and woo	slightly gravelly CLAY with od fragments. Gravel is I fine to medium of chalk	-			a. a
				and mudstone with occ angular cobble of chall	casional concrete. 1No.	-	(1.20)		
				(MADE GROUND)					
							Ī		
1.20 - 1.65 1.20 - 1.30	SPTS D 3	N=11 (2,2/2,2,3,4)			rangish brown slightly sandy	7 :	1.20 (0.10) +4.32 1.30 (0.10) +4.22		
1.20 - 1.65 1.20 - 2.00	D 4 L	100% rec, diameter 87mm		rounded fine to mediur	Gravel is subangular to m of mudstone and flint with	/ -			
1.30 - 2.00 1.50 - 1.70	B 6 D 5	-		rare chalk.	ttled grey and rarely black,	/  :			11
				slightly sandy slightly o	gravelly CLAY. Gravel is				
2.00 - 2.45 2.00 - 2.20	SPTS D 7	N=23 (3,5/6,5,6,6)		angular to rounded fine with rare sandstone.	e to coarse of chalk and flint	2.05-2.55 indistinctly laminated			A
2.00 - 2.45 2.00 - 3.00	D 8 L	100% rec, diameter 77mm		marraro cariacione.		2.30 becoming with -	(2.10)		
2.30 - 3.00	B 10					no gravel - 2.55 becoming	(2.10)		
						thinly laminated			loF
2.80 - 3.00	D 9					-			
3.00 - 3.45 3.00 - 3.45	SPTS D 11	N=14 (4,5/4,3,3,4)				_			
3.00 - 4.00	L	40% rec, diameter 67mm							- IŏF
3.40 - 3.65	D 12			Brown fine to coarse S	AND.	-  -	3.40 +2.12 (0.25)		بِمَا
3.65 - 3.80	D 13			Firm brown mottled ar	rey, sandy slightly gravelly	-  :	3.65 +1.87		
				CLAY. Gravel is angula	ar to subrounded fine to				
4.00 - 4.45	SPTS	N=20 (2,3/5,4,5,6)		medium of chalk.		_	(0.80)		1/
			10/04/18 0	000					//
				END OF EVD	LODATORYLIOLE		4.45 +1.07	9	/
				END OF EXP	LORATORY HOLE	-			
							1		
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Indwater Entri			Denth Seeled	Depth Related Remarks			Chiselling Detai		Tools ··
Depth Stri	ke Remarks		Depth Sealed		avated inspection pit.		Depths (m)	Duration (mins)	rools u
				0.00 - 1.00 Material to	oo granular for hand vane testing. dwater encountered during drilling.	L			
ey to Explorato	on of symbols an ry Hole Records tres. Stratum thic	. All depths and		/PI IMMINGHAM			Borehole	<b>M</b>	
ets in depth col	umn.	Project	No.	A8015-18				WS3	
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		_							S	OCOTEC
rilled MB	Start	Equipment, Methods and Rema	arks					Ground Level		5.10 mO
ogged IH	06/04/2018	Archway Dart.				(m) (m) 1.20 2.00	(mm) (m) 87	Coordinates (m)		E 516586.0
ecked TC	End	Dynamic sampling. SPT Hammer ID: DART235, Roo	type: quick t	hread		2.00 3.00 3.00 3.60	77 57	National Grid		N 417401.6
		0. 1 Hammor 15. 57 11 (1200, 1100	rypo. quion a	ouu.		3.00	<i>51</i>	Hational Grid		14 + 17 + 0 1.0
proved TC	06/04/2018							4		
amples and					Strata Description	1		ļ		
Depth	TCR SCR RQD	If Records/Samples	Date Casing	Time Water	Ma	ain	Detail	Depth, Level (Thickness)	Legend	Backfi
0.00 - 0.50	D 2	-			Brown, occasionally mott	led grey, slightly sandy	-		***********	0.0
0.00 - 0.50 0.25	B 1 HV	p 120kPa, r N/A			slightly gravelly CLAY. Gr	avel is subangular to	-	_		^ 1
					subrounded fine to coarse with rare flint and occasion			1		- i'al
0.50 0.50 - 1.20	HV D 4	p 120kPa, r N/A			(MADE GROUND)	mai roottoto.	0.50 dark brown -			$ \Gamma$ $\Pi$
0.50 - 1.20	B 3	-						(1.40)		-1/11
							-			
1.00	HV	p 120kPa, r N/A					_			
1.20 - 1.65 1.20 - 1.40	SPTS D 5	N=19 (2,3/4,5,5,5)								4
1.20 - 1.65	D 6	-			Firm brown, occasionally	mottled grey and rarely	1.35-1.40 layer of brick, recovered as	1.40 +3.70		
1.20 - 2.00 1.20 - 2.00	B 8 L	100% rec, diameter 87mm			reddish brown, slightly sa	indy slightly gravelly	subangular medium _ to coarse gravel _	-		$- \circ $
1.60 - 1.80	D 7	-			CLAY. Gravel is subangul coarse of chalk and muds		1.60 pocket of			
2.00 - 2.45	SPTS	N=22 (3,4/5,5,6,6)			sandstone and flint.	storio marraro	sandy clay (30mm - diameter)—			1,4
2.00 - 2.20 2.00 - 2.45	D 10 D 9						2.00-2.40 sandy -	(1.60)		
2.00 - 3.00	L	75% rec, diameter 77mm					2 40 indictionally	(1.50)		90
2.40 - 2.60	D 11	-					2.40 indistinctly - laminated -			
	1						2.70 thinly -			-V/
2.80 - 3.00	D 12	-					laminated -			
3.00 - 3.45 3.00 - 3.20	SPTS	N=20 (2,3/4,5,5,6)			Medium dense orangish l	brown fine to coarse		3.00 +2.10	1	록 /
3.00 - 3.45	D 13 D 14	-			SAND.	2 12 124.00	] =			//
3.00 - 3.50 3.00 - 3.60	B 16 L	83% rec, diameter 57mm					-	(0.60)		
3.50 - 3.60	D 15						3.50-3.60 brown - slightly clayey fine	3.60 +1.50		
3.60 - 4.05 3.60 - 4.05	SPTS D 17	N=15 (3,3/3,4,4,4)			Firm dark brown slightly g Gravel is subangular to re		to medium sand =			//
			06/04/18	1500	chalk and mudstone.	burided line to mediam o	'	(0.45)		
					END OF EXPLO	RATORY HOLE	<del>                                     </del>	4.05 +1.05		
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undwater Entries					Depth Related Remarks			Chiselling Detai		_
Depth Strik	e Remarks		Depth Se	ealed	Depths (m) Remarks 0.00 - 1.20 Hand excava	ated inspection pit.		Depths (m)	Duration (mins)	Tools us
5.00										
s: For explanation Key to Exploratory				VPI	IMMINGHAM			Borehole		
ced levels in metr	es. Stratum thic		No	ΛΩΛ	15-18				WS4	
ets in depth colu © Cop	mn. pyright SOCOTE	EC UK Limited AGS								
e 1:50	14	/08/2018 13:47:32 Carried	out ioi	AEC	· · · · · ·			1	Sheet 1 of 1	



led 100	64	Carriage and Market	d Damester			Danah from:			Creusalli		OCOTEC
led MB	Start	Equipment, Methods an	d Remarks			Depth from to (m) (m)			Ground Level		4.70 mOI
iged IH	10/04/2018	Dynamic sampling.				1.20 2.00 2.00 3.00	)	87 77	Coordinates (m)		E 516626.8
cked TC	End	SPT Hammer ID: DART2	35, Rod type: quick	thread.		3.00 5.00	)	67	National Grid		N 417337.4
roved TC	10/04/2018								]		
mples a	nd Tests				Strata Description	า					
Depth	TCR SCR RQD	If Records/Samp	Date les One les	Time	Ma	ain		Detail	Depth, Level	Legend	Backfil
0.00 - 1.20	RQD D 2	-	Casing	Water	Firm dark brown, mottled	grev and black slic	ahtly		(Thickness)	***************************************	•
0.00 - 1.20 0.25	B 1 HV	p 110kPa, r N/A			sandy slightly gravelly CL	AY with low cobble		=			·A
0.25	l nv	p Hokea, HNA			content and occasional ro subangular to subrounde	ootlets. Gravel is		-			
0.50	HV	p 100kPa, r N/A			mudstone, chalk, sandsto	one and occasional	brick	_	(1.25)		$ \Gamma$
					fragments. Cobble is sub (MADE GROUND)	angular of chalk.		_	(1.23)		
1.00	HV	p 100kPa, r N/A			(WADE GROUND)			-	-		$-1$ $\lambda$ 1
		ľ						-			$ \Gamma$ $\perp$
1.20 - 1.65 1.20 - 1.25	SPTS D 3	N=9 (1,2/2,2,2,3)			Firm, becoming stiff, grey	rish brown slightly s	andy	1.20 soft -	1.25 +3.45	***************************************	
1.20 - 1.65 1.20 - 2.00	D 4 L	100% rec, diameter	87mm		slightly gravelly CLAY. Gr rounded fine to coarse of		to well	_			- A
1.25 - 1.80 1.50 - 1.70	B 7 D 5				occasional sandstone an			=			- [ ] [
1.80 - 2.00	D 6	-						1.80 brown mottled - grey. Gravel is chalk -	-		
2.00 - 2.45 2.00 - 2.45	SPTS D 8	N=20 (3,4/5,4,5,6)						and occasional— mudstone			-1/11
2.00 - 3.00 2.00 - 3.00	B 11 L	88% rec, diameter 7	7mm					-			
2.20 - 2.40	D 9	00 % rec, diameter 7	/······					2.35-5.45 indistinctly alminated			Y
								2.65-5.45 rare	1		
2.80 - 3.00	D 10	-						gravel _	-		$\exists \lambda$
3.00 - 3.45	SPTS	N=24 (3,4/5,6,6,7)						_	1		$\perp$
3.00 - 3.20 3.00 - 3.45	D 12 D 13	-						=	1		
3.00 - 4.00	L	85% rec, diameter 6	7mm					3.35-5.45 soft,	(4.20)		
								gravelly. Gravel is _ subangular to _			
3.75 - 3.85	D 14							subrounded fine to _ medium of chalk _	-		loF
	0.000							and mudstone with _			
4.00 - 4.45 4.00 - 4.45	SPTS D 15	N=23 (4,4/4,5,6,8)						rare sandstone and— flint -			1_4
4.00 - 5.00	L	Diameter 67mm						3.40 dark brown - 3.75 firm -	-		OĻ
								4.00-4.45 - occasional gravel -			
								size pockets of sand			
								=			//
5.00 - 5.45	SPTS	N=19 (4,4/4,4,5,6)						<u>-</u>			
5.00 - 5.45	D 16		10/04/18	1300				-			
			10/04/10	1300				_	5.45 -0.75		//
					END OF EXPLO	RATORY HOLE		_	0.70		
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ndwater Ent	ies	1	I.		Depth Related Remarks				Chiselling Detail	s	
Depth St			Depth S	ealed	Depths (m) Remarks	ded form 10 10				Duration (mins)	Tools u
						ited inspection pit. ater encountered during	g drilling.				
						•	•				
For evoluna	ion of symbols	and abbreviations	Project	\/DI	IMMINGHAM				Borehole		
		s. All depths and	·ojeci	VPI					Dorentole		
ed levels in mets in depth o	etres. Stratum t olumn.	ickness given in	Project No.	A80	15-18					WS5	



		L		_	-			T		COTE
lled MB	Start	Equipment, Methods and Rer	narks			Depth from to (m)	Diameter Casing Depth (mm) (m)			5.69 mOl
ged WH	11/04/2018	Archway Dart. Dynamic sampling.				1.20 3.00	87	Coordinates (m)		E 516668.5
cked TC	End	Dynamic sampling. SPT Hammer ID: DART235, Ro	od type: quick t	hread.		3.00 4.00 4.00 5.00	77 67	National Grid		N 417414.7
oved TC	11/04/2018									
nples and					Strata Description			1		
iipies and			Date	Time	Strata Description	<u> </u>		Depth, Level	Legend	Backf
Depth	TCR SCR RQD	If Records/Samples	Casing	Water	Ma	ain	Detail	(Thickness)	Legend	Dacki
0.00 - 1.20	B 1	-			Brown sandy gravelly CL					٥
0.25	HV	p 90kPa, r N/A			to subrounded fine to coa and sandstone.	erse of chalk, mudstone	-	_		آھ
					(MADE GROUND)		-			
0.50 0.60	HV D 2	p 90kPa, r N/A			( == 5.15 5.1=)		_			$_{\rm FL}$
0.00										$-\Delta$
							-	(1.70)		
1.00	HV	p 90kPa, r N/A					_			
1.20 - 1.65	SPTS	N=8 (1,1/3,1,1,3)					1.20-1.30 1No	-		-1/L
1.20 - 1.65 1.20 - 2.00	D3 L	94% rec, diameter 87mm					subrounded cobble - of chalk -	7		T I
1.30 - 1.70	B 5 D 4						1.40-1.50 dark -			$ \square$
1.50 1.70 - 2.00	B 7				Firm to stiff brown, occasi	ionally mottled grey	greyish brown clay	1.70 +3.99		$\perp \downarrow$
1.80	D 6	-			slightly sandy slightly gray	velly CLAY. Gravel is		7		-V
2.00 - 2.45 2.00 - 2.45	SPTS D 8	N=22 (3,3/4,6,5,7)			subangular fine to coarse	of chalk, flint and	-	1		- $ A $
2.00 - 3.00	B 10	-			sandstone.		-	1		1/ ]
2.00 - 3.00	L	100% rec, diameter 87mm	וי					1		
2.50	D 9	-					-	1		$\exists A$
							-	(1.99)		+
2.80 - 3.25 2.80 - 3.25	SPTS D 11	N=21 (4,4/5,4,6,6)						1		- A
3.00 - 3.60	B 13						_			
3.00 - 4.00	L	100% rec, diameter 77mm	י					1		7
3.50	D 12	-					-	-		
					Soft brown CLAY		3.69-3.80 light -	3.69 +2.00		<u> </u>
3.80 - 4.25 3.80	SPTS D 14	N=29 (5,8/8,7,7,7)			OUIL DIOWII GLAT		brown fine to coarse - sand pocket -	(0.31)	<u>                                     </u>	
3.80 - 4.25	D 15	-			Medium dense light brow	n gravelly slightly clave		4.00 +1.69	70N 20N 1	록 /
4.00 - 5.00	L	70% rec, diameter 67mm			fine to coarse SAND with	rare pockets of gravell		1		- /
4.30 - 5.00	B 17	-			clay. Gravel is subangular			1		1/
4.50	D 16	-					_	-		
								(1.45)		
							-	(1.40)		+
5.00 - 5.45	SPTS	N=19 (4,4/5,4,5,5)								
			44/04/12	4200				1		1/
			11/04/18	1100			-	1		
					END OF EXPLO	RATORY HOLE		5.45 +0.24	77. 77.	
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ndwater Entries	<u> </u>				Depth Related Remarks			Chiselling Detail	s	
Depth Strik			Depth Se	ealed	Depth Related Remarks  Depths (m) Remarks				s Duration (mins)	Tools u
4.00						ited inspection pit.			,	
		nd abbreviations Projects: All depths and	:t	VPI	IMMINGHAM			Borehole		
	es. Stratum thi	ckness given in	t No.	A80	15-18				WS6	
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											OCOTE
d	MB	Start	E	quipment, Methods and Rema	ırks			iameter Casing Depth (mm) (m)	Ground Level		5.79 mOl
ed	WH	11/04/2018	D	Archway Dart. Dynamic sampling.			1.20 3.00 3.00 4.00	87 77	Coordinates (m)		E 516708.4
ked		End	s	SPT Hammer ID: DART235, Rod	type: quick t	hread.	4.00 5.00	67	National Grid		N 417492.5
oved		11/04/2018	3						4		
пp	les and				Date	Time	Strata Description		Bentle Level	T	D1-61
	Depth	TCR SCR RQD	If	Records/Samples	Casing	Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfi
	0 - 0.30 0.20	B 1 D 2					Brown slightly gravelly sandy CLAY with rootlets and low cobble content. Gravel is subangular fine		(0.30)		٠.۵
	0 - 0.80	B 3					to coarse of chalk and sandstone. Cobbles are	1 :	0.30 +5.49		ا ا
	0.50	D 4		-			subrounded of chalk. (TOPSOIL)	0.50-0.70 pockets of -			- $ $
0.8	0 - 1.20	B 5					Light brown sandy gravelly CLAY with low cobble content. Gravel is subangular fine to coarse of	clay	(0.90)		$-\square$
	0.90	D 6					sandstone. Cobbles are subrounded of chalk.				
12	0 - 1.65	SPTS		N=6 (3,3/2,2,1,1)			(MADE GROUND)		1.20 +4.59		
1.2	0 - 1.65 0 - 1.80	D7 B9		14-0 (0,0/2,2,1,1)			Soft greyish brown slightly sandy CLAY with rare subrounded fine to medium gravel of chalk.		1.20		
1.2	0 - 2.00 1.50	L D8		100% rec, diameter 87mm			· ·	-	(0.60)		И
	0 - 2.00	B 11							1.80 +3.99		
	1.90 0 - 2.45	D 10 SPTS		N=19 (3,4/4,4,5,6)			Firm, becoming stiff, brown, mottled light grey, slightly sandy slightly gravelly CLAY. Gravel is				
2.0	0 - 2.45 0 - 3.00	D 12 L		80% rec, diameter 87mm			subrounded fine to coarse of chalk.				
	0 - 3.00	B 14		00 % rec, diameter ormin							$\square$
								-			
	2.80	D 13		-				]	1		
3.0	0 - 3.45	SPTS		N=23 (4,5/5,6,6,6)					1		$ \cdot $
3.0	0 - 3.45 0 - 4.00	D 15 L		40% rec, diameter 77mm							4
				,				:	(3.20)		
3.6	0 - 4.00	B 17		-					1		
	3.80	D 16									$\mathbb{Z}_{2}$
	0 - 4.45	SPTS		N=23 (5,5/5,6,6,6)							
	0 - 4.45 0 - 5.00	D 18 L		90% rec, diameter 67mm							
											1/
4.6	0 - 5.00	B 20		-				-			//
								4.80-4.85 soft brown			//
5.0	4.90 0 - 5.45	D 19 SPTS		N=18 (5,5/5,4,5,4)			Medium dense light brown gravelly fine to coarse	clay -	5.00 +0.79	1	マ /
5.0	0 - 5.45	D 21			11/04/18	1300	SAND. Gravel is subrounded coarse of igneous		(0.45)		
					11/04/10	1000	rock and chalk.		5.45 +0.34		//
							END OF EXPLORATORY HOLE	-	-		
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nd	ator Entris -						Donth Polated Pomarko		Chicalling Date		
	ater Entries Depth Strike		8		Depth Se	aled	Depth Related Remarks Depths (m) Remarks		Chiselling Detai Depths (m)	s Duration (mins)	Tools u
	5.00						0.00 - 1.20 Hand excavated inspection pit. 0.00 - 1.00 Material too granular for hand vane testing.			,	
							material too granulal for Hariti valle testilig.				
: For	explanation	of symbols	and a	bbreviations Project		VPI	MMINGHAM		Borehole		
ey to	Exploratory	Hole Record	ds. All	I depths and		•••				14/07	
	depth colun			Project	No.	A80	5-18			WS7	
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						· ———				OCOTE
led MB	Start	Equipment, Methods and Rer	narks			Depth from to (m)	Diameter Casing Depth (mm) (m)	Ground Level		4.53 mOl
ged WH	11/04/2018	Archway Dart. Dynamic sampling.				1.20 2.00 2.00 3.00	87 77	Coordinates (m)		E 516813.2
ked TC	End	Dynamic sampling. SPT Hammer ID: DART235, Ro	od type: quick	thread.		3.00 3.00	67	National Grid		N 417461.7
oved TC	11/04/2018							J		
nples and	l Tests				Strata Description	า				
Depth	TCR SCR RQD	If Records/Samples	Date Casing	Time Water	Ma	ain	Detail	Depth, Level (Thickness)	Legend	Backfi
0.00 - 1.20	B 1	-	ousing	Trutor	Brown slightly sandy sligh	htly gravelly CLAY with			***********	٥
0.25	HV	p 120kPa, r N/A			rootlets. Gravel is subang sandstone.	gular fine to medium of				ا
0.50	HV	p 120kPa, r N/A			(MADE GROUND)					
0.60	D 2	p izokra, i N/A						(1.35)		T J
								(1.55)		
1.00	HV	p 120kPa, r N/A					_			
1.20 - 1.65	SPTS	N=12 (1,1/3,3,3,3)								
1.20 - 1.65 1.20 - 2.00	D3 L	100% rec, diameter 87mm	,		Firm brown slightly sandy	slightly gravelly CLAY.		1.35 +3.18		$\Gamma$
1.35 - 1.70 1.50	B 5 D 4				Gravel is subrounded fine			(0.35)		
1.70 1.70 - 2.00	D 6 B 7				sandstone. Firm brown slightly sandy	slightly gravelly CLAY.		1.70 +2.83		-1/L
2.00 - 2.45	SPTS	N=18 (3,4/4,4,5,5)			Gravel is subrounded fine sandstone.	e to medium of chalk ar	nd _			
2.00 - 2.45 2.00 - 3.00	D 8 L	40% rec, diameter 77mm			Sanustone.					
2.00 - 3.00	-	40 % rec, diameter 17 min								A'
							-	1		
2.70	D 9	-						(2.00)		Y]
2.70 - 3.00	B 10	N=40 (0.0/0.0 0.0 0						-		
3.00 - 3.45 3.00 - 3.45	SPTS D 11	N=12 (3,3/3,2,3,4)					_			
3.00 - 4.00	L	30% rec, diameter 67mm								
							-			
3.70	D 12	-			Coff brown OLAY			3.70 +0.83		0
					Soft brown CLAY.				F_=_=	- 1 <sup>o</sup> F
4.00 - 4.45 4.00 - 4.45	SPTS D 13	N=14 (3,3/3,3,4,4)					-	(0.75)		
4.00 4.40	D 10		11/04/18	1500				1		
					END OF EVEL	DATORY/LIQUE		4.45 +0.08	L	
					END OF EXPLO	RATORY HOLE	-			
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ndwater Entries	6				Depth Related Remarks			Chiselling Detail	s	
Depth Strik			Depth S	ealed	Depths (m) Remarks				Duration (mins)	Tools u
						ated inspection pit. ater encountered during dri	lling.			
y to Exploratory	Hole Records	nd abbreviations . All depths and	t	VPI	IMMINGHAM			Borehole		
ed levels in metrets in depth colu	mn.	Projec	t No.	A80	15-18				WS8	
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		3						SOCOTEC
Logged WH	Start	Equipment, Methods and R	emarks	Dimension and Orientation		Ground Leve	ı	6.33 mOD
Checked TC	11/04/2018	Tracked 360 excavator. Machine excavated.		Width 0.60 m		Coordinates		E 516544.31
Approved TC	End			Length 4.00 m	270 (Deg)	National Grid	I	N 417427.12
	11/04/2018		lotuata Dan animtian	·				
Samples an			Strata Description			Depth, Lev	rel Legend	Backfill
Depth	Type & No.	Records	Main		Detail	(Thickness)	Legend	Duckiiii
- 0.10 - 0.10 - 0.30 	D1 B2		Dark brown sandy clayey subangular to sub GRAVEL of sandstone, chalk, clinker, maca content. Cobbles are subrounded to subang (MADE GROUND)	dam and slag with low cobble	- - - - - -	(0.50)		
- - - - 0.70 - 0.70 - 0.90	D3 B4		Firm dark greyish brown, mottled black, slig Gravel is subangular to subrounded of brick chalk. Strong oil/hydrocarbon odour. (MADE GROUND)			(0.60)	5.83	
- 1.20 - 1.20 - 1.20 - 1.50	HV D5 B6	p 120kPa, r N/A	Stiff brown, mottled grey, slightly sandy grasubrounded fine to medium of chalk and sa	velly CLAY. Gravel is ndstone.	- - - - - - - - - - - - - - - - - - -	1.10	5.23	
	HV D7 B8	p 120kPa, r N/A			- - - - - - - - - - -	(1.40)		
			Firm brown, mottled light grey, slightly sand Gravel is subangular to subrounded fine to with sandstone.		- - - - - - - - - - - - - - - - - - -	2.50 4	3.83	
3.40 - 3.60 3.50 3.50	B10 D9	11/04/18 D	END OF EXPLORATO	DRY HOLE	- - - - - - - - - - - - - - - - - - -	3.90	2.43	
<del>-</del>								
Groundwater Entrie No. Depth Strike			Remarks  Depth (m) Remarks  0.00 - 3.90 No groundwater encountered during	g excavation.		Shoring	Stable  None  Overcast	
Notes: For explanation see Key to Explorator	on of symbols and	abbreviations All depths and	Project VPI IMMINGHAM			Trial Pit		
reduced levels in met brackets in depth col	tres. Stratum thick	rness given in	Project No. A8015-18				TP1	
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	- ·	I					
Logged WH	Start	Equipment, Methods and Re	marks Dimension and Orientation		Ground Level		5.70 mOD
Checked TC	11/04/2018	Tracked 360 excavator. Machine excavated.	Width 0.60 m		Coordinates (m)		E 516559.56
Approved TC	End		Length 4.00 m	270 (Deg)	National Grid	N	N 417394.29
	11/04/2018		la · · · ·				
Samples and	d lests		Strata Description		Don'th Lovel	Linne	D Letti
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
- 0.40 0.00	D0		Soft dark brown slightly gravelly sandy CLAY with low cobble content and rootlets. Gravel is subangular to subrounded fine to coarse of chalk, flint,	-			
- 0.10 - 0.30 -	B2		sandstone and debris including metal bolts, wood and concrete. Cobbles	_	(0.30)		
- 0.20 -	D1		are subrounded of chalk. (MADE GROUND)				
- 0.30 - 0.30 - 0.50	D3 B4	-	Firm dark brown, mottled black, slightly sandy slightly gravelly CLAY.	1 -	0.30 +5.40		
_ _			Gravel is subangular to subrounded fine to coarse of chalk, sandstone and flint. Strong oil/hydrocarbon odour.	-	(0.30)		
_			(MADE GROUND)		ļ		
_			Firm brown, mottled light grey, slightly sandy slightly gravelly CLAY with	0.60-0.90 firm - light brown -	0.60 +5.10		
_			low cobble content. Gravel is subangular to subrounded fine to coarse of predominantly chalk with sandstone and flint. Cobbles are subrounded of	slightly gravelly = CLAY. Gravel is =			
_			chalk.	subangular to subrounded fine	1		
_ _				to coarse of chalk, sandstone	1		
_				and flint	1		
_							
_				_			
- 1.30 - 1.30	HV D5	p 120kPa, r N/A		_			
- - 1.30 - 1.50	B6	-		_			
				_			
<b>-</b>					1		
<del>-</del> -				-			
_ _				_	1		
<del></del> -				_	(2.90)		
<del>-</del> -				-	1		
_ _				-	1		
- 2.30 - 2.50 -	B8	-		-			
_ _				-			
2.50	D7	-		_			
_ _				_			
- -							
_							
_ _				_			
				_			
- 3.10 -	HV	p 120kPa, r N/A					
_				3.20-3.50 - becoming grey -			
<u> </u>				with less gravel			
- 3.40 - 3.40 - 3.50	D9 B10	-		-	_		
	B10		Light brown clayey, locally very clayey, fine to medium SAND.		3.50 +2.20		
_							
<u> </u>				-			
_ _				_	_		
- -				-	(0.90)		
- 4.00 - 4.00 - 4.20	D11 B12	-		_	(0.30)		
4.00 - 4.20 - -	612			-	1		
_				-			
_		11/04/18 Dry	4				
- 4.40 - 4.40	HV D13	p 120kPa, r N/A	Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is	1 :	4.40 +1.30		
4.40 - 4.50	B14		subangular to subrounded fine to medium of chalk.  END OF EXPLORATORY HOLE	<del>                                     </del>	4.50 +1.20		
_ _			END OF EXPLORATORY HOLE	-	1		
_							
				_			
						L	
Groundwater Entrie			Remarks		Stability Stat	hle	
No. Depth Strike	(m) Remarks		Depth (m) Remarks 0.00 - 4.50 No groundwater encountered during excavation.		Judinity Stat	U.U	
			0.00 - 3.50 Material too friable for hand vane testing.		Shoring Non	ne	
					Weather Ove	ercast	
Notes: For explanatio see Key to Explorator	n of symbols and	abbreviations	Project VPI IMMINGHAM		Trial Pit		
reduced levels in met	res. Stratum thick	kness given in	Project No. A8015-18			TP2	
brackets in depth colu © Co	umn. opyright SOCOTE	EC UK Limited AGS	Project No. A8015-18				



		-					soco	
Logged WH	Start	Equipment, Methods and Re Tracked 360 excavator.	marks	Dimension and Orientation		Ground Level		1 mOD
Checked TC	10/04/2018 <b>End</b>	Machine excavated.		Width 0.60 m		Coordinates (m) National Grid		568.48
Approved TC	10/04/2018			Length 4.00 m	340 (Deg)	National Grid	11417	297.43
Samples an			Strata Description			i		
Depth	Type & No.	Records	Main		Detail	Depth, Level (Thickness)	Legend B	Backfill
			Soft dark brown slightly sandy slightly gravelly	CLAY with frequent		(TillCkiless)		
0.10 0.10 - 0.20	D1 B2	-	rootlets. Gravel is subangular to subrounded fi sandstone, chalk and flint.	ne to medium of	=	(0.20)		
			(MADE GROUND)  Firm light brown, mottled grey, slightly sandy g	ravelly CLAY with low	0.20-0.40 light - brown, mottled -	0.20 +4.2		
			cobble content. Gravel is subrounded fine to me chalk with sandstone and mudstone. Cobbles	nedium of predominantly	orangish brown =			
- 0.50	HV	p 120kPa, r N/A	chalk with sandstone and middstone. Cobbles chalk.	are subrounded or fillit and	_			
0.50 0.50 0.50 - 0.80	D3 B4	p 120kt d, 116/K			=			
					-			
					_	-		
					=			
					_			
					-			
					- -	(2.30)		
					_			
					-			
					-			
1.80	D5				<u>-</u>			
1.80 - 2.00	B6	-			_			
					_			
					<del>-</del>			
					_ _			
					-			
					_			
2.50 2.50	HV D7	p 120kPa, r N/A	Firm brown CLAY.		_	2.50 +1.9	1 = = = =	
2.50 - 2.80	B8	-			=	(0.30)		
					-			
			Dark brown slightly clayey fine to coarse SANI	D.	=	2.80 +1.6		
					_			
					_			
						(0.80)		
					=			
3.40	D9	-			<u>-</u>			
3.40 - 3.60	B10	-			_			
			Soft dark brown very sandy CLAY with occasion	onal gravel size pockets of	-	3.60 +0.8	1 2 2 2	
			sand.		-			
					-			
	5.4							
4.00 4.00 - 4.20	D11 B12	-				(0.90)		
					=			
		10/04/18 Dry	,		-	-		
					_	-		
			END OF EXPLORATOR	/ HOI F	-	4.50 -0.09	,	
			2.12 6. 2.1. 26.6 1. 6.1		_			
					-	-		
					-			
					<del>-</del>			
					_			
oundwater Entrie	es		Remarks			A		
o. Depth Strike	(m) Remarks		Depth (m) Remarks 0.00 - 4.50 No groundwater encountered during ex	cavation.		Stability Fa 2.8	ace A and E collapsed fro 80m	mc
			g. g. z.			Shoring No	one	
							vercast	
es: For explanation Key to Explorator	ry Hole Records.	All depths and	Project VPI IMMINGHAM			Trial Pit		
uced levels in met ckets in depth colu	res. Stratum thick umn. opyright SOCOTE		Project No. A8015-18				TP3	
Scale 1:25		08/2018 13:48:24	Carried out for AECOM				Sheet 1 of 1	



		- 9						SOCOTEC
ogged WH	Start	Equipment, Methods and I	Remarks	Dimension and Orientation	_	Ground Level		4.47 mOI
necked TC	09/04/2018	Tracked 360 excavator Machine excavated pit		Width 0.60 m		Coordinates (m)		E 516556.5
proved TC	End 10/04/2018			Length 4.00 m	290 (Deg)	National Grid		N 417325.0
mples and			Strata Description	•				
Depth	Type & No.	Records	Main		Detail	Depth, Level (Thickness)	Legend	Backf
0.10 0.10 - 0.30	D1 B2	09/04/18	Dark brown slightly sandy slightly grave Gravel is subangular to subrounded fin and flint. (MADE GROUND)  Firm brown, mottled light grey, slightly s subangular to subrounded fine to coars sandstone, mudstone and flint.	e to medium of sandstone, chalk sandy gravelly CLAY. Gravel is	-	(0.30) 0.30 +4.17		
0.80 0.80 - 1.00	D3 B4				1.10 land drain –	(1.10)		1 또
1.40 1.40 1.40 - 1.60	HV D5 B6	p 120kPa, r N/A	Firm brown, mottled light grey, CLAY.		2.60-3.00 grey - mottled brown -	(2.00)		
3.00 3.00 - 3.20	D7 B8				3.00-3.40 brown- slightly gravelly- clayey sand Gravel is subangular fine to coarse of chalk	3.40 +1.07		
3.50 4.00 4.00 - 4.30	D9 D11 B12		Firm brown slightly sandy gravelly CLA subrounded fine to medium of chalk, flii	y. Gravei is subangular to nt and sandstone.	-	(1.10)		
		10/04/18	END OF EXPLOR	ATORY HOLE	- - - - -	4.50 -0.03		
					-			
oundwater Entries Depth Strike	(m) Remarks Seepage		Remarks Depth (m) Remarks					
es: For explanation Key to Exploratory uced levels in metro ckets in depth colur © Co cale 1:25	y Hole Records. res. Stratum thicl ımn. pyyright SOCOTE	All depths and kness given in	Project VPI IMMINGHAM  Project No. A8015-18  Carried out for AECOM			Trial Pit	TP4 Sheet 1 of 1	



	T			<b>I</b> n		la		SOCOTEC
Logged WH		Equipment, Methods and I	Remarks	Dimension and Orientation		Ground Level		4.31 mOD
Checked TC	10/04/2018	Tracked 360 excavator. Machine excavated.		Width 0.60 m	] <sub>0</sub>	Coordinates (m)		E 516595.86
Approved TC	End 10/04/2018			Length 4.00 m	120 (Deg)	National Grid		N 417316.85
Samples an			Strata Description			ł		
•		1				Depth, Level	Legend	Backfill
Depth	Type & No.	Records	Main	Illy CLAV with fraguent	Detail	(Thickness)	*****	100000000000000
- 0.10	D1	-	Soft dark brown slightly sandy slightly grave rootlets. Gravel is subangular to subrounded	fine to medium of	_			
0.10 - 0.20	B2		sandstone, chalk and flint. (MADE GROUND)			(0.30)		
			Firm brown, mottled grey, gravelly slightly so content. Gravel is subrounded fine to mediu	andy CLAY with low cobble	-	0.30 +4.01		
			content. Gravel is subrounded fine to mediu mudstone. Cobbles are subangular of chalk	m of chalk, flint and	-			
- 0.50 0.50	HV D3	p 120kPa, r N/A						
0.50 - 0.70	B4				0.60-0.90 soft - light yellowish -	-		
					brown slightly sandy clay			
					_			
_						(1.40)		
					1.20 land drain	-		1 목
					-			
- 1.50 1.50	HV D5	p 120kPa, r N/A			_			
1.50 - 1.70	B6	-			_	-		
			Stiff bluish grey, mottled brown, CLAY.		7 =	1.70 +2.61		
- 2.00	D7							
2.00 - 2.20	B8	-			=	(0.80)		
					-			
					_	-		
2.50 2.50 - 2.70	D9 B10	-	Light brown slightly clayey to clayey fine to	nedium SAND. Rare angular	-	2.50 +1.81		
			fine gravel of mudstone.		=	-	37-17	
		10/04/18				(0.50)		
		16,6 11 16			-	-		
_			END OF EXPLORATO	PV HOLE	-	3.00 +1.31		
			END OF EXPEDITATION	IN HOLE				
						_		
					=	-		
					=	-		
•					1 3			
					-	-		
					-	-		
-					_			
					-	_		
						-		
						-		
					-			
						-		
						-		
					-	-		
Groundwater Entri	es		Remarks			04-1		
No. Depth Strike	e (m) Remarks Seepage		Depth (m) Remarks			Stability Fac	ces A and C c	oliapsed
	3 -					Shoring No		
-1		alabara daki	Desired Visionian Community				ercast	
otes: For explanation ee Key to Explorato Educed levels in me	ry Hole Records.	All depths and	Project VPI IMMINGHAM			Trial Pit	TD-	
ackets in depth col	umn. opyright SOCOTE		Project No. A8015-18				TP5	
Scale 1:25		08/2018 13:48:24	Carried out for AECOM				Sheet 1 of 1	



Logged WH	Start	Equipment, Methods and F	Remarks	Dimension and Orientation		Ground Level		5.43 mOD
Checked TC	10/04/2018	Tracked 360 excavator. Machine excavated.		Width 0.60 m	1	Coordinates (m)		E 516601.66
Approved TC	End			Length 4.00 m	B 240 (Deg)	National Grid		N 417379.51
	10/04/2018			C C				
Samples an	d Tests		Strata Description					
Depth	Type & No.	Records		Main	Detail	Depth, Level (Thickness)	Legend	Backfill
- - 0.10 - 0.10 - 0.30 -	D1 B2		Gravel is subangular fine to coars Cobbles are subrounded of chalk. (MADE GROUND)		-	(0.30) 0.30 +5.13		
- 0.40 - 0.60 - 0.50 	B4 D3		CLAY. Gravel is subrounded fine t (MADE GROUND)  Firm light brown slightly sandy slig subrounded fine to coarse of flint,	ahtly gravelly CLAY. Gravel is	- 0.60-1.20 brown - mottled grey - gravelly clay -	(0.30)		
	D5 B6				1.20 land drain - - - - - - - -			
- 1.50 - 1.50 	HV	p 120kPa, r N/A			-			又
2.00 	HV	p 120kPa, r N/A			-	(3.50)		
2.50 2.50 - 3.00	D7 B8							
4.10 - 4.30 - 4.30 - 4.30 - 4.30 - 4.30 - 4.30	D9 B10	10/04/18	Firm dark brown sandy CLAY with sand.	occasional gravel size pockets of	-	(0.50)		
- - - - - - -			END OF EXP	PLORATORY HOLE	- - - - - -	4.60 +0.83	3	188398888888888888888888888888888888888
Groundwater Entric No. Depth Strike 1 1.90  Notes: For explanation	e (m) Remarks Seepage	abbreviations	Remarks Depth (m) Remarks  Project VPI IMMINGHAM			Stability Sta  Shoring Nor  Weather Ove		
see Key to Explorato reduced levels in me brackets in depth col	ry Hole Records. A tres. Stratum thick lumn. copyright SOCOTE	All depths and eness given in					TP6 Sheet 1 of 1	



		_						SOCOTEC
	Start	Equipment, Methods and I	Remarks	ension and Orientation		Ground Level		5.29 mOD
Logged WH	10/04/2018	Tracked 360 excavator. Machine excavated.		Α Α		Coordinates (m)	1	E 516616.25
Checked TC	End	iviaci ii ie excavateu.	Widt	ath 400 m	B 140 (Deg)	National Grid		N 417423.18
pproved TC	10/04/2018		Leng	giii 4.00 iii				
amples an	d Tests		Strata Description					
Depth	Type & No.	Records	Main		Detail	Depth, Level (Thickness)	Legend	Backfill
			Soft brown sandy slightly gravelly CLAY with freque	ent rootlets. Gravel is	_		X//XX	
0.10 - 0.30	B2	-	subrounded fine to medium of chalk. (TOPSOIL)		_	(0.30)		
0.20	D1	-	(131 3312)		_			
			Soft brown slightly gravelly sandy CLAY. Gravel is s	subangular to	1 =	0.30 +4.99		
			subrounded fine to medium of chalk sandstone and	I flint.	=			
					_			
					=			
					=			
					_			
					_			
					1.10 soft orangish -			1 목
					1.10 soft orangish — brown sandy clay — 1.10 land drain —			•
1.30	HV	p 120kPa, r N/A			_			
1.30 1.30 - 1.60	D3 B4				=			
					_			
					_	(2.60)		
					=			
					=			
					_			
					_			
					_			
					_			
					_			
					_			
					_			
					_			
					_			
					_			
			Brown clayey fine to coarse SAND.		1 =	2.90 +2.39	' = =	
					=			
					_	(0.90)		
3.50	D5				_			
3.50 - 3.80	B6	-			_			
					_			
			Firm dad, mariah harrow Ol AV		_	3.80 +1.49	, — —	
			Firm dark greyish brown CLAY.		_			
4.00	D7	10/04/18			_	(0.40)		
4.00 - 4.20	B8	-			=			
			END OF EXPLORATORY HO	LE		4.20 +1.09		
			2.15 6. 27.1 25.1 1.1 6.11 1.16		]			
					_			
					_			
					=			
					_			
					_			
					=			
							•	
oundwater Entrie o. Depth Strike	(m) Remarks		Remarks Depth (m) Remarks			Stability Fa	ces A and C co	llapsed from
1.10	Seepage		1				one	
							vercast	
es: For explanation	n of symbols and	d abbreviations	Project VPI IMMINGHAM			Trial Pit		
Key to Explorator uced levels in met	y Hole Records. res. Stratum thic	All depths and kness given in					TP7	
ckets in depth col	umn. opyright SOCOTI		Project No. A8015-18				161	



		3						SOCOTEC
Logged WH	Start	Equipment, Methods and Re	emarks	Dimension and Orientation	_	Ground Level		4.60 mOD
Logged WH Checked TC	10/04/2018	Tracked 360 excavator. Machine excavated.		Width 0.60 m		Coordinates (n	n)	E 516678.60
Approved TC	End				35 (Deg)	National Grid		N 556494.03
	10/04/2018		los s p s s	-		ļ		
Samples an			Strata Description			Depth, Leve	I Legend	Backfill
Depth	Type & No.	Records	Main		Detail	(Thickness)	Legenu	Dackiiii
- - 0.10	D1	=	Soft dark brown silty CLAY with rootlets. (TOPSOIL)		-	(0.20)		
- 0.10 - 0.20 - 0.20	B2 HV	p 120kPa, r N/A	Light orangish brown slightly sandy gravelly (	CLAY Gravel is subrounded	-	0.20 +4	40	
0.20 0.20 - 0.50	D3 B4	-	fine to coarse of sandstone and chalk. (MADE GROUND)	SEATT. CITAVOLIO SUBIOGINACA	_	(0.30)		
_			(MADE GROUND)		-			
<del>-</del> -			Firm brown, mottled light grey, slightly sandy		-	0.50 +4.	10	
-			cobble content. Gravel is subrounded to roun and sandstone. Cobbles are subrounded of co					
_ - 0.80	HV	p 120kPa, r N/A			_			
- 0.80 - 0.80 - 1.00	D5 B6				-			
_					_			
<u>-</u> -					-	_		
<del>-</del>					-			
_					_			
<u>-</u>					-			
<u>-</u> -					-	(0.50)		
_					_	(2.50)		
_					-			
	D7 B8	-				-		
<u> </u>					-			
_					-			
_					-			
<del>-</del>					-	-		
_					_			
_					_			
_ _					-			
<u> </u>					-	3.00 +1.		
_ _ 3.10	D9	_	Soft light grey, mottled brown, CLAY with rare gravel of chalk.	e subrounded fine to medium	_	3.00 +1.		
- 3.10 - 3.30 -	B10	-			3.20-3.90 firm -	(0.30)		
<del>-</del> -			Dark brown clayey fine to medium SAND with	n occasional gravel size	dark brown clay	3.30 +1.	30	
<del>-</del> - -			pockets of sandy clay.	r coodcional gravor cizo	-			
_					_			
<del>-</del>					-	(0.60)		
- 3.70 - 3.90 - 3.80	B12 D11				_			
- 3.60 -	D11				-	3.90 +0.	70	
4.00	HV	p 100kPa, r N/A	Firm brown slightly sandy silty CLAY.		_		××	
- 4.00 - 4.00 - 4.50	D13 B14	-			_		××	
- -					-	(0.60)	×x	
- -		10/04/18 Dry	1		-		×x	
-					-	4.50 +0.	10 × ×	
<del>-</del> - -			END OF EXPLORATOR	RY HOLE	-	4.50 +0.	.10	
<u>-</u> -					-	-		
- -					-			
_					_			
Groundwater Entri	es.		Remarks					
No. Depth Strike			Depth (m) Remarks			Stability S	Stable	
			0.00 - 4.50 No groundwater encountered during	excavation.		Shoring N	None	
						_	Overcast	
Notes: For explanation	on of symbols and	l abbreviations All depths and	Project VPI IMMINGHAM			Trial Pit		
reduced levels in me brackets in depth col	tres. Stratum thick umn.	kness aiven in	Project No. A8015-18				TP8	
Scale 1:25	opyright SOCOTE	EC UK Limited AGS 08/2018 13:48:25	Carried out for AECOM				Sheet 1 of 1	
	17/							



Irial		•					SOCOTE
d M//	Start	Equipment, Methods and	Remarks Dimension and Orientation		Ground Level		5.71 mC
ogged WH	10/04/2018	Tracked 360 excavator. Machine excavated.	м		Coordinates (m	)	E 516677.
ecked TC	End	iviaciline excavateu.	Width 0.60 m	B 310 (Deg)	National Grid		N 417410.
roved TC	10/04/2018		Length 4.00 m				
mples an	d Tests		Strata Description				
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backf
0.40	D4		Soft dark brown slightly gravelly slightly silty CLAY with frequent rootlets.  Gravel is angular to subrounded fine to medium of sandstone and flint.	-	(0.20)		
0.10 0.10 - 0.20	D1 B2	-	(TOPSOIL)		0.20 +5.5		
0.30	D3		Light yellowish brown very sandy clayey angular to subangular fine to coarse GRAVEL of limestone and sandstone.		0.20 +5.5	' <b>******</b>	
0.30 - 0.40	B4	-	(MADE GROUND)				
				_			
				-			
				-			1 🗷
0.80	D5	-		-			
0.80 - 1.00	В6	-		-	(1.40)		
				-			
				-			
				-			
				-			
1.60 1.60	HV D7	p 120kPa, r N/A	Stiff dark orangish brown, mottled dark brown, CLAY with rare subangular	-	1.60 +4.1	1	
1.60 - 1.80	B8	-	fine gravel of flint.	=			
				-	(0.40)		
					i		
2.00 2.00 - 2.20	D9 B10	-	Stiff light brown, mottled grey, slightly gravelly sandy CLAY. Gravel is	1 <u>-</u>	2.00 +3.7	1	
			subangular fine to coarse of chalk.	-			
				-			
				_			
				-			
				]			
				-			
				-			
				-	(2.20)		
3.20 3.20 - 3.40	D11	-		-			
3.20 - 3.40	B12			-			
				-			
				_			
				-			
				-			
				-			
		10/04/18		-			
		10/04/16					
				-	4.20 +1.5		
			END OF EXPLORATORY HOLE	-			
				-			
				_			
				-			
				-			
				-			
				-			
			+				
indwater Entrie Depth Strike	es (m) Remarks		Remarks Depth (m) Remarks		Stability Fa	ices A and C co	llapsed fron
0.70	Seepage				0.	20 to 4.20m	
					_	one	
· For comba	n of ownbal '	l abbroviations	Project VDI IMMINOUAN		<u> </u>	vercast	
ey to Explorator	n of symbols and y Hole Records res. Stratum thick	All depths and	Project VPI IMMINGHAM		Trial Pit		
ets in depth colu	ımn.		Project No. A8015-18			TP9	
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				_			SOCOTEC
Logged WH	Start	Equipment, Methods and I	Remarks Dimension and Orientation		Ground Level		4.70 mOD
	06/04/2018	Tracked 360 excavator. Machine excavated.	A A		Coordinates (m	)	E 516725.56
Checked TC	End	iviacrime excavateu.	Width 0.60 m	B 230 (Deg)	National Grid		N 417441.68
Approved TC	06/04/2018		Length 3.00 m				
Samples an			Strata Description		1		
					Depth, Level	Legend	Backfill
Depth	Type & No.	Records	Main	Detail	(Thickness)		
- - 0.10 - 0.40 -	B2	-	Soft light brown, mottled greyish brown, slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to rounded of chalk and mudstone.  (TOPSOIL)	-	(0.40)		
- 0.30	D1	-		-	-		
- 0.40	HV	p 120kPa, r N/A	Firm dark greyish brown, mottled dark grey, slightly sandy CLAY with	-	0.40 +4.3	0	
- 0.40 - 0.40 - 0.60	D3 B4		frequent wood and plant material.	_		平耳道	
<del>-</del> -				-	(0.40)		
-				_			
- - 0.80	HV	p 120kPa, r N/A			0.80 +3.9	,	
- 0.90	D5	, , , , , , , , , , , , , , , , , , , ,	Firm light orangish brown, mottled light grey, slightly sandy gravelly CLAY. Gravel is subangular to subrounded of predominantly chalk with	_			
0.90 - 1.20	B6	-	mudstone and flint.	1.00-1.20 light—			1 모
-				yellowish brown -			
_				sand pockets			
_ _				-			
<del>-</del> =				-			
-				-			
-				_			
_							
<u>-</u> -				_			
-				-			
-				-	(2.20)		
<u>-</u>							
_ _				_			
- 2.20	D7			-	-		
- 2.20 - 2.20 - 2.70	D7 B8	-		-	-		
-							
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<del>_</del> -				_	_		
_				-	-		
- -				-	1		
-							
<del>-</del> -				-			
- 3.00	D9				3.00 +1.7		
- 3.00	Da		Firm dark brown CLAY with rare subrounded fine to medium gravel of mudstone.	-	3.00	° [- <u>-</u> ]	
-			mudstone.	-	1		
- 3.20 - 3.70 -	B10	-					
<del>-</del> -				-			
<u>-</u>					_		
_				_	(1.00)		
-					1		
= =				-			
_ _				-			
- -				-			
					4.00 +0.7	<u></u>	
_			Greyish brown slightly gravelly clayey fine to coarse SAND. Gravel is subrounded fine to medium of mudstone.		4.00 +0.7	٠ 🗔	
- -			subrounded line to medium of mudstone.	-	1		
- 4.20 - 4.20 - 4.50	D11 B12				(0.50)		
-		06/04/18			1 ' '		
_				-		7	
			END OF EXPLORATORY HOLE		4.50 +0.2	0	
 -			END OF EXPEDITATION THOSE	-	1		
- -				-			
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_				-			
<del>-</del> =				-			
Groundwater Entrie			Remarks		Stability St	able	
No. Depth Strike 1 1.00	(m) Remarks Seepage		Depth (m) Remarks				
	F-3-				Shoring No	one	
					Weather O	vercast	
Notes: For explanation	on of symbols and	abbreviations	Project VPI IMMINGHAM		Trial Pit		
see Key to Explorator reduced levels in met	ry Hole Records. A tres. Stratum thick	ness given in				TP10	
brackets in depth colu	umn. opvright SOCOTE		Project No. <b>A8015-18</b>		1	1710	

#### Trial Dit Loa



	PIL L						SOCOTEC
Logged WH		Equipment, Methods and	Remarks Dimension and Orie	ntation	Ground Level		6.44 mOI
Checked TC		Tracked 360 excavator. Machine excavated.	Width 0.60 m	A	Coordinates (m)	)	E 516698.3
pproved TC	End		Length 4.00 m	D B => 220 (Deg)	National Grid		N 417407.3
<b>PP</b>	09/04/2018			C	4		
amples and	d Tests		Strata Description				
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfil
0.40	5.4		Soft brown slightly sandy slightly gravelly CLAY. Gravel is angular rounded fine to coarse of chalk, brick, sandstone and concrete.	r to			
0.10 0.10 - 0.30	D1 B2	-	(MADE GROUND)	-			
				-	(0.50)		
0.50	HV	p 120kPa, r N/A		0.50 concrete	0.50 +5.9	4	
0.50 0.50 0.50 - 0.70	D3 B4	p izoki a, i iviA	Firm brown, mottled light grey, slightly sandy gravelly CLAY. Grav subangular to subrounded fine to coarse of chalk, mudstone, flint	el IS   block wider than -	0.00		
0.30 - 0.70	54		sandstone.	action of trace B			
				-			
				=	(1.60)		
				1.40 low cobble			
				content. Cobbles are subrounded			1 목
				of chalk			
1.70 1.70	D5 D6	-		-			
1.70	D6			-			
				_			
			Firm dark greyish brown, mottled dark grey, slightly gravelly slight		2.10 +4.3	4	
2.20 2.20	HV D7	p 100kPa, r N/A	sandy to sandy CLAY. Gravel is subrounded fine to coarse of san	dstone.	(0.30)		
2.20 - 2.30	B8	-					
			Firm light brown, mottled light grey, locally light orange brown, slight		2.40 +4.0	4	
2.50 2.50 - 2.70	D9 B10	-	gravelly CLAY. Gravel is subrounded to rounded fine to coarse of	chalk. –			
				-			
				-			
					(1.00)		
					(1.00)		
				-			
3.40	D11	-	Chiff light brown mothled group lightly conducting billy group lightly g	/ Cravel	3.40 +3.0	4	
3.50 - 3.70	B12	-	Stiff light brown, mottled grey slightly sandy slightly gravelly CLAN is subrounded fine to coarse of sandstone and chalk.	r. Graver			
				=			
				=			
					(1.10)		
				_	(1.10)		
				4.10 locally - slightly sandy -			
				gravelly clay			
		09/04/18					
				-			
			END OF EXPLORATORY HOLE	-	4.50 +1.9	4	800810818018
				-			
				-			
oundwater Entrie	es		Remarks		<b>a</b>		-
Depth Strike 1.50	(m) Remarks Seepage		Depth (m) Remarks		Stability St	able	
					Shoring No	one	
					Weather O	vercast	
Key to Explorator	n of symbols and ry Hole Records. A	Ill depths and	Project VPI IMMINGHAM		Trial Pit		
uced levels in met ckets in depth colu	res. Stratum thicks	ness given in  C UK Limited AGS	Project No. A8015-18			TT1	
		C UK Limited AGS			1		



quipment, Methods and Remarks Dimension and Orientation Ground Level WH Logged Coordinates (m) E 516764.39 TC Checked 0.60 m Machine excavated. Top strata too friable to do hand vane. Width National Grid N 417439.42 End 160 (Deg) TC Length 4.00 m Approved Samples and Tests Strata Description Depth, Level (Thickness) Backfill Legend Type & No. Records Detail Soft light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded of flint and sandstone. Occasional rootlets. (MADE GROUND) 0.25 D1 (3.00) 2.00 2.00 2.00 - 2.15 HV D5 B6 p 70kPa, r N/A HV D7 B8 p 120kPa, r N/A 3.00 Dark greyish brown, mottled light brown, CLAY with rare angular to subrounded fine to medium gravel of various lithologies including flint and (0.25) 3.25 3.25 3.25 - 3.50 3.25 Firm light brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of flint and mudstone. 06/04/18 3.50 END OF EXPLORATORY HOLE Stability Stable No. Depth Strike (m) Remarks Depth (m) 0.00 - 3.50 No groundwater encountered during excavation. Shoring None Weather Overcast Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Copyright SOCOTEC UK Limited Scale 1:25 14/08/2018 13:51:53 VPI IMMINGHAM Project Trial Pit TT2 Project No. A8015-18 **AECOM** 

#### Trial Dit Loa



mai	TIL L	.og					SOCOTEC
	Start	Equipment, Methods and F	temarks Dimension and Oriental	tion	Ground Level		5.40 mOD
Logged WH	05/04/2018	Tracked 360 excavator		A	Coordinates (m)		E 516764.82
Checked TC	End	Machine excavated pit	Width 0.60 m	B - 230 (Deg)	National Grid		N 417461.85
Approved TC	06/04/2018		Length 4.00 m	С			
Samples and	d Tests		Strata Description				
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		05/04/18	Brown, locally light brown, slightly sandy CLAY with low cobble conte Cobbles are subrounded of flint and sandstone.	ent.		××	
_		03/04/16	Cobbles are subfounded of limit and sampsione.	-		××	
- - 0.30	D1			-		××	
- 0.30 - 0.60 -	B2	-		=		×_ ×	
_				_		<u> </u>	
_				=		$\boxed{}$ $\times$ $\stackrel{\wedge}{}$	
E					(1.40)	× ×	
_ _						^—x	
<del>-</del>				=		<u>×</u> ×	
-				_		× –×	
E						×x	
_ _ 1.30	D3			-		××	
- 1.30 - 1.60 -	B4	-	Dark greyish brown silty CLAY with occasional wood fragments. Slig	-	1.40 +4.00	×	
_			organic odour.	-		×	
E						<u>×</u> ×	
<u>-</u>				-	(0.60)	<u>×x</u>	
_				=		××	
F					0.00	××	
	HV	p 120kPa, r N/A	Firm light brown, mottled light grey, slightly sandy slightly gravelly CL Gravel is subangular to subrounded fine to medium of sandstone, ch		2.00 +3.40		
- 2.10 - 2.10 - 2.10 - 2.50	D5 B6	p 120ki a, i iviz	and quartzite.	-			
- -	50	06/04/18		-	(0.50)		
-							
			END OF EXPLORATORY HOLE		2.50 +2.90		
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Groundwater Entrie			Remarks		Ctability C	blo	
No. Depth Strike	(m) Remarks		Depth (m) Remarks 0.00 - 2.00 Material too friable for hand vane testing.		Stability Sta	DIE	
			0.00 - 2.50 No groundwater encountered during excavation.		Shoring Nor		
Notes: For overland!	n of eymbols as i	ahhraviations	Project VPI IMMINGHAM		Weather ove	ercast	
Notes: For explanatio see Key to Explorator reduced levels in met	v Hole Records, A	All depths and	Project VPI IMMINGHAM		iliai rit	<b>TT</b> ^	
brackets in depth colu © Co	imn. opyright SOCOTE		Project No. A8015-18			TT3	
Scale 1:25		18/2018 13:51:54	Carried out for AECOM		I	Sheet 1 of 1	



# APPENDIX C INSTRUMENTATION AND MONITORING

Installation Details Table C1

#### **Installation Details**



	1					ı	1	
Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH1 (1)	SP	11/04/2018	50	14.80	12.60 to 15.00	Gas tap	Raised cover	
BH2 (1)	SP	16/04/2018	50	15.10	14.00 to 15.20	Gas tap	Flush cover	
BH3 (1)	SP	18/04/2018	50	28.60	26.60 to 28.60	Gas tap	Flush cover	
BH4 (1)	SP	20/04/2018	50	34.60	28.60 to 34.60	Gas tap	Flush cover	
BH5 (1)	SP	19/04/2018	50	18.50	17.50 to 18.50	Gas tap	Flush cover	
BH6 (1)	SP	16/04/2018	50	34.50	25.50 to 34.50	Gas tap	Raised cover	
WS1 (1)	SP	06/04/2018	50	1.40	1.00 to 1.40	Gas tap	Raised covers	
WS2 (1)	SP	10/04/2018	50	1.20	0.70 to 1.20	Gas tap	Raised cover	
WS3 (1)	SP	10/04/2018	50	3.50	2.50 to 3.50	Gas tap	Raised cover	
WS4 (1)	SP	06/04/2018	50	2.30	1.30 to 2.30	Gas tap	Raised cover	
WS5 (1)	SP	10/04/2018	50	4.30	3.30 to 4.30	Gas tap	Raised cover	
WS6 (1)	SP	11/04/2018	50	3.70	3.10 to 3.70	Gas tap	Raised cover	
WS7 (1)	SP	11/04/2018	50	3.60	3.10 to 3.60	Gas tap	Raised cover	
WS8 (1)	SP	11/04/2018	50	4.10	3.60 to 4.10	Gas tap	Raised cover	



# APPENDIX D GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX 1 to 3
Particle Size Distribution Analyses	PSD 1 to 24
Unconsolidated Undrained Triaxial Compression Tests  – Summary of Results	UUSUM
Consolidated Undrained Triaxial Compression Tests with Measurement of Pore Water Pressure	CUM 1 to 6 (3 sheets per test)
One Dimensional Consolidation Test	OED 1 to 8
Determination of Consolidation Properties Using a Hydraulic Cell	HC 1 and 3 (2 sheets per test)
Dry Density / Moisture Content Relationship (Light)	COMPL 1 to 7
Dry Density / Moisture Content Relationship (Heavy)	COMPH 1 to 9
California Bearing Ratio	CBR 1 to 11
Chemical Tests	EFS/187041 EFS/187043 EFS/187204 EFS/187902

#### **INDEX PROPERTIES - SUMMARY OF RESULTS**

		Sampl	le		<b>⊣</b>	р	$p_{d}$	W	< 425	$W_L$	$W_P$	lР	ps	
Hole No.	No	Deptl	h (m)	t mo	Soil Description				μm sieve					Remarks
	No.	from	to	type		Mg/	/m3	%	%	%	%		Mg/m3	
BH1	4	0.50	0.70	В	Greyish brown slightly sandy slightly gravelly silty CLAY.			27	91	54 a	26	28		
BH1	8	2.00	2.45	D	Brown slightly sandy slightly gravelly CLAY.			14	92	43 a	19	24		
BH1	9	2.50	3.00	В	Brown slightly sandy slightly gravelly silty CLAY with chalk fragments.								2.71-p	
BH1	17	6.50	6.95	D	Brown slightly sandy slightly gravelly CLAY.			13	82	33 a	15	18		
BH1	22	9.50	9.95	D	Brown slightly sandy slightly gravelly CLAY.			14	88	29 a	15	14		
BH1	27	13.00	13.50	В	Brown slightly gravelly sandy silty CLAY.								2.68-p	
BH1	35	17.00	17.45	UT	Very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is mainly chalk.								2.72-p	
BH1	36	17.45	17.60	D	Dark grey sandy gravelly CLAY.			13	82	30 a	15	15		
BH1	40	20.40	20.50	D	Grey slightly sandy gravelly CLAY.			22						
BH1	43	22.50	22.70	D	Grey slightly sandy slightly gravelly CLAY. Gravel contains chalk fragments.			13						
BH1	46	25.00	25.22	D	Grey slightly gravelly sandy CLAY. Gravel is chalk fragments.			13	89	27 a	15	12		
BH2	2	0.30	0.50	В	Brown slightly sandy gravelly CLAY.			20	56	44 a	22	22		
BH2	5	1.00		D	Brown slightly sandy slightly gravelly CLAY.			22						
BH2	8	1.65	1.80	D	Brown slightly sandy slightly gravelly CLAY.			24	91	42 a	19	23		
BH2	15	3.30	3.75	UT	Firm laminated brown slightly sandy CLAY.			23	100	47 a	22	25		
BH2	28	5.10	5.55	UT	Firm dark brown slightly sandy slightly gravelly CLAY.			16	83	32 a	17	15	2.70-р	
BH2	34	7.10	7.55	D	Brown slightly sandy slightly gravelly CLAY.			18	88	33 a	14	19		
BH2	40	9.50	9.95	UT	Firm bown slightly sandy slightly gravelly silty CLAY. Gravel is chalk fragments.			14	87	32 a	13	19		
BH2	51	13.10	13.55	В	Brown slightly sandy slightly gravelly silty CLAY. Gravel is chalk.			16	89	31 a	15	16		
BH2	63	18.50	19.00	В	Greenish grey slightly sandy SILT.			22	100	23 a	NP			
BH3	3	1.65	2.00	В	Brown slightly sandy slightly gravelly silty CLAY with chalk fragments.			28	95	37 a	21	16	2.71-p	
BH3	8	4.00	4.45	D	Brown slightly gravelly very sandy silty CLAY.			21						
ВНЗ	12	5.65	6.00	В	Brown slightly sandy slightly gravelly CLAY.			18	85	32 a	15	17	2.70-р	
ВНЗ	19	9.00	9.45	UT	Firm greyish brown slightly sandy slightly gravelly silty CLAY. Gravel contains chalk fragments.			17						
ВНЗ	27	12.00	12.45	UT	Firm brown slightly sandy slightly gravelly CLAY.			17						
ВНЗ	32	13.50	13.95	D	Light brown silty SAND.			25						
BH3	45	23.00	24.00	В	Greenish grey CLAY with chalk fragments.			15						
BH4	1	0.50	1.20	В	Brown slightly sandy slightly gravelly CLAY.			24	95	43 a	21	22		
BH4	7	3.10	3.55	UT	Brown slightly sandy SILT.			21						
BH4	10	4.50	4.95	UT	Firm to stiff greyish brown slightly sandy slightly gravelly CLAY.								2.70-р	
BH4	14	6.00	6.45	UT	Firm brown slightly sandy slightly gravelly CLAY.			14	89	33 a	14	19		
		,												

General notes: All above tests carried out to BS1377: 1990 unless annotated otherwise. See Remarks for further details

WL Liquid limit <425um preparation Key: p bulk density, linear WP Plastic limit ps particle density pd dry density a 4 point cone test NP non - plastic n from natural soil -g = gas jar

b 1 point cone test s sieved specimen IP Plasticity Index w moisture content -p = small pyknometer

\* test carried out to BS EN ISO 17892-1 2014

<b>QA Ref</b> SLR 1 Rev 2.91 Mar 17	
	SOCOTEC

	Project No	A8015-18	Figure
	Project Name	VPI IMMINGHAM	INDX
100000		ons expressed herein are outside the scope of UKAS 1 2017 SOCOTEC UK Limited	Printed: 31/07/2018 12:05

#### **INDEX PROPERTIES - SUMMARY OF RESULTS**

	Sample				р	$p_{d}$	W	< 425	$W_L$	W <sub>P</sub>	lР	$p_s$		
Hole No.	No.	Dept	h (m)	type	Soil Description				μm sieve					Remarks
	INO.	from	to	туре		Mg	/m3	%	%	%	%		Mg/m3	
BH4	22	9.00	9.45	UT	Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel contains chalk fragments.			15	89	32 a	15	17		
BH4	27	11.15	11.60	D	Brown slightly sandy slightly gravelly CLAY.			12						
BH4	34	15.50	16.00	В	Light brown gravelly SAND.			8.6						
BH4	42	22.00	22.50	В	Grey slightly sandy slightly gravelly CLAY. Gravel is chalk fragments.			17						
BH5	3	0.50		D	Brown slightly sandy slightly gravelly CLAY.			16	96	39 a	19	20		
BH5	11	2.30	2.75	UT	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is chalk fragments.			16					2.71-p	
BH5	20	4.50	4.95	UT	Firm laminated brown slightly gravelly sandy CLAY.			17	88	27 a	16	11		
BH5	27	8.00	8.45	UT	Firm greyish brown slightly sandy slightly gravelly CLAY. Gravel contains chalk.			16	82	30 a	14	16		
BH5	35	11.00	11.45	UT	Firm brown slightly sandy slightly gravelly CLAY.			16						
BH5	42	13.00		D	Soft brown slightly gravelly, slightly sandy CLAY.			15						
BH5	51	17.00	17.36	D	Light grey sandy gravelly CLAY.			1.7						
BH5	58	20.00	20.28	В	Greenish grey CLAY with chalk fragments.			4.9						
BH6	1	0.00	0.30	В	Brown very sandy clayey GRAVEL.			20						
BH6	6	2.00	2.45	UT	Very stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel contains chalk.								2.71-p	
BH6	9	3.50	4.00	В	Brown slightly silty CLAY.			27						
BH6	14	6.00	6.45	UT	Firm to stiff greyish brown slightly gravelly sandy CLAY. Gravel contains chalk.			15	90	29 a	18	11		
BH6	21	10.00	10.50	В				17						
BH6	25	13.00	13.50	В	Brown slightly sandy slightly gravelly CLAY.			16					2.65-g	
BH6	28	15.00	15.45	D	Light brown sandy gravelly CLAY.			16						
BH6	35	19.50	21.00	В	Greyish brown gravelly CLAY. Gravel is chalk fragments.			17						
TP1	4	0.70	0.90	В	Brown slightly sandy CLAY with occasional chalk fragments.			26						
TP1	8	2.00	2.20	В	Brown slightly sandy slightly gravelly CLAY.			20	96	47 a	19	28	2.69-p	
TP10	8	2.20	2.70	В	Brown slightly sandy slightly gravelly CLAY.			22	95	41 a	19	22		
TP10	12	4.20	4.50	В	Brown SAND.			21						
TP2	1	0.20		D	Dark brown slightly sandy slightly gravelly CLAY.			25						
TP2	8	2.30	2.50	В	Brown slightly sandy slightly gravelly CLAY.			11	94	45 a	19	26		
TP2	12	4.00	4.20	В	Brown slightly gravelly silty SAND.			25					2.72-p	
TP2	13	4.40		D	Brownish grey slightly gravelly sandy CLAY.			16	88	32 a	17	15		
TP3	10	3.40	3.60	В	Light brown SAND.			25					2.69-р	
TP3	12	4.00	4.20	В	Brown very clayey SAND with chalk fragments.			21	92	23 a	14	9		
TP4	4	0.80	1.00	В	Brown slightly sandy CLAY with chalk fragments.			17	94	42 a	17	25		
	<u>I</u>	1		<u> </u>			1		1					

General notes: All above tests carried out to BS1377: 1990 unless annotated otherwise. See Remarks for further details

WL Liquid limit <425um preparation Key: p bulk density, linear WP Plastic limit ps particle density pd dry density a 4 point cone test NP non - plastic n from natural soil -g = gas jar

b 1 point cone test s sieved specimen IP Plasticity Index w moisture content -p = small pyknometer

\* test carried out to BS EN ISO 17892-1 2014

<b>QA Ref</b> SLR 1 Rev 2.91 Mar 17	
	SOCOTEC

	Project No	A8015-18	Figure
	Project Name	VPI IMMINGHAM	INDX
100000		ons expressed herein are outside the scope of UKAS 1 2017 SOCOTEC UK Limited	Printed: 31/07/2018 12:05

#### **INDEX PROPERTIES - SUMMARY OF RESULTS**

		Sample				р	$p_{d}$	W	< 425	$W_L$	W <sub>P</sub>	lР	ps	
Hole No.	No.	Depti	h (m)	typo	Soil Description				µm sieve					Remarks
	INO.	from	to	type		Mg	/m3	%	%	%	%		Mg/m3	
TP4	12	4.00	4.30	В	Brown slightly sandy slightly gravelly CLAY.			18	93	39 a	17	22		
TP5	6	1.50	1.70	В	Brown slightly sandy CLAY with chalk fragments.			24	98	50 a	23	27		
TP5	10	2.50	2.70	В	Brown silty SAND.			24					2.65-p	
TP6	1	0.10		D	Dark brown slightly sandy slightly gravelly CLAY.			20						
TP6	8	2.50	3.00	В	Brown slightly sandy slightly gravelly CLAY.			25	95	41 a	17	24		
TP7	5	3.50		D	Brown slightly gravelly SAND.			23						
TP8	4	0.20	0.50	В	Brown slightly sandy slightly gravelly silty CLAY.			20	94	48 a	19	29		
TP8	8	2.00	2.20	В	Brown slightly sandy slightly gravelly CLAY.			24	94	46 a	18	28	2.72-p	
TP8	11	3.80		D	Brown slightly gravelly silty SAND.			23						
TP8	14	4.00	4.50	В	Brown SAND.			23						
TP9	4	0.30	0.40	В	Light brown slightly sandy slightly gravelly CLAY.			16						
TP9	12	3.20	3.40	В	Brown slightly sandy slightly gravelly CLAY. Gravel is chalk.			19	95	44 a	21	23		
TT1	1	0.10		D	Brown slightly sandy slightly gravelly CLAY.			22	82	44 a	18	26		
TT1	9	2.50		D	Brown slightly sandy slightly gravelly CLAY.			15	95	40 a	19	21	2.71-p	
TT2	4	1.00	1.25	В	Brown slightly sandy slightly gravelly silty CLAY with rootlets.			24	92	46 a	25	21		
TT2	10	3.25	3.50	В	Brown slightly gravelly sandy silty CLAY.			22	87	37 a	19	18		
TT3	4	1.30	1.60	В	Brown silty CLAY.			20						
TT3	6	2.10	2.50	В	Brown slightly sandy silty CLAY			18	95	43 a	20	23	2.67-p	

General notes: All above tests carried out to BS1377: 1990 unless annotated otherwise. See Remarks for further details

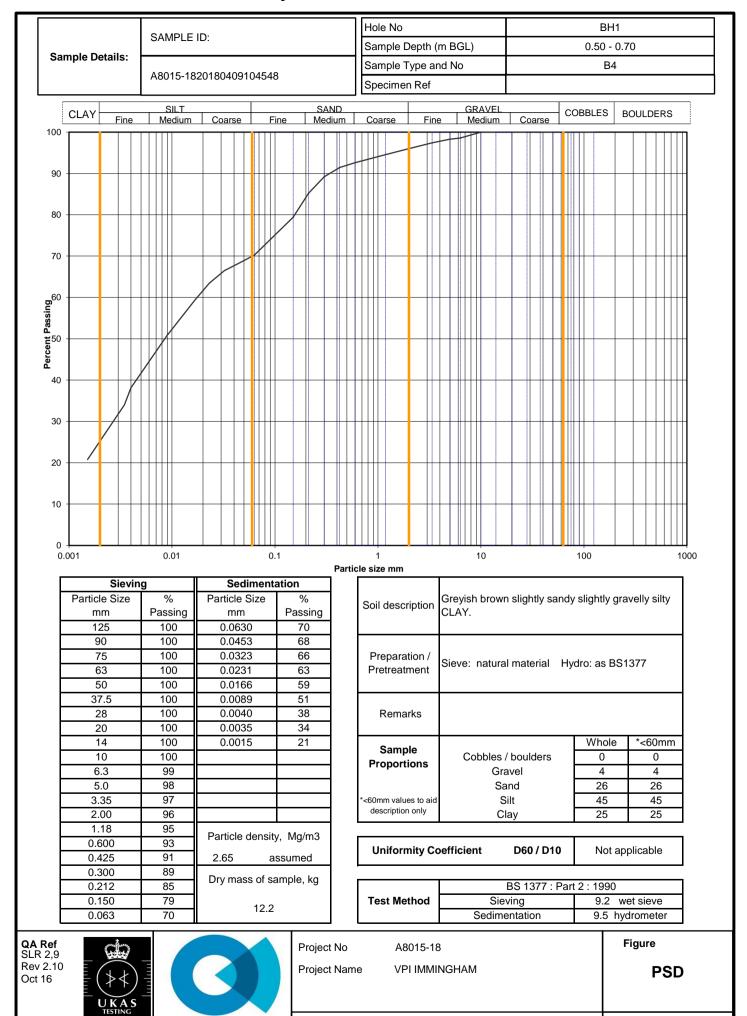
WL Liquid limit <425um preparation Key: p bulk density, linear WP Plastic limit ps particle density pd dry density a 4 point cone test NP non - plastic n from natural soil -g = gas jar

b 1 point cone test s sieved specimen IP Plasticity Index w moisture content -p = small pyknometer

\* test carried out to BS EN ISO 17892-1 2014

<b>QA Ref</b> SLR 1 Rev 2.91 Mar 17	
	SOCOTEC

	Project No	A8015-18	Figure
	Project Name	VPI IMMINGHAM	INDX
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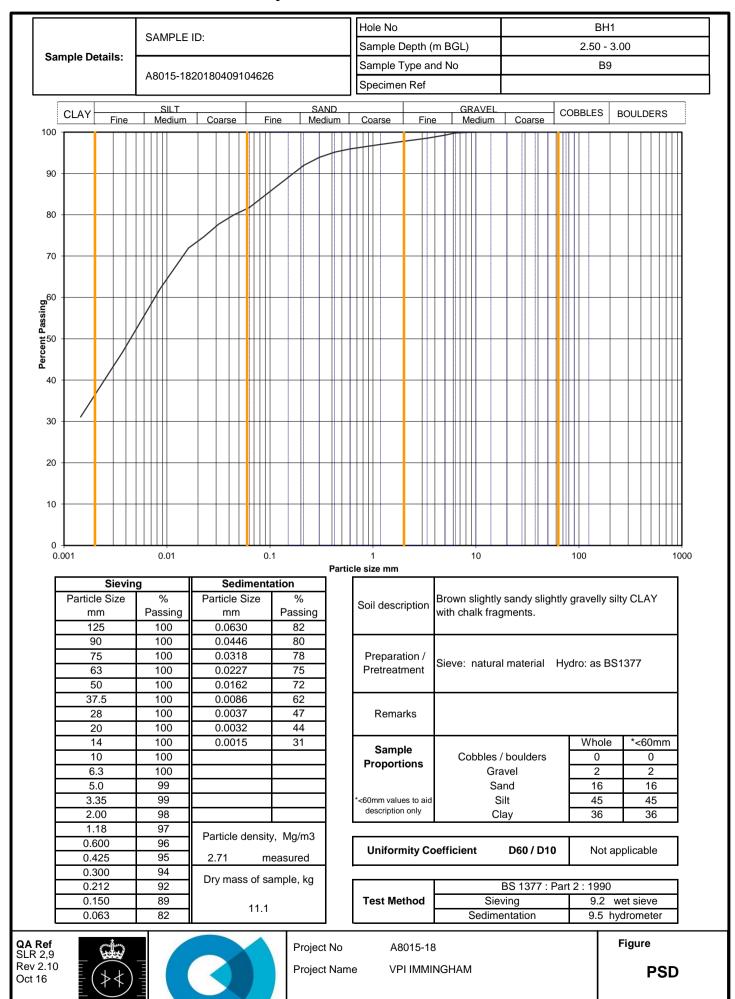


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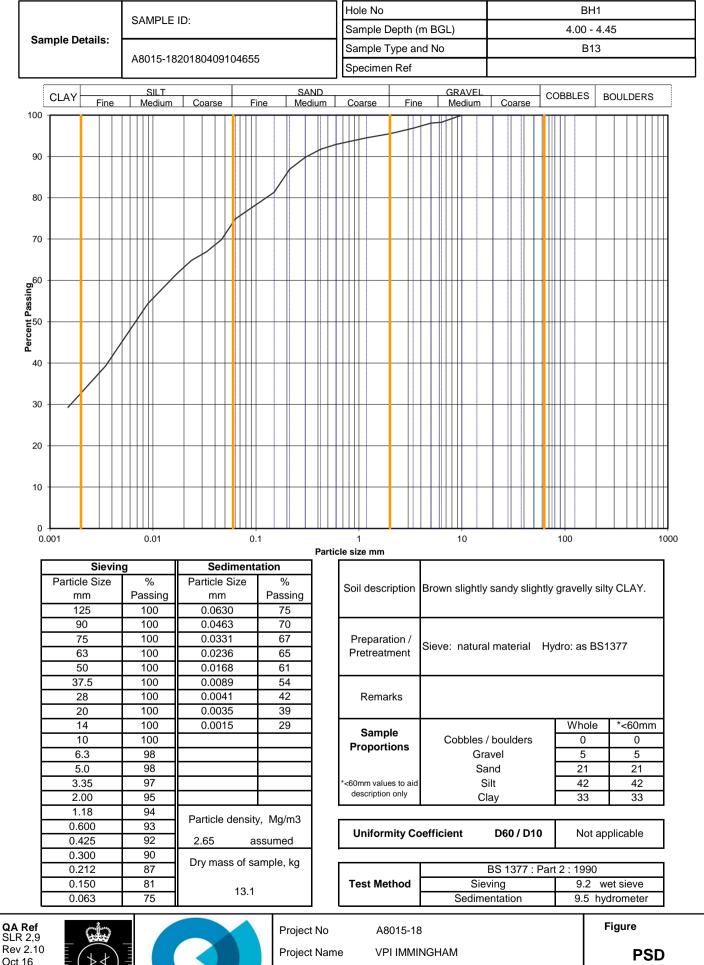


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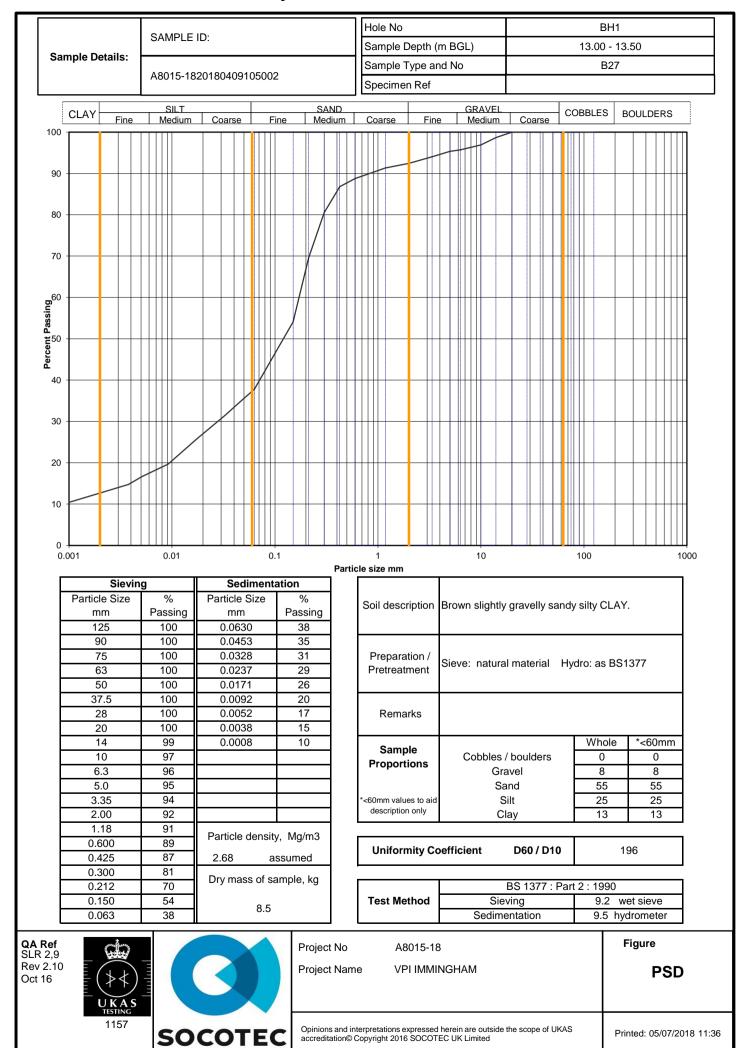
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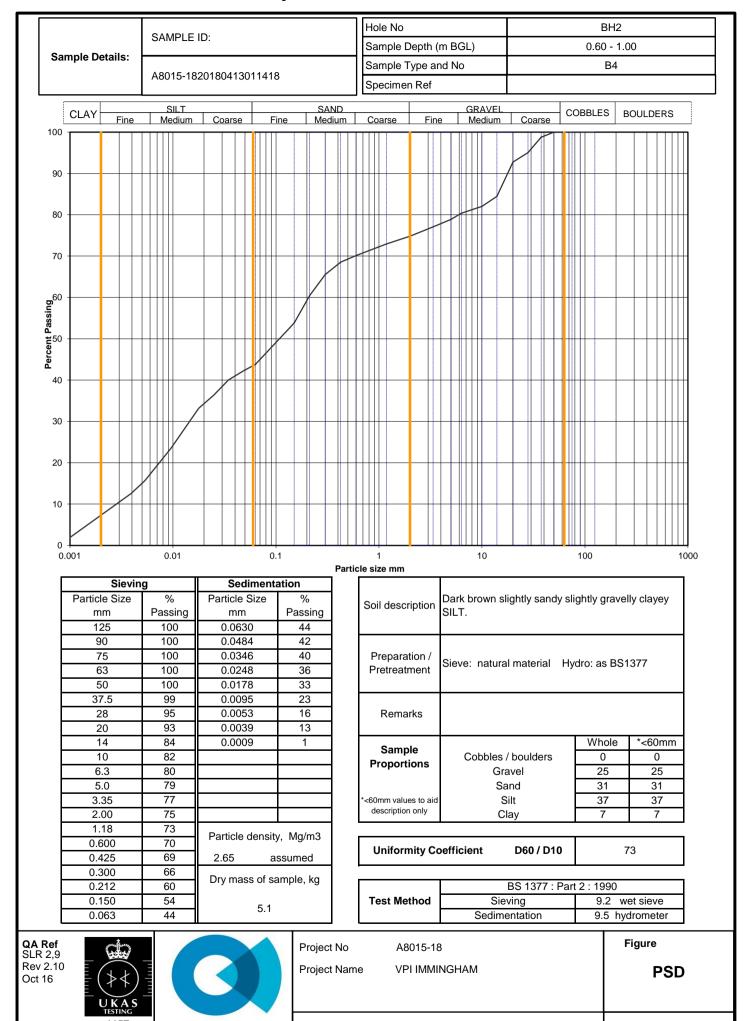
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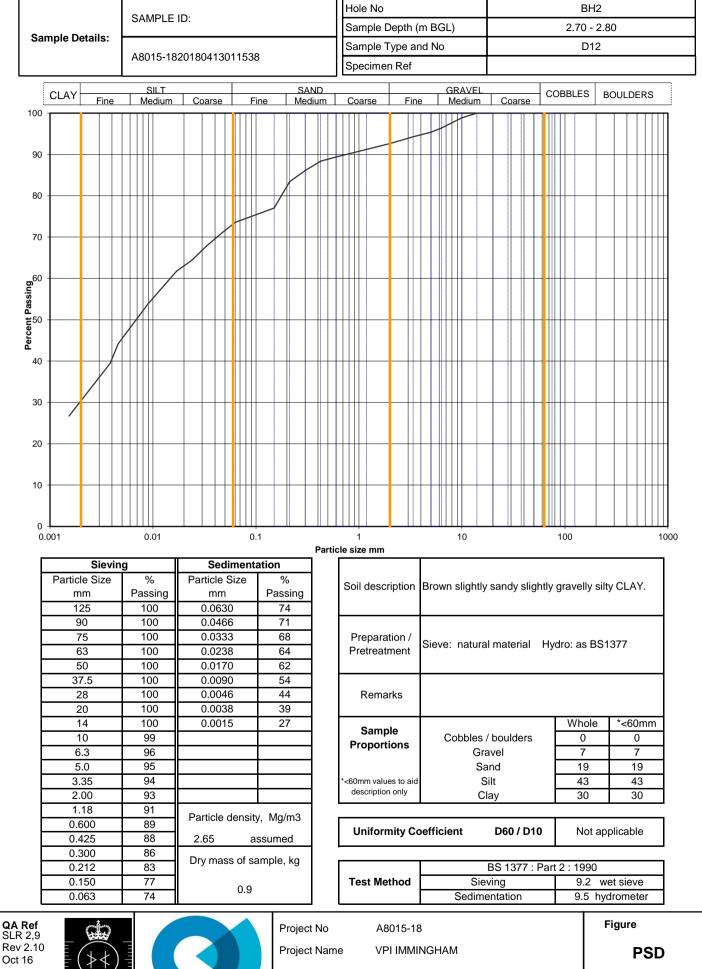


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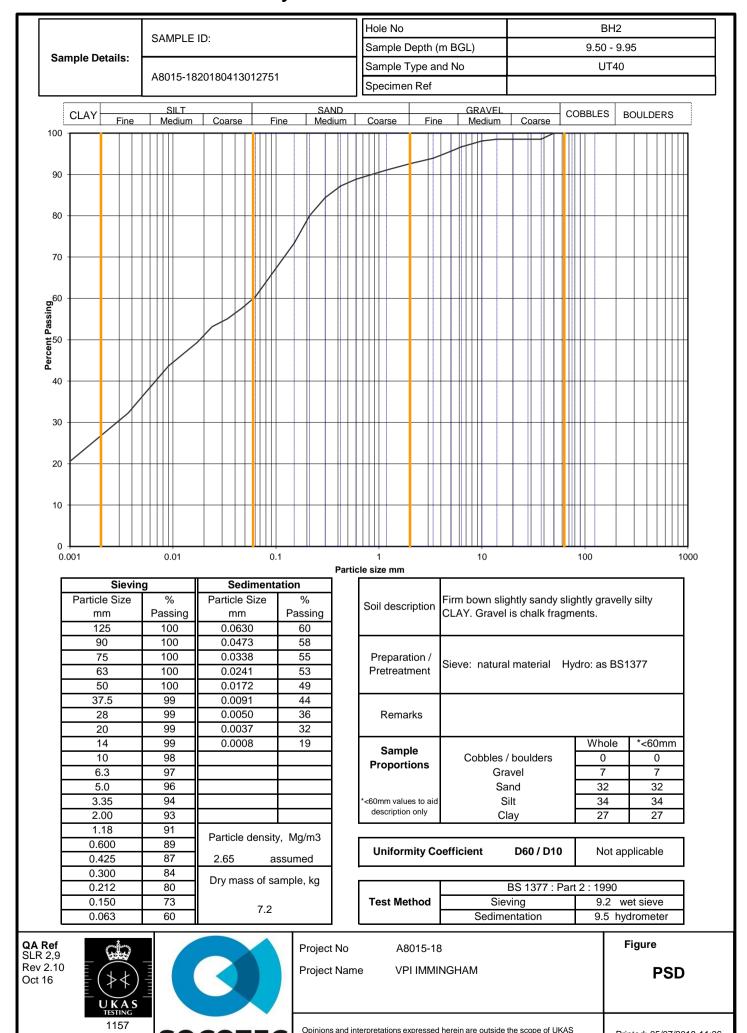




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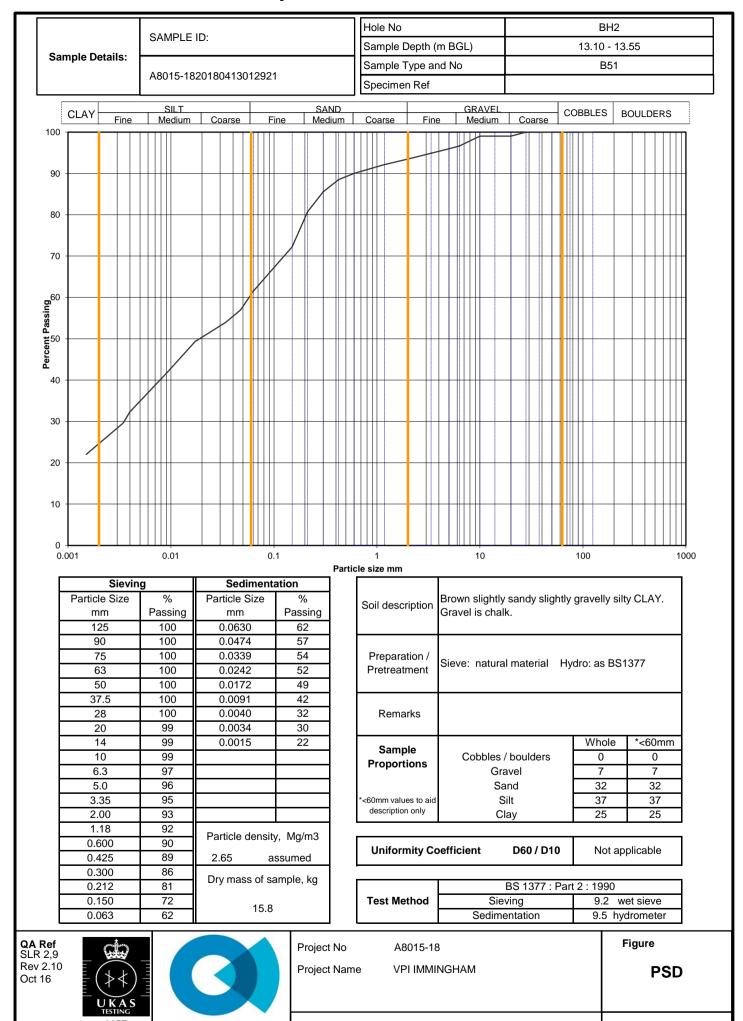
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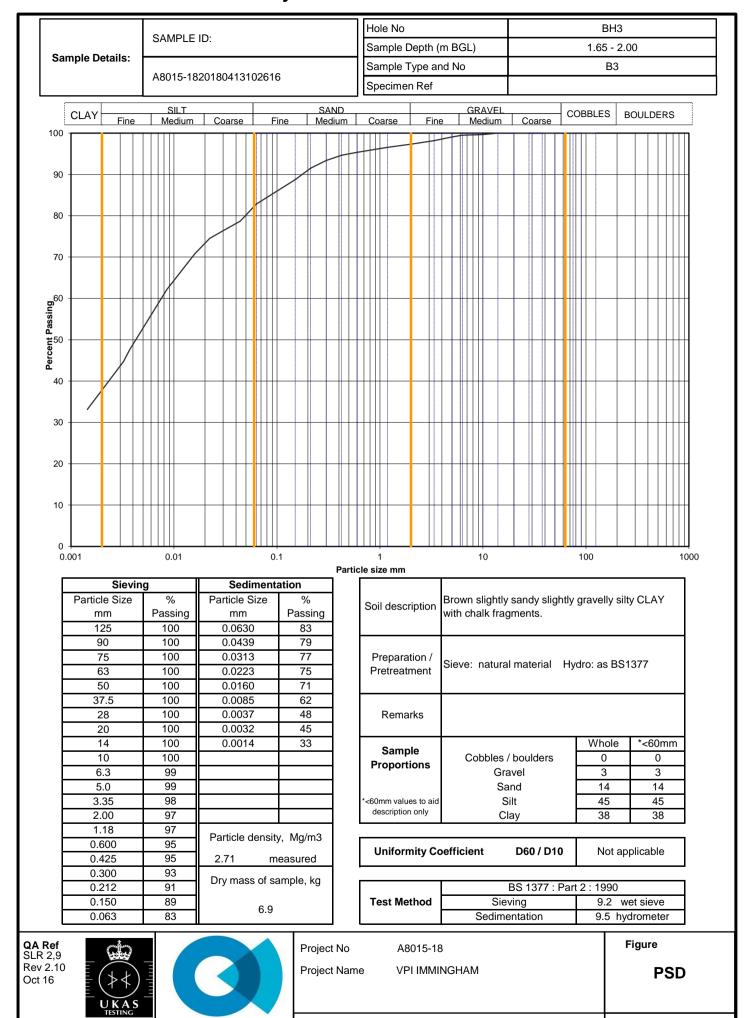
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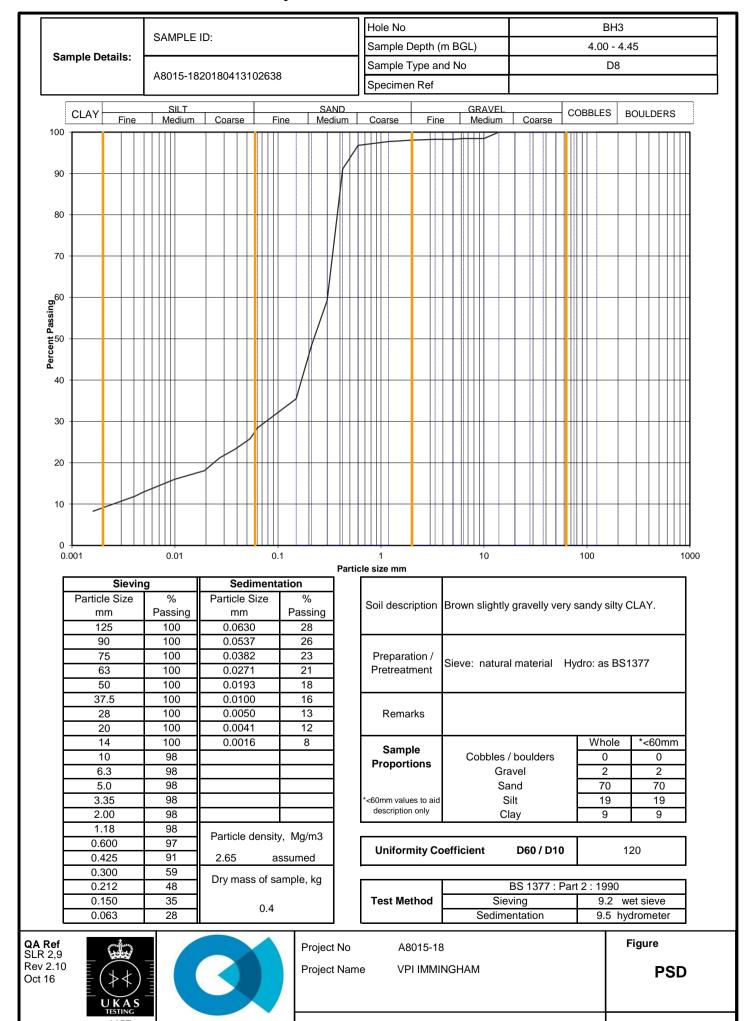
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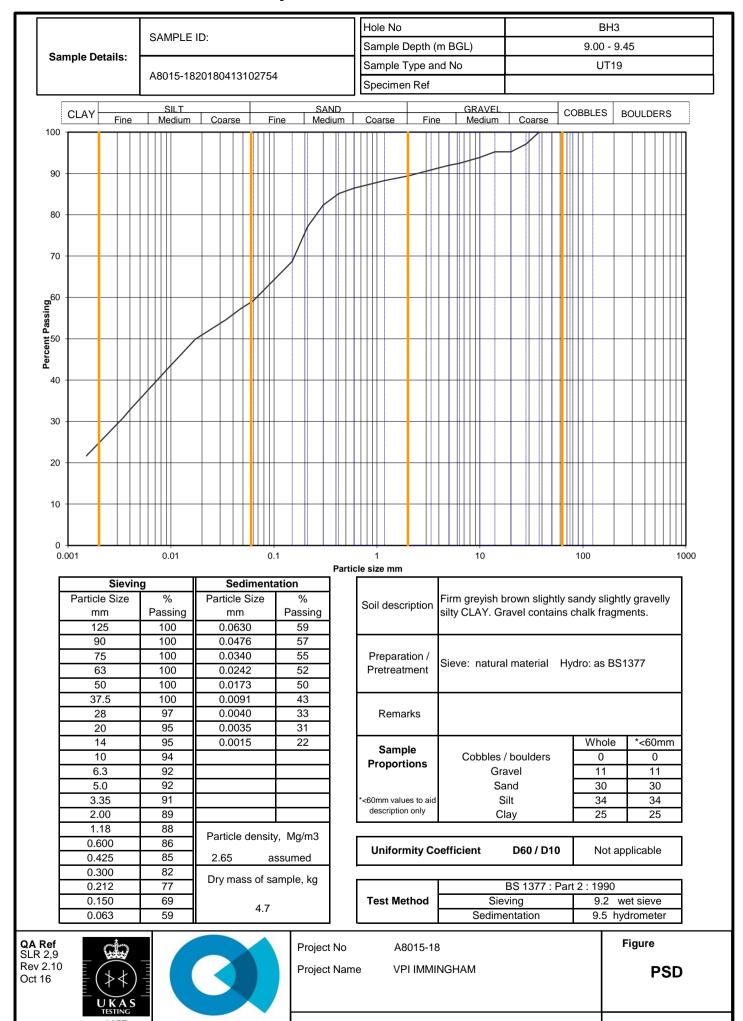
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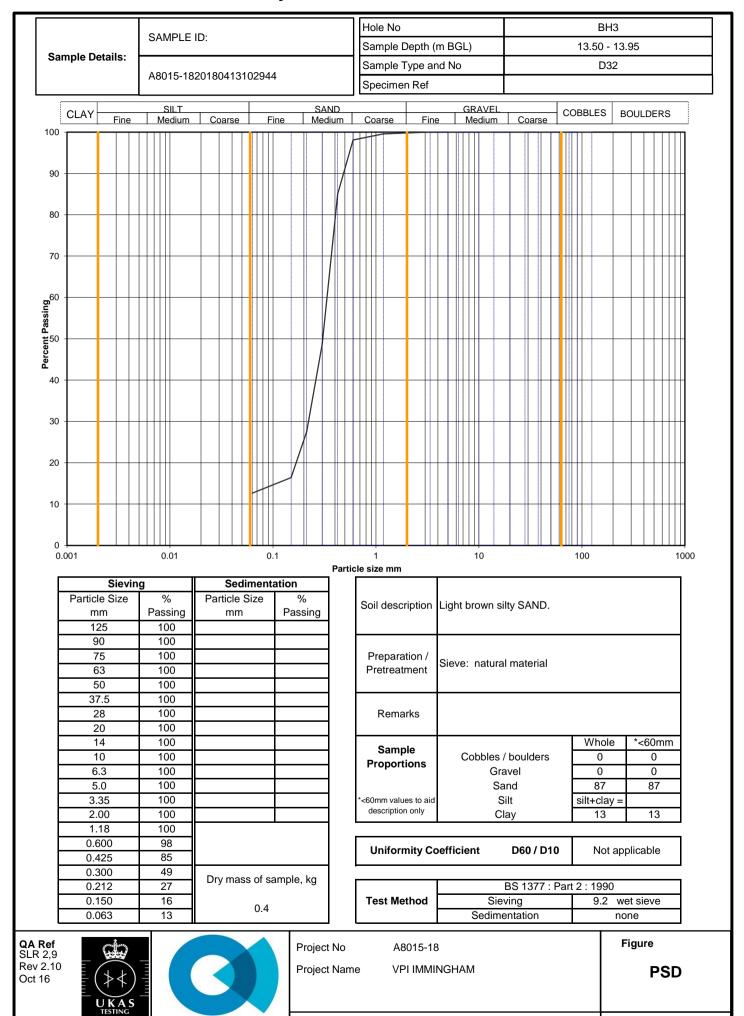
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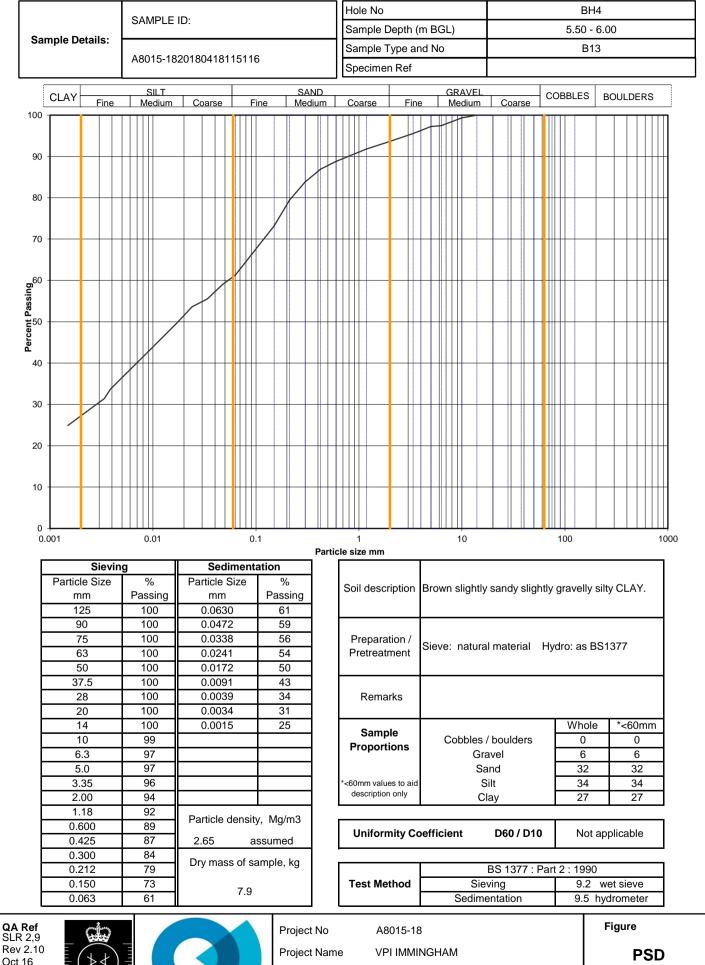
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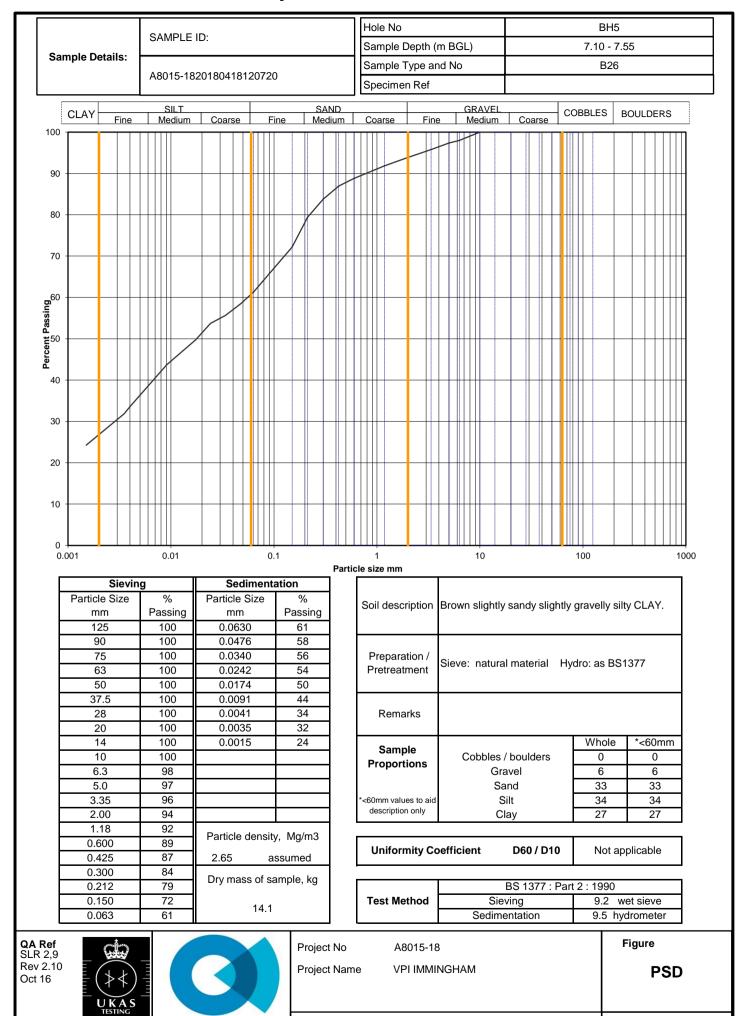
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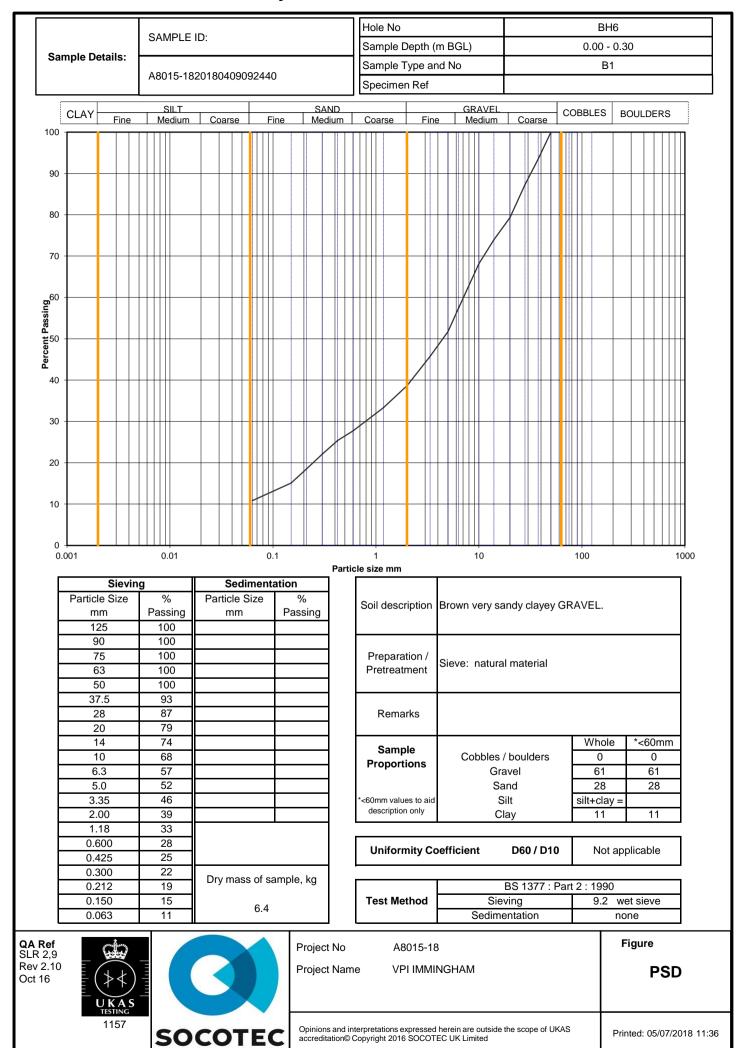
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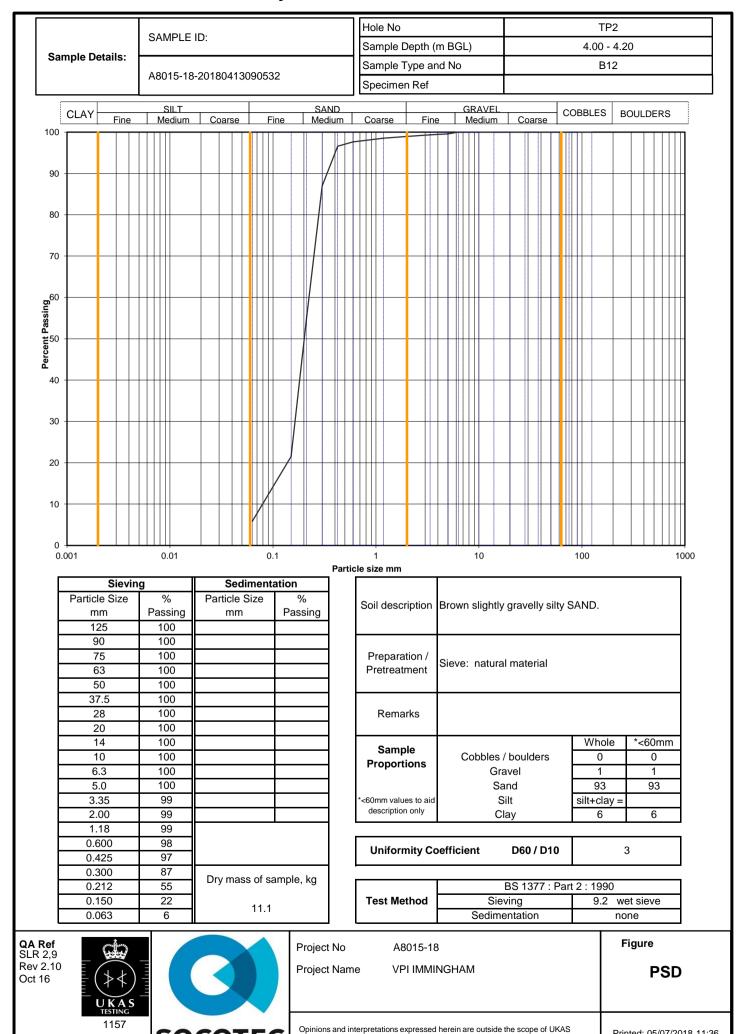


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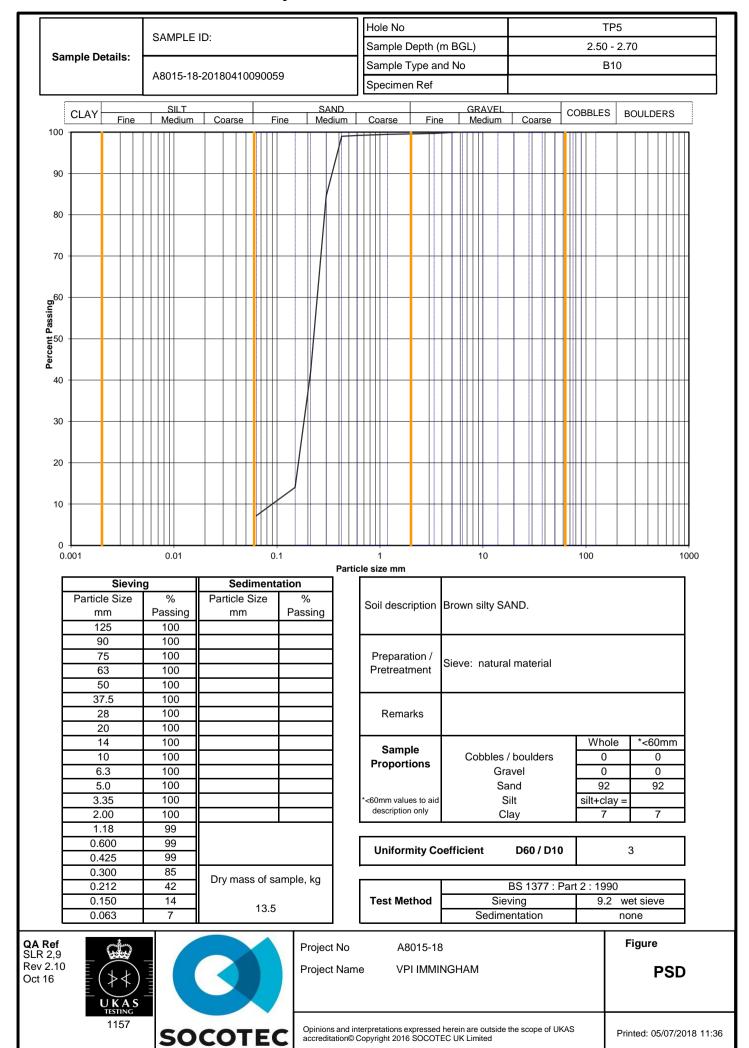
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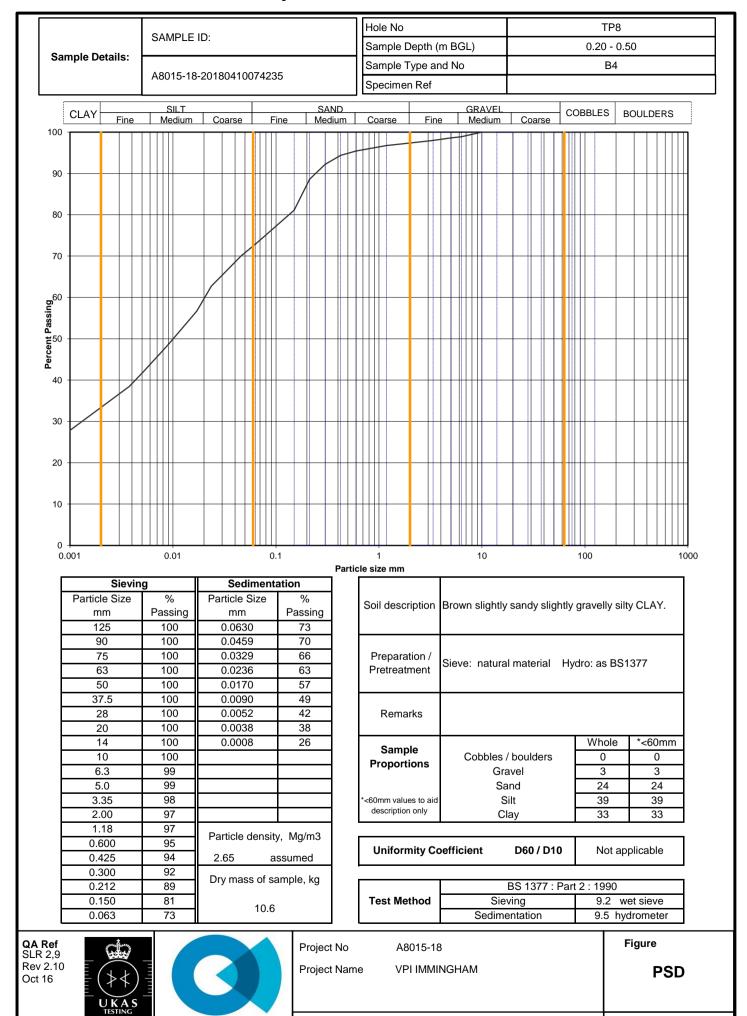




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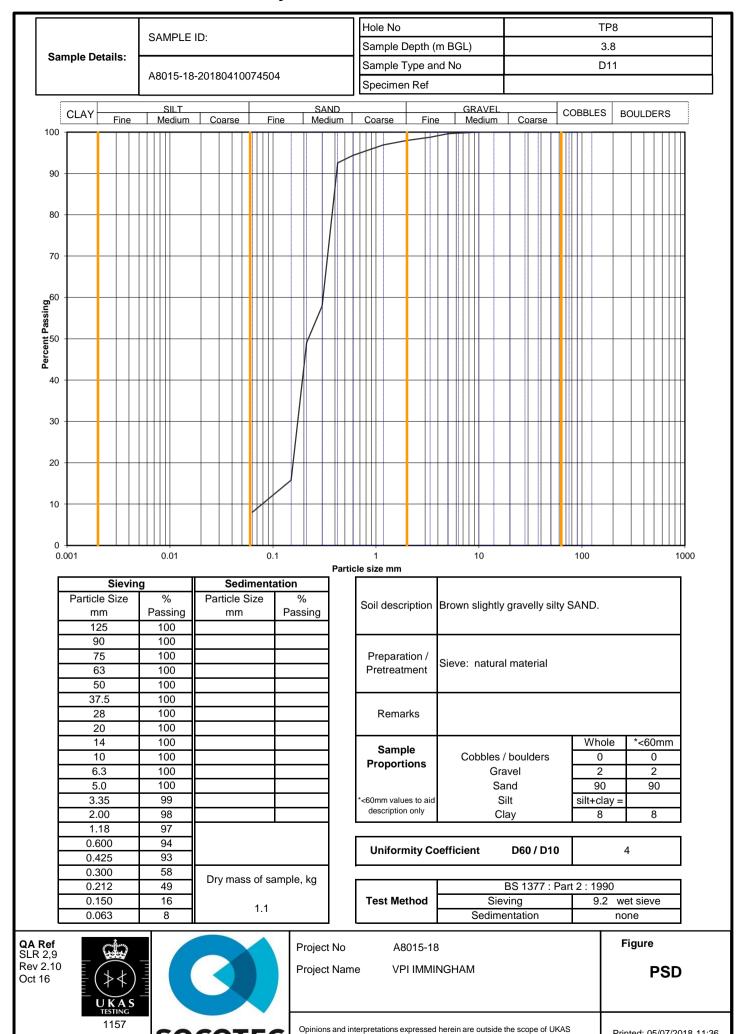




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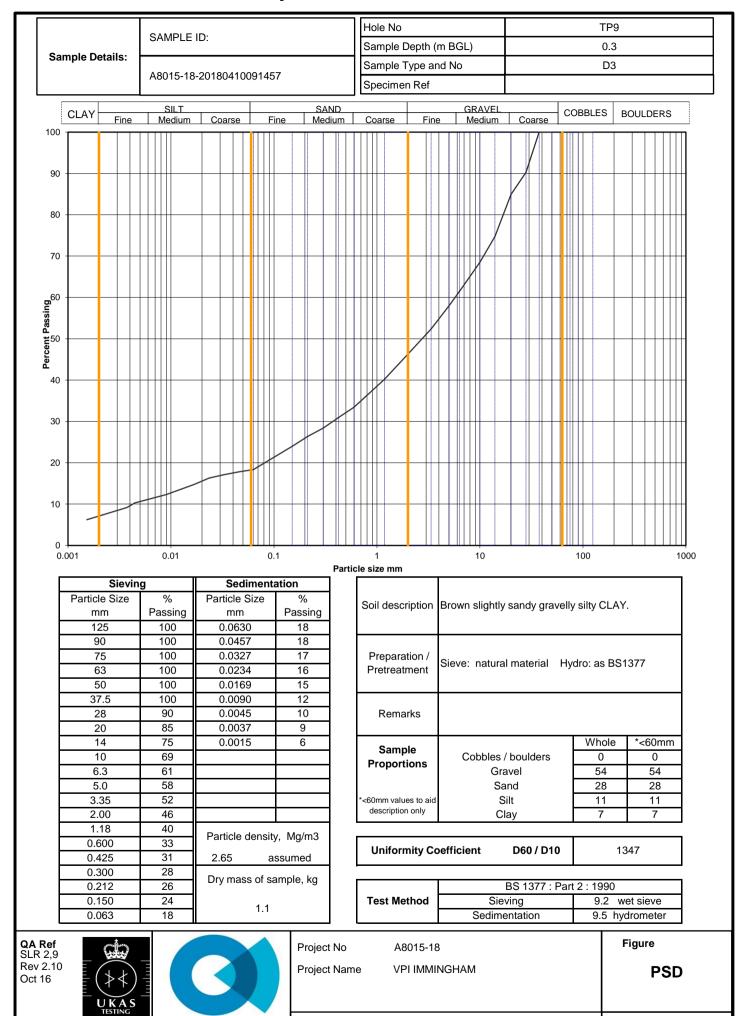
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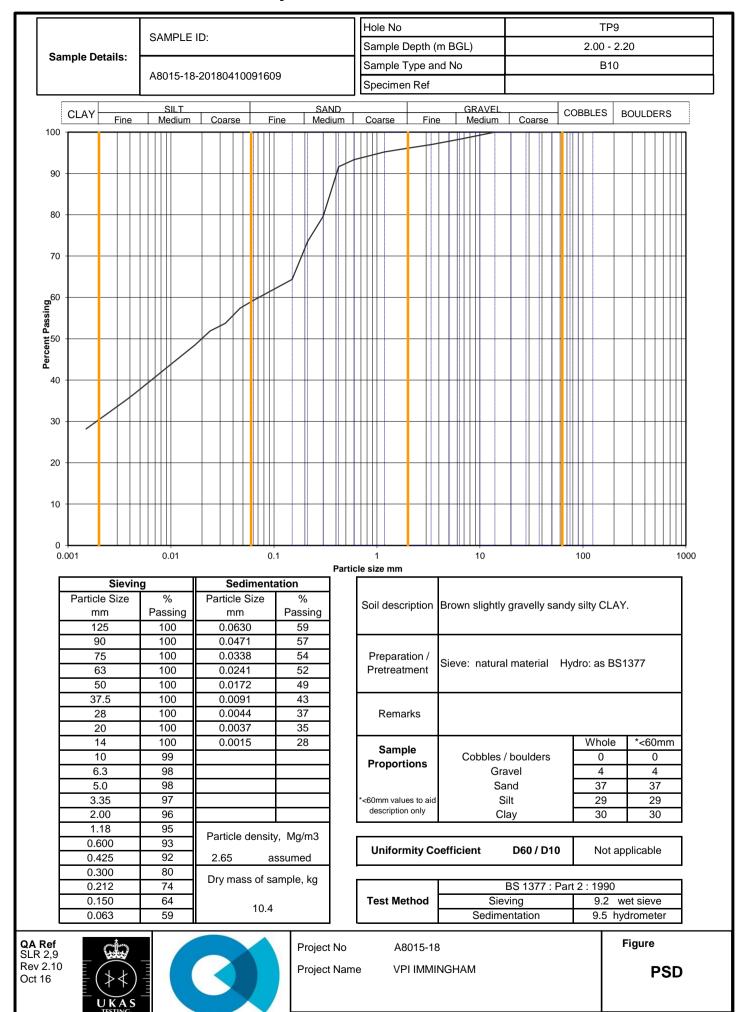
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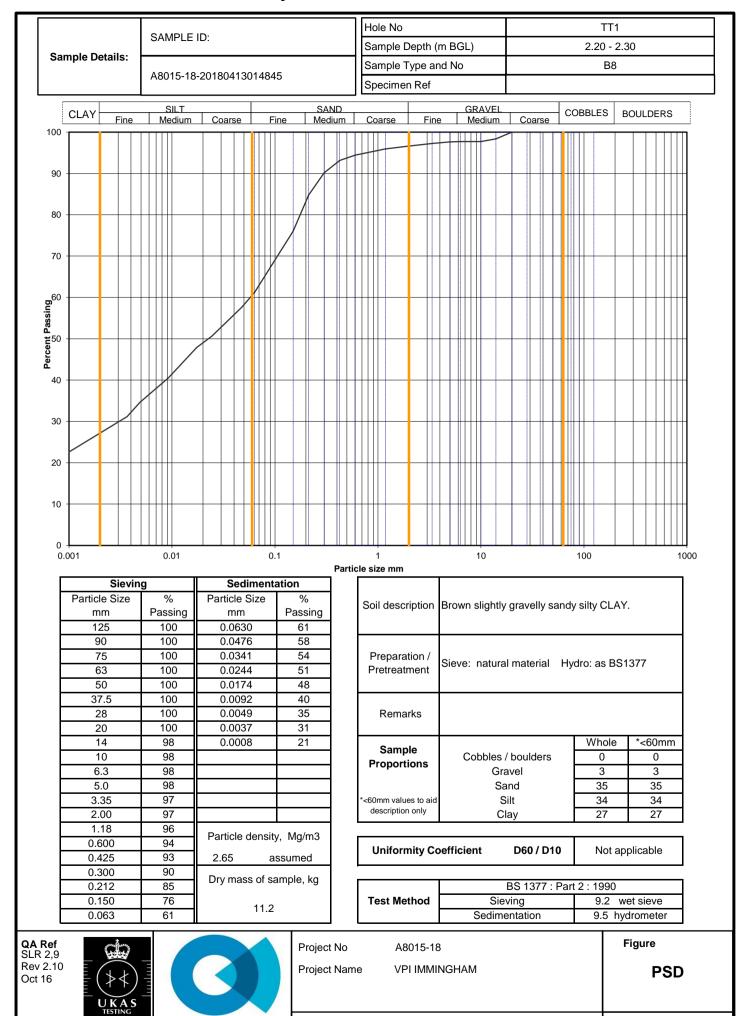
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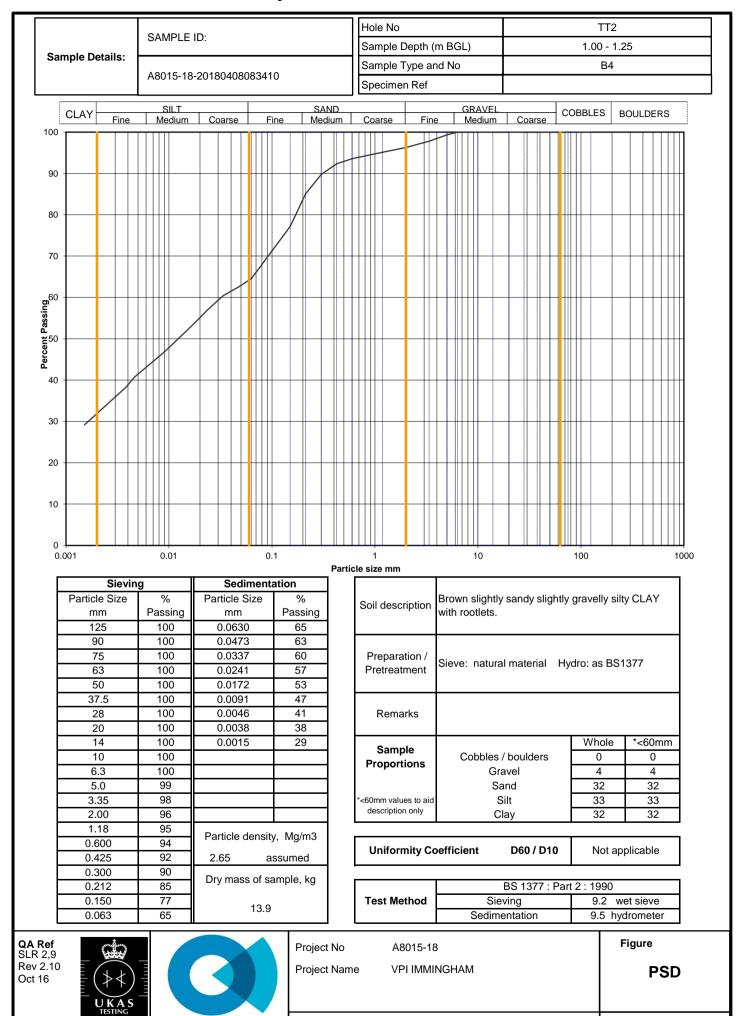
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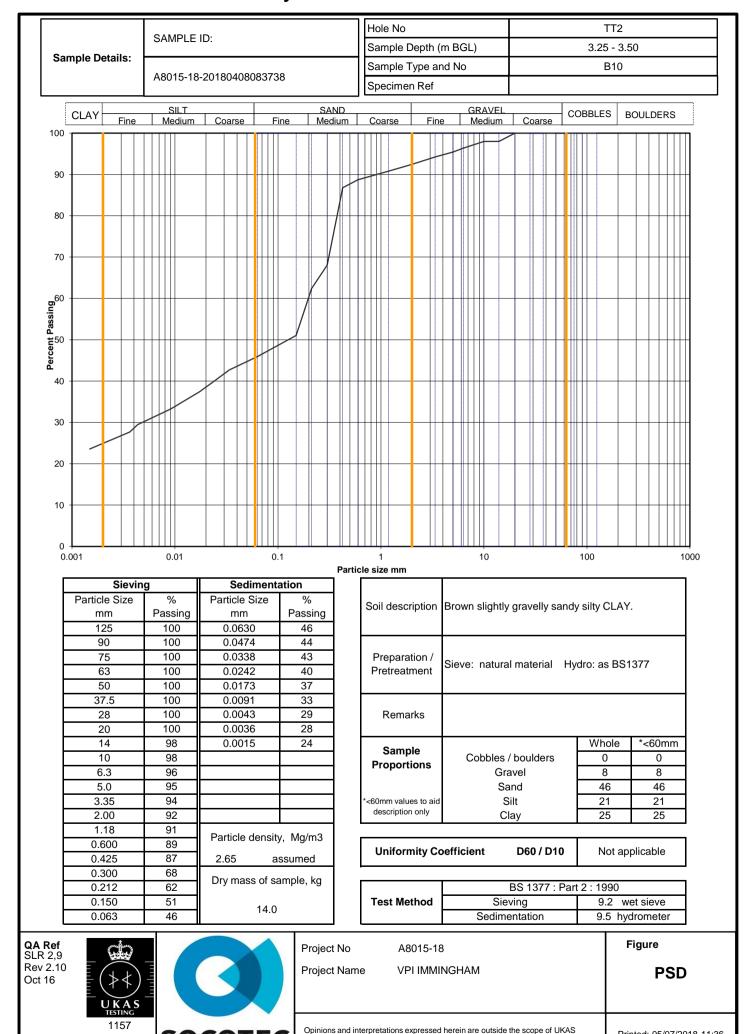
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# UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS

		Sam	ple			Der	nsity	w	Test	Dia.	ó3	At fail	ure / er	nd of st	tage	Membrane	
Hole No.	No	Dept	h (m)	t. 120	Soil Description	bulk	dry		type			Axial strain	ó1 - ó1	си	M 0	Thickness	Remarks
	No.	from	to	type		Mg	/m3	%		mm	kPa	%	kPa	kPa	D E	mm	
BH1	15	5.00	5.45	UT	Stiff greyish brown slightly sandy slightly gravelly CLAY.	2.21	1.93	15	UUM	99.4 99.4 99.4	100 200 400	11.4 13.4 18.8	203 216 229	101 108 114	Р	0.4	
BH1	20	8.00	8.45	UT	Firm greyish brown slightly sandy slightly gravelly CLAY.	2.21	1.92	15	UUM	102.6 102.6 102.6	160 320 640	7.9 10.4 19.8	110 127 163	55 64 82	Р	0.4	
BH1	35	17.00	17.45	UT	Very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is mainly chalk.	2.23	1.96	14	UUM	103.8	250	19.9	506	253	Р	0.4	Sample reached 20% axial strain during 1st stage.
BH1	39	20.00	20.40	UT	Very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is chalk.	2.2	1.92	14	UUM	103.6 103.6	250 500	18.4 19.9	524 535	262 268	Р	0.4	Sample reached 20% axial strain during 2nd stage.
BH2	7	1.20	1.65	UT	Firm stiff brown slightly sandy slightly gravelly CLAY	2.05	1.71	20	UUM	103.9 103.9 103.9	25 50 100	7.9 9.8 19.1	166 180 213	83 90 106	Р	0.4	
BH2	28	5.10	5.55	UT	Firm dark brown slightly sandy slightly gravelly CLAY.	2.16	1.86	16	UUM	102.7 102.7 102.7	100 200 400	2.5 4.5 19.8	33 43 66	17 22 33	Р	0.4	
BH2	44	11.00	11.45	UT	Stff greyish brown slightly sandy slightly gravelly CLAY.	2.2	1.91	15	UUM	102.8 102.8 102.8	220 440 880	10.9 12.9 19.9	217 225 254	109 113 127	Р	0.4	
ВН3	19	9.00	9.45	UT	Firm greyish brown slightly sandy slightly gravelly CLAY. Gravel contains chalk fragments.	2.12	1.81	17	UUMR	102.9 102.9 102.9	180 360 720	5.0 6.9 19.8	81 89 113	41 45 56	Р	0.4	
BH4	10	4.50	4.95	UT	Firm to stiff greyish brown slightly sandy slightly gravelly CLAY.	2.19	1.91	14	UUM	102.6 102.6 102.6	90 180 360	10.4 12.3 19.7	220 229 246	110 114 123	Р	0.4	
BH4	22	9.00	9.45	UT	Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel contains chalk fragments.	2.16	1.87	15	UUM	95.9 95.9 95.9	180 360 720	5.4 6.9 19.7	100 108 148	50 54 74	Р	0.4	
BH5	11	2.30	2.75	UT	Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is chalk fragments.	2.14	1.84	16	UUM	102.5 102.5 102.5	45 90 180	16.3 18.8 19.8	537 541 542	268 270 271	Р	0.4	
BH5	27	8.00	8.45	UT	Firm greyish brown slightly sandy slightly gravelly CLAY. Gravel contains chalk.	2.19	1.89	16	UUM	101.9 101.9 101.9	160 320 640	4.0 5.9 18.8	69 83 115	35 41 58	Р	0.4	
BH6	6	2.00	2.45	UT	Very stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel contains chalk.	2.13	1.82	17	UUM	102.7 102.7 102.7	40 80 160	10.9 12.4 19.8	446 452 480	223 226 240	Р	0.4	
BH6	14	6.00	6.45	UT	Firm to stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel contains chalk.	2.2	1.91	15	UUM	102.5 102.5 102.5	120 240 480	4.0 6.4 19.3	109 134 174	54 67 87	Р	0.4	

General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested

си

at a rate of strain of 2%/minute, unless annotated otherwise. Latex rubber membrane used and membrane correction applied in accordance with BS1377-7 8.5.1.4 unless stated.

 Legend
 UU - single stage test ( may be in sets of specimens )
 ó3
 cell pressure
 Mode of failure
 P
 plastic

 UUM - multistage test on a single specimen
 ó1 - ó3
 deviator stress
 B
 brittle

QA Ref SLR 2 Rev 2.7 Apr 15





Project No	A8015-18	Figure
Project Name	VPI IMMINGHAM	UUSUM

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undrained shear strength

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compound

	Con	solid	ate						n test with I Itistage test						ress	ure	
Project N	No	L	Δ <u>8</u> Ω	15-1	8 8				Sample D	etails:	Hole No	)	В	H1			_
Project N			100	15 1					<del> </del>		Depth (			.20 - 1.6	5		
1 10,0001	<b>v</b> arrio										No		6	Туре		UT	
		Į.	MN	ЛING	HAM						ID			71			_
											Spec R	ef					
											<u>'</u>						_
		imen D	etails	3					Soil Desc	•	Firm bro	own sl	ightly sandy	y slightly gra	velly C	CLAY	
	Initial	Length				mm	2	03.24	Specimer /Prepara		UNDIS	TURBI	ED				
		Diame				mm		03.57	-								i
		Bulk D	ensit	у		Mg/m³		2.10	0-4		- Dataila			Method of S	Saturat	ion	1
		Water	Cont	ent		%		19	Sat	uratio	n Details		Increme	ents of cell a	ınd ba	ck pressure	
		Dry de	nsity			Mg/m³		1.76	Cell pressu	ure incr	ements	kPa		50	١		
	After	test							Differential	Pressi	ure	kPa		10	l		
		Bulk D	ensit	у		Mg/m³		2.08	Final Cell F	Pressur	re	kPa		310	0		
		Water	Cont	ent		%		20	Final pore	water p	ressure	kPa		293	.8		
		Dry de	nsity			Mg/m³		1.73	Final B Val	lue				0.9	7		İ
1.0								1					×				
0.8								×	×		×						
							/										
9.0 age	Consolidation Details  Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4)			- ×													
o 0.4 ·	Consolidation Details  Consolidation parameters (see note to BS137 pt 8, clause 6.3.4)																
Water Content Dry density  Mg/m³  1.0 0.8 0.6 0.0 0 50 100  Consolidation Details  Drainage Conditions Stage No. Cell Pressure applied Back Pressure applied Effective Pressure Pore pressure at start of co Pore pressure at start of co Pore pressure dissipation a Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4)  Coefficient of Compressibility Coefficient of Permeability																	
Water Content   %   20   Final pore water pressure   kPz																	
	Water Content Dry density  1.0 0.8 0.6 0.2 0.0 0 50  Consolidation Details  Effect Pore Pore Pore Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4)  0 5 0 5		100	1	50	200	2	50 50		300	35	i0	400	ი			
1.0	000			100	,												
Consolidation   Details   Drainage Conditions   Stage No.   1	m radial bo	oundary and	one e	nd	ſ												
	Drainage Conditions																
	Stage No.	0	kPa														
	Drainage Conditions	300	0	kPa													
	Stage No.	2	25	50	١	kPa											
		Consolidation Details  Effective Pressure applied Effective Pressure Pore pressure at start of Pore pressure at end of Pore pressure dissipati  Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4)  Stage No.  Cell Pressure applied Effective Pressure Pore pressure at end of Pore pressure dissipati Coefficient of Consolidation Coefficient of Compress Coefficient of Permeab	art of cons	olidation			30	3	308	324	4	kPa					
	Consolidation Details  Effective Pres Pore pressure Pore pressure Pore pressure Pore pressure Consolidation parameters ( see note to BS1377: pt 8, clause 6.3.4)  Cell Pressure Cofficient of Coefficient of Coefficient of	ssure at en	d of cons	olidation			30	1	300	300	0	kPa					
					Pore pres	sure dissi	oation at e	end of consoli	dation		70	)	95	100	0	%	
			1							C <sub>vi</sub>	2.1	2	1.17	1.0	8	m²/year	
			3S13	77 :												m <sup>2</sup> /MN	
	pt 8,	clause	6.3.4	ł)	Coefficie	nt of Perme	eability ( c	alculated)		k <sub>vi</sub>	4.4E	-10	1.7E-10	) 1.1E-	-10	m/s	İ
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	Name	 e							$\longrightarrow$	1	,	Depth		JL)	_	) - 1.65	5	_	_
•		1		101101	• 4				J	1		No		6		Туре	L'	JT	_
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			<u></u>								'	Spec F	Ref	<u> </u>					
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	200 -	<u></u>																	
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stress	120 -	-	+	-		<del></del>	-	_	+	_	+	_	+	+			-	+	_
Deviator stress ( σ1' - σ3' ) kPa	1															ļ			
Dev	80 -		2	+	+	+	+	_	+	_	+	+	+					+	_
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		0	2	4	6	8	10	12	14	16	18	20	22	24	26	3 2	28	30 ε	%
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Principal stress ratio ( σ1' / σ3' )	1	1/	<b>^</b> 2														[		
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Pore water pressure kPa								`									1		
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Lab.	18	1						<b>(</b> **)									•	•	
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#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No Project No BH1 A8015-18 1.20 - 1.65 Depth (m BGL) Project Name No Туре UT 6 **IMMINGHAM** ID Spec Ref **Mohr Circles** 100 80 Shear stress kPa 60 40 20 60 80 100 120 140 160 200 220 240 260 280 300 320 Effective stresses kPa **MIT Stress field** 100 Compression stages 2 3 Stage 325 Cell pressure 312 350 kPa 80 Initial pwp 299 300 301 kPa 25 Initial $\sigma_3$ ' 14 49 kPa 60 $(\sigma_1' - \sigma_3')/2$ Rate of strain 1.51 1.51 1.51 %/hr 40 Failure conditions Maximum effective principal Criterion stress ratio 20 Axial strain 1.54 2.47 4.60 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 6.616 5.321 4.046 0 52.8 $(\sigma_1' - \sigma_3')_f$ 73.0 111.8 kPa 140 160 180 200 303 308 313 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3'_f$ 9 17 37 kPa 200 62 90 148 kPa $\sigma_1'_f$ 0.08 0.11 0.11 160 Time to failure 1.0 1.6 3.0 hrs **Shear Strength Parameters** 120 at peak stress ratio $(\sigma_1' - \sigma_3')$ Linear regression 80 kPa 9.8 ō Ø' 31.0 degrees Manual re-assessment 40 с' kPa ø' degrees 0 40 80 120 200 280 320 400 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.594 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 Printed:20/07/2018 10:42 **CUM** Feb18

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Sheet 3 of 3

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	Consol	idate	ed Un (	drained BS1377	Triaxi	al Coi 8 : 19	mpression 90 ) - Multis	test with I stage test	Meas on a	ureme single	ent o	f Pore	e Wa n	ater Pre	essure	
Project N	lo	ΔΩ	015-1	<u>۸</u>				Sample D	etails:	Hole No	)		BH2	2		
Project N		17.0	015 1					┥ ゛		Depth (		iL)	_	- 0 - 3.75		
i rojecti	anic									No		<u></u>		Туре	UT	
		IM	MING	MAH						ID				. 7		
										Spec R	ef					
										T T						$\neg$
	Specimer	Deta	ils					Soil Desc		Firm br	own la	minated	slightl	ly sandy CL	AY.	
	Initial	ath			mm	2	02.89	Specimen /Prepara		UNDIS	TURBI	ED				
	Len Dia	neter			mm		03.07	7. Topaic	4							_
			sity		Mg/m³		2.03	_					Me	thod of Sat	uration	
	Wat	ter Co	ntent		%		25	Sat	uration	n Details		Incre	ments	of cell and	back pressi	ıre
	Dry	densit	у		Mg/m³		1.63	Cell pressu	re incr	ements	kPa			50		
	After test							Differential	Pressu	ıre	kPa			10		
	Bull	k Dens	sity		Mg/m³		2.04	Final Cell F	ressur	е	kPa			310		
	Wat	ter Coı	ntent		%		24	Final pore	water p	ressure	kPa			300		
	Dry	densit	у		Mg/m³		1.64	Final B Val	ue					0.97		
1.0							1					<u></u>				_
0.0							×	×		×						
9.0 <u>R</u>	No.   No.															
Water Content   %   24   Final pore water pressure   Final B Value																
0.2	Bulk Density   Mg/m²   2.04   Final Cell Pressure   kPa   310															
0.2		Nater Content   %   25														
	Water Content   %   24   Final pore water pressure   kPa   300	350		400												
	Consolidation Details   Drainage Conditions   Stage No.   1   2   3   3   3   3   3   3   3   3   3		100													
	Drainage Conditions   From radial boundary and one er	ne end	$\neg$													
	Drainage Conditions															
	Drainage Conditions	kPa														
	Drainage Conditions	300	kPa													
	Consolidation Details  Consolidation Details  Consolidation Details  Effective Pressure applied  Effective Pressure at start of consolidation  Pore pressure at end of consolidation  Pore pressure dissipation at end of consolidation  Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4)  Coefficient of Compressibility  Coefficient of Permeability (calculated)  Root time minute  10 20 30 40			55	5	11	0	220	kPa							
		Stage No.  Cell Pressure applied  Back Pressure applied  Effective Pressure  Pore pressure at start of  Pore pressure at end of  Pore pressure dissipatio  assolidation  ameters  anote to BS1377:  By clause 6.3.4)  Stage No.  Cell Pressure applied  Effective Pressure  Pore pressure at start of  Coefficient of Consolidat  Coefficient of Compress  Coefficient of Permeabil	t of cons	solidation			34	8	36	5	419	kPa				
		Cell Pressure applied  Back Pressure applied  Effective Pressure  Pore pressure at start of Pore pressure at end of Consolidation ameters enote to BS1377:	of cons	olidation			30	1	30	1	302	kPa				
				Pore press	ure dissip	ation at e	end of consolidat	ion		97	7	99	)	98	%	
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			377 :												m <sup>2</sup> /M	
	pt 8, clau	se 6.3	.4)	Coefficient	of Perme	ability ( c	alculated)		k <sub>vi</sub>	1.1E	-10	5.1E	-11	3.3E-11	I m/s	
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#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No Project No BH2 A8015-18 3.30 - 3.75 Depth (m BGL) Project Name No 15 Туре UT **IMMINGHAM** ID Spec Ref **Mohr Circles** 200 160 Shear stress kPa 120 80 40 120 200 240 280 320 400 440 480 520 600 640 Effective stresses kPa **MIT Stress field** 200 Compression stages 2 3 Stage Cell pressure 355 410 520 kPa 160 Initial pwp 301 301 302 kPa 54 109 Initial $\sigma_3$ ' 218 kPa 120 $(\sigma_{1}^{'} - \sigma_{3}^{'})/2$ Rate of strain 0.71 0.71 0.71 %/hr 80 Failure conditions Maximum effective principal Criterion 40 Axial strain 1.76 3.70 6.40 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 2.839 3.051 2.751 0 60.3 $(\sigma_1' - \sigma_3')_f$ 150.5 267.7 kPa 120 200 280 320 360 400 322 337 367 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3{'}_f$ 33 73 153 kPa 500 93 224 421 kPa $\sigma_1'_f$ 0.35 0.24 0.24 400 Time to failure 2.5 5.2 9.0 hrs **Shear Strength Parameters** 300 at peak stress ratio $(\sigma_1' - \sigma_3')$ Linear regression 200 kPa 3.8 ۵. Ø' 27.4 degrees Manual re-assessment 100 с' kPa ø' degrees 0 100 200 300 500 700 800 1000 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.594 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 **CUM** Printed:20/07/2018 10:43 Feb18

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	Consoli	date	ed Un (	drained BS1377	Triaxi : Part	al Co 8 : 19	mpression 1 90 ) - Multis	test with N stage test	Meas on a	ureme single	ent o	f Pore	e Wa n	ater Pre	ssure	
Project N	lo	A80	015-1	8				Sample D	etails:	Hole No	)		вна	3		
Project N	Jame	1.0						$\dashv$		Depth (	m BG	iL)	5 - !	5.45		
	tarro									No		10		Туре	UT	
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	Specimen Initial	Detail	ls					Soil Desc		Firm bro	own sl	ightly sar	ndy sli	ghtly gravel	lly CLAY	
	Lenç	ath			mm	2	203.48	Specimen /Prepara		UNDIS	TURBI	ED				
		neter			mm		02.37									
	Bulk	Densi	ty		Mg/m³		2.19	Cot	urotion	n Details			Me	thod of Satu	uration	
	Wate	er Con	tent		%		20	Sati	uratioi	i Details		Incre	ments	of cell and	back pressure	е
	Dry (	density	/		Mg/m³		1.82	Cell pressu	re incr	ements	kPa			50		
	After test							Differential	Pressu	ure	kPa			10		
	Bulk	Densi	ty		Mg/m³		2.26	Final Cell P			kPa			260		
		er Con			%		16	Final pore v		ressure	kPa			237.3		
	Dry	density	/		Mg/m³		1.94	Final B Val	ue					0.99		
1.0										×						7
0.8								×								
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o 0.4 ⋅	Drainage Conditions   Stage No.   1   2   3   3   3   3   3   3   3   3   3															
0.2	0.8 0.6 0.4 0.2 0.0 0 50 100 150 200 250 300 350  Applied cell pressure kPa    Drainage Conditions   From radial boundary and one en Stage No.															
	Consolidation   Details   Drainage Conditions   From radial boundary and one end   Stage No.   1   2   3   3   370   440   440   8   8   8   8   8   8   8   8   8															
	Consolidation Details   Drainage Conditions   From radial boundary and one end		⊣ 400													
	Drainage Conditions   From radial boundary and one end															
				Drainage Co	onditions						Fro	m radial	boun	darv and on	e end	7
										1						
				Cell Pressu	re applie	d				33	5	370	0	440	kPa	
	Back Pressure applied   300   300   300   300	kPa														
	Back Pressure applied   300   30   30   30   Effective Pressure   35   7	70	)	140	kPa											
		Consolidation Details    Cell Pressure applied			31	4	32	7	383	kPa						
		Back Pressure applied  Effective Pressure  Pore pressure at start of consolidation  Pore pressure at end of consolidation  Pore pressure dissipation at end of consolidation  Consolidation  parameters see note to BS1377: pt 8, clause 6.3.4)  Back Pressure applied  Consolidation  Coefficient of Consolidation  Coefficient of Compressibility  Coefficient of Permeability (calculated)			30	0	300	0	302	kPa						
	Effective Pressure   35   70		10	0	100	0	98	%								
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						m <sup>2</sup> /MN										
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ject l	No		A8015	 5-18					San	nple Details:	: Hole N	10		вн3	}		
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#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No Project No BH3 A8015-18 5 - 5.45 Depth (m BGL) Project Name No 10 Туре UT IMMINGHAM ID Spec Ref **Mohr Circles** 200 160 Shear stress kPa 120 80 40 80 120 160 200 240 280 320 400 440 480 520 600 640 Effective stresses kPa **MIT Stress field** 200 Compression stages 2 3 Stage 370 Cell pressure 335 440 kPa 160 Initial pwp 300 294 kPa Initial $\sigma_3$ ' 35 76 138 kPa 120 $(\sigma_1' - \sigma_3')/2$ Rate of strain 1.02 1.02 1.02 %/hr 80 Failure conditions Maximum effective principal Criterion stress ratio 40 Axial strain 2.26 3.25 4.98 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 3.480 3.556 3.126 0 138.0 $(\sigma_1' - \sigma_3')_f$ 78.1 207.3 kPa 120 200 280 320 360 400 304 316 343 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3{'}_f$ 32 54 98 kPa 300 110 192 305 kPa $\sigma_1'_f$ 0.04 0.16 0.20 240 Time to failure 2.2 3.2 4.9 hrs **Shear Strength Parameters** 180 at peak stress ratio $(\sigma_1' - \sigma_3')$ Linear regression 120 kPa 6.9 ō Ø' degrees 29.4 Manual re-assessment 60 с' kPa ø' degrees 0 50 100 150 250 350 400 450 500 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.595 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 **CUM** Printed:20/07/2018 10:43 Feb18 sheet 3 of 3

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	Cons	olida	ate	d Un	drained BS1377	Triaxi : Part	ial Com 8 : 199	npression 90 ) - Multis	test v stage	vith Me test or	ası ı a	ureme single	ent o	f Pore	e W en	ater P	ress	ure	
Project N	No		480	15-1	8 8				San	nple Deta	ils:	Hole N	)		ВН	4			
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		Length Diamet				mm mm	_	03.49 03.68	/	Preparation	1	ONDIO	TOTIBL						4
		Bulk De		v		Mg/m³		2.22							Мє	ethod of S	aturat	ion	٦ ا
		Water				%		14		Satura	tion	Details		Incre	ement	s of cell a	nd ba	ck pressure	
	ı	Dry der	nsity			Mg/m³	1	.95	Cell	pressure i	ncre	ments	kPa			50			
	After te	est							Diffe	erential Pre	ssui	re	kPa			10			
		Bulk De	ensity	У		Mg/m³	2	2.23	Fina	l Cell Pres	sure	)	kPa			310	)		
	1	Water	Conte	ent		%		13	Fina	al pore wate	er pr	essure	kPa			287	.6		
	l l	Dry der	nsity			Mg/m³	1	.97	Fina	al B Value						0.9	7		
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	Details	3			Effective P	• • • •						6		13		260		kPa	-
					Pore press		irt of consc	olidation				34		37		457		kPa	
				-	Pore press							30		30		302	-	kPa	
				ŧ	Pore press	ure dissip	oation at er	nd of consolidat	ion			94	4	10	0	99		%	
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	parame ( see no		3013	77 ·	Coefficient	of Compi	ressibility			ı	M <sub>vi</sub>	0.2	24	0.1	12	0.0	7	m <sup>2</sup> /MN	
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oject	No		A8015	j-18					S	ample De	tails:	Hole N	lo		BH	4			
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Pore water pressure kPa	340 -				<b>\</b> ,														
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#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No Project No BH4 A8015-18 7.50 - 7.95 Depth (m BGL) Project Name No 18 Туре UT IMMINGHAM ID Spec Ref **Mohr Circles** 200 160 Shear stress kPa 120 80 40 120 160 200 240 280 320 400 440 480 520 560 600 640 Effective stresses kPa **MIT Stress field** 500 Compression stages 2 3 Stage 430 Cell pressure 365 560 kPa 400 Initial pwp 302 300 kPa Initial $\sigma_3$ ' 63 130 258 kPa 300 $(\sigma_1' - \sigma_3')/2$ Rate of strain 1.56 1.56 1.56 %/hr 200 Failure conditions Maximum effective principal Criterion 100 Axial strain 2.19 3.40 4.22 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 3.863 3.523 3.183 0 146.9 $(\sigma_1' - \sigma_3')_f$ 249.6 392.0 kPa 1000 500 700 800 900 314 331 380 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3'_f$ 51 99 180 kPa 500 198 348 572 kPa $\sigma_1'_f$ 0.08 0.12 0.20 400 Time to failure 2.2 2.7 hrs **Shear Strength Parameters** 300 at peak stress ratio $(\sigma_1' - \sigma_3')$ Linear regression 200 15.9 kPa ō Ø' degrees 29.1 Manual re-assessment 100 с' kPa ø' degrees 0 100 200 300 700 800 1000 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.596 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 **CUM** Printed:20/07/2018 10:44

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	Conson	uaic	(	BS1377 :	Part	8 : 19	mpressior 90 ) - Muli	tista	ge test (	on a	single	spe	ecime	n	ater Fre	SSUIC	
Project N	lo	A80	)15-1	.8				(	Sample De	tails:	Hole No	)		BHS	5		
Project N	lame										Depth (	m BG	iL)	11 -	11.45		
,		l									No		35		Туре	UT	
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											Spec R	ef					
	Specimen	Detail	s						Soil Descri	iption	Firm bro	own sl	ightly sai	ndy sli	ghtly grave	elly CLAY	
	Initial							┧┟	Specimen	Tyne							
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	Diam	neter			mm	1	03.08	<u> </u>									
	Bulk	Densi	ty		Mg/m³		2.16		Satu	ıration	n Details			Me	thod of Sat	turation	
	Wate	er Con	tent		%		17	<b>!</b>					Incre	ments		d back pressi	ure
		density	'		Mg/m³		1.84	1  -	•			kPa			50		
	After test							1 F									
				I													
								1			ressure	kPa					
	Dry (	aensity			ivig/m³		1.85	J L	Finai B Vaiu	ie					0.96		
1.0							ж		×		×		×				$\neg$
0.8																	_
Φ ο ο																	
valu o.o	0.8 0.6 0.4 0.2 0.0 0 50 100 150 200 250 300 350    Drainage Conditions   From radial boundary and one en Stage No.																
₾ 0.4	Dry density   Mg/m²   1.85   Final B Value   0.96																
0.2	After test Bulk Density Water Content Dry density  Dry density  Dry density  Drainage Conditions Stage No. Consolidation Details  Effective Pressure a start of consolidation Prore pressure a start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure at start of consolidation Prore pressure dissipation at end of consolidation Prore pressure at start of consoli		_														
0.0	Water Content																
	0.8   0.6   0.4   0.2   0.0   0.50   100   150   200   250   300   350   200   Applied cell pressure kPa		400														
	Drainage Conditions																
	Stage No.	ne end															
	Drainage Conditions																
	Drainage Conditions	kPa															
	Drainage Conditions   Stage No.   Cell Pressure applied   Back Pressure applied   Effective Pressure   Pore pressure at start of consolidation   Pore pressure at end of consolidation   Pore pressure dissipation at end of consolidation   Pore pressure dissipation at end of consolidation   Coefficient of Consolidation   Coefficient of Compressibility   Coefficient of Compressibility   Coefficient of Permeability (calculated)   Root time minutes   No. 10						kPa										
		Drainage Conditions  Stage No.  Cell Pressure applied  Back Pressure applied  Effective Pressure  Pore pressure at start of consolidation  Pore pressure at end of consolidation  Pore pressure dissipation at end of conso  consolidation  arameters  ee note to BS1377: t 8, clause 6.3.4)  Drainage Conditions  Stage No.  Cell Pressure applied  Back Pressure at end of consolidation  Pore pressure dissipation at end of conso  Coefficient of Consolidation  Coefficient of Compressibility  Coefficient of Permeability (calculated)										kPa					
		Stage No.  Cell Pressure applied  Back Pressure applied  Effective Pressure  Pore pressure at start of consolidation  Pore pressure at end of consolidation  Pore pressure dissipation at end of consolidation  rameters see note to BS1377:  28, clause 6.3.4)  Stage No.  Cell Pressure applied  Effective Pressure  Pore pressure at end of consolidation  Coefficient of Consolidation  Coefficient of Compressibility  Coefficient of Permeability ( calculated )										kPa kPa					
		Back Pressure applied  Effective Pressure  Pore pressure at start of consolidation Pore pressure at end of consolidation Pore pressure dissipation at end of consolidation Pore pressure dissipation at end of consolidation Coefficient of Consolidation Coefficient of Compressibility Coefficient of Permeability ( calculated )		lation								%					
	Consolidati	Effective Pressure Pore pressure at start of consolidation Pore pressure at end of consolidation Pore pressure dissipation at end of consolidation Pore pressure dissipation at end of consolidation Coefficient of Consolidation Coefficient of Compressibility Coefficient of Permeability (calculated)	eria di coristila	ialion		C.						m²/ye	ar				
	Pore pressure at start of consolidation Pore pressure at end of consolidation Pore pressure dissipation at end of consolidation Consolidation parameters (see note to BS1377: pt 8, clause 6.3.4) Coefficient of Compressibility Coefficient of Permeability (calculated)  Root time			_					m <sup>2</sup> /M								
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oject	No		A8015	5-18					5	Sample Deta	ils:	Hole N	0		ВН	5				_
oject	Name	)										Depth			11	- 11.4				_
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		*	nh								_	Spec F	let							_
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#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No BH5 Project No A8015-18 11 - 11.45 Depth (m BGL) Project Name No 35 Туре UT IMMINGHAM ID Spec Ref **Mohr Circles** 100 80 Shear stress kPa 60 40 20 40 100 120 140 160 200 220 240 260 280 300 320 Effective stresses kPa **MIT Stress field** 200 Compression stages 2 3 Stage 355 Cell pressure 327 410 kPa 160 Initial pwp 302 300 kPa 25 Initial $\sigma_3$ ' 55 108 kPa 120 $(\sigma_1' - \sigma_3')/2$ Rate of strain 0.50 0.50 0.50 %/hr 80 Failure conditions Maximum effective principal Criterion stress ratio 40 Axial strain 0.87 1.60 3.46 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 3.952 3.551 3.172 0 35.4 $(\sigma_1' - \sigma_3')_f$ 81.6 167.3 kPa 120 280 320 360 400 315 323 333 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3{'}_f$ 12 32 77 kPa 240 47 114 244 kPa $\sigma_1'_f$ 0.37 0.28 0.19 200 Time to failure 1.7 3.2 6.9 hrs 160 **Shear Strength Parameters** at peak stress ratio $(\alpha_1' - \alpha_3')$ 120 Linear regression kPa 4.0 80 ō Ø' 30.1 degrees Manual re-assessment 40 с' kPa ø' degrees 0 40 80 120 280 320 400 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.595 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 **CUM** Printed:20/07/2018 10:44 Feb18

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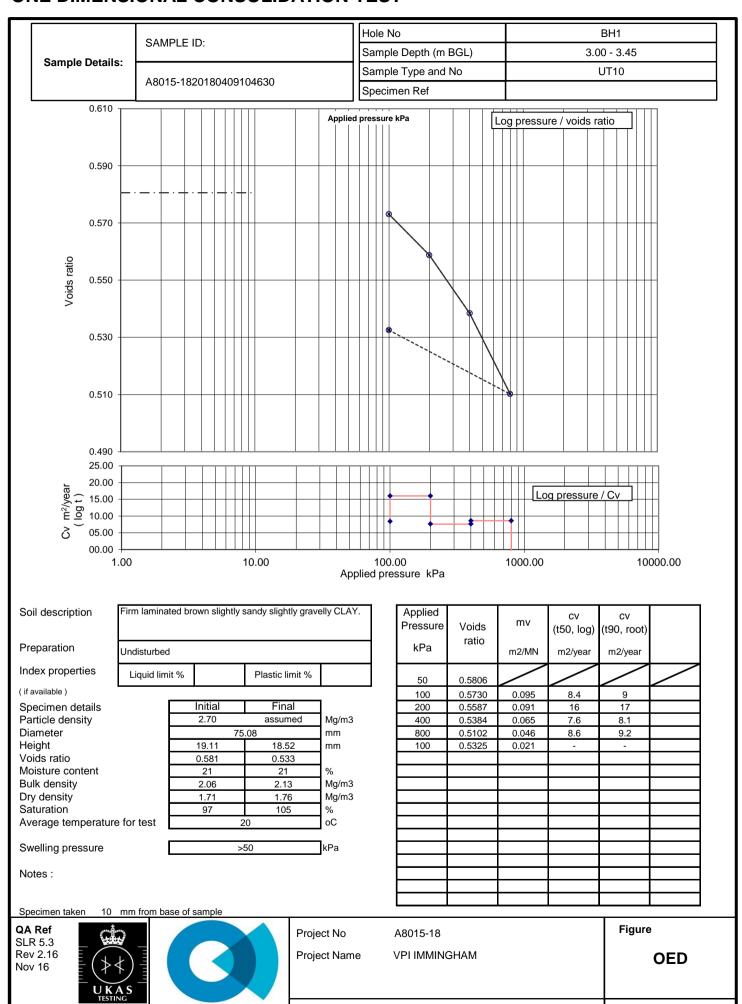
sheet 3 of 3

	Consoli	date	d Un	drained Tri BS1377 : Pa	axial Co art 8 : 19	mpression t 990 ) - Multis	est with I tage test	Meas on a	ureme single	nt o	f Pore	Wa n	ater Pres	sure						
Project No A80			)15-1	8		Sample D	ple Details: Hole No			вн6										
	Project Name					-	Depth (m BG				9 - 9									
riojectiv	iaiiie								No		19		Туре	UT						
		IMI	ИING	HAM					ID		1.7		Турс	101						
								- (												
									Spec R	et										
	Specimen	Detail	s				Soil Desc	Description Soft to firm brown slightly sandy slightly gravelly CLAY.												
	Initial						Specimen		UNDIST	TURBE	=D									
	Leng			m		203.49	/Prepara	/Preparation												
	Diam					102.79				1										
	Bulk Density Water Conte			Mg/i		2.14	Sat	Saturation Details					ethod of Saturation							
					%	17				Increr	ments	of cell and ba	and back pressure							
	-	lensity		Mg/i	m <sup>3</sup>	1.84	Cell pressu													
	After test  Bulk Density  Water Conte					0.47		Differential Pressure Final Cell Pressure Final pore water press		-			10 260							
				Mg/i		2.17				kPa										
					%	15				kPa	238									
	Dry d	lensity		Mg/i	1119	1.88	Final B Val	ue					0.96							
1.0 -									—×											
0.8 -				*		<del>*</del>	*													
- 6.0 B value																				
> □ 0.4																				
0.2 -																				
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(	0	5	60	100			200 Il pressure kP		50		300		350	400						
	1					Applied Cel	ii piessuie kr	a												
				Drainage Condit					Fro	m radial	bound	dary and one	end							
					1		2		3											
	Consolidat	ion		Cell Pressure ap	oplied				35	5	410	)	520	kPa						
	Details			Back Pressure a					30		300	)	300	kPa						
				Effective Pressu			55		110		220	kPa								
			Pore pressure a			333		371		459	kPa									
				Pore pressure a			300		303		300	kPa								
	0- "-			· · · · · · · · · · · · · · · · · · ·	end of consolidation	on	1	100 2.41		96		100	%							
	Consolidation parameters			Coefficient of Co				C <sub>vi</sub>			1.42		1.38	m²/year						
	( see note to		377 :	Coefficient of Co				0.36		0.17		0.09	m <sup>2</sup> /MN							
	pt 8, clause 6.3.4) Coefficient of Permeability ( calculated )							$k_{vi}$	2.7E	-10	7.4E-	11	3.8E-11	m/s						
							ne minutes													
0		1(	0	20		30	40	5	50		60		70	80						
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Volume change mL (-ve if swell )	//																			
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뒽	1/																			
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roject No		A801	5-18						*	Sample	Details:	Hole 1	No		BH	BH6					
Project Name			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1									1		n (m BC	GL)	_	9 - 9.45				
<b>O</b> J		ا	<u> </u>									1	No		19		Туре		UT		
		ا	IMM	INGHA	ιM							1	ID								
													Spec I	Ref							
Shea		tages	- grap	hical da	ata													o fai	ilure po	oints	
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	250					$\Box$					$\pm$	3									
7 2																					
. eg -	200						_							_							
5				/																	
Deviator stress(σ1' - σ3') κΡα	150		+ }	• 2	_	+	+		-		_	_	+	+	_						
ator *			//																		
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	50 +	71	$\top$										1								
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ss rat		/	/	X						_	+	3									
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Principal stress ratio ( ত1' / ত3' )	2.0	Ц																	$\perp$		
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	1.0		2	4	6	8	10		12	14	16	18	20	22	24		26	28	30	ε%	
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	:20																				
	400 -				<b>_</b>																
Ра	380 -					$\checkmark$													$\perp$		
ure k				/			<b>\</b>	_													
Pore water pressure kPa	360 -		+	_		_	_			<del>-</del>		3		_					_		
ater p			1	_																	
re wa	340 -		$/\!\!\!/+$	2	_	-	_		-	_			-	+					+		
Po		1																			
	320 -	1	1	-															$\top$		
	200	L						_								_					
	300 4	1	2	4	6	8	10	1	12 Axial	14	16 : % (all p	18	20	22	24		26	28	30	_	
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		•					7	- \		■ .	•							chaat	t 2 of	<b>'</b> 2	

#### Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377: Part 8: 1990) - Multistage test on a single specimen Sample Details: Hole No Project No BH6 A8015-18 9 - 9.45 Depth (m BGL) Project Name No 19 UT Туре **IMMINGHAM** ID Spec Ref **Mohr Circles** 200 160 Shear stress kPa 120 80 40 80 120 160 200 240 280 320 400 440 480 520 600 640 Effective stresses kPa **MIT Stress field** 200 Compression stages 2 3 Stage Cell pressure 355 410 520 kPa 160 Initial pwp 300 300 300 kPa 55 Initial $\sigma_3$ ' 110 220 kPa 120 $(\sigma_1' - \sigma_3')/2$ Rate of strain 1.80 1.80 1.80 %/hr 80 Failure conditions Maximum effective principal Criterion stress ratio 40 Axial strain 1.57 3.52 6.15 ( $\sigma_1'$ / $\sigma_3'$ ) $_f$ 3.142 3.205 3.052 0 68.5 $(\sigma_1' - \sigma_3')_f$ 143.3 264.7 kPa 200 280 320 360 400 323 345 391 kPa $u_{f}$ s' $(\sigma_1' + \sigma_3') / 2 \text{ kPa}$ Cambridge stress field $\sigma_3{'}_f$ 32 65 129 kPa 500 101 208 394 kPa $\sigma_1'_f$ 0.34 0.31 0.34 400 Time to failure 0.9 2.0 3.4 hrs **Shear Strength Parameters** 300 at peak stress ratio $(\sigma_1' - \sigma_3')$ Linear regression 200 2.2 kPa ۵. Ø' degrees 30.1 Manual re-assessment 100 с' kPa ø' degrees 0 100 200 300 700 800 1000 p' $(\sigma_1' + 2\sigma_3')/3$ kPa Mode of failure Deviator stresses corrected for area change, vertical side drains and 0.595 mm thick rubber membrane(s) Notes: Ref **Figure** SLR8.1 Rev 86.0 **CUM** Printed:20/07/2018 10:45 Feb18 sheet 3 of 3

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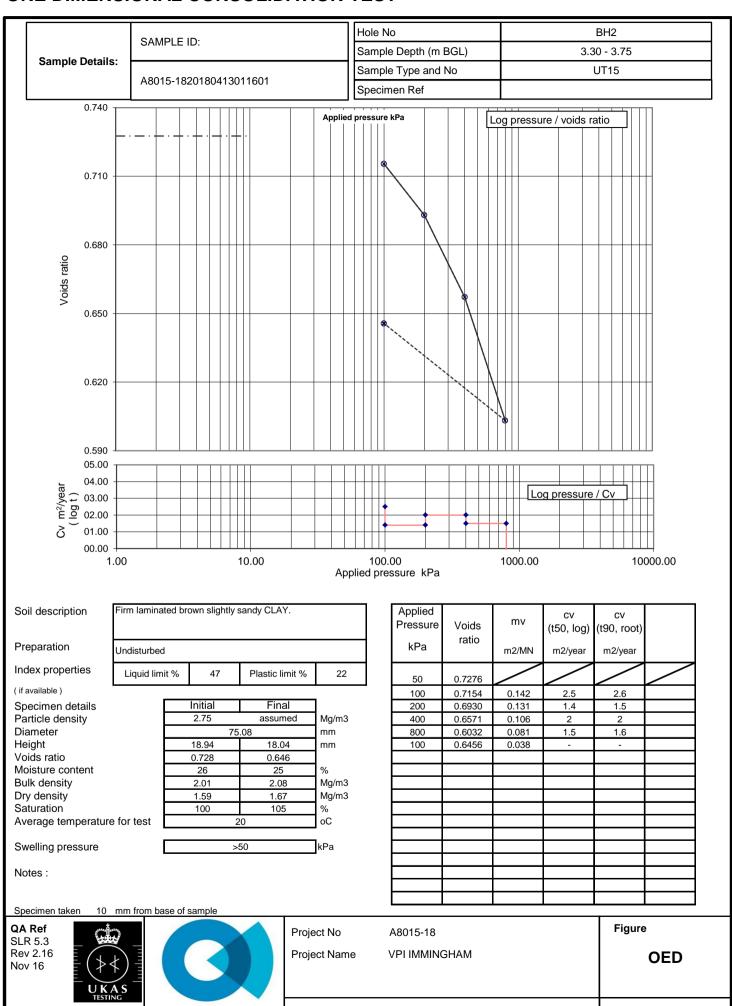


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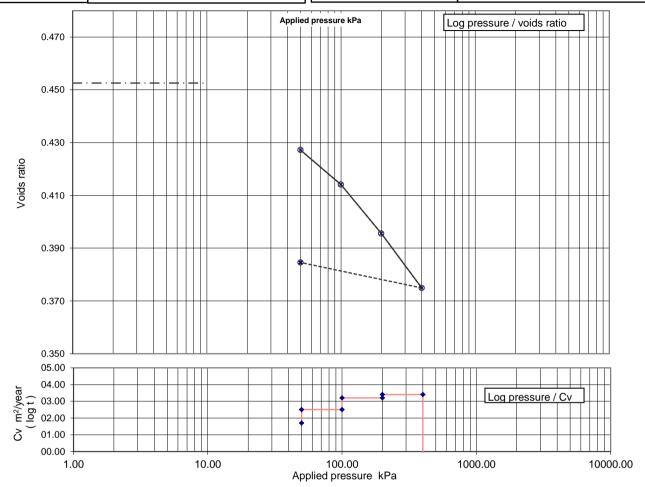
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 Sample Details:
 SAMPLE ID:
 Hole No
 BH2

 Sample Depth (m BGL)
 8.00 - 8.45

 Sample Type and No
 UT36

 Specimen Ref



Soil description

Preparation

Index properties

( if available )

Specimen details
Particle density
Diameter
Height
Voids ratio
Moisture content
Bulk density
Dry density
Saturation

Swelling pressure

Notes:

QA Ref SLR 5.3 Rev 2.16

Nov 16

Average temperature for test

Firm brown slightly sandy slightly gravelly CLAY. Gravel is chalk.
Undisturbed

Liquid limit % Plastic limit %

initiai	Finai	
2.75	assumed	Mg/m3
75	.08	mm
19.10	18.20	mm
0.453	0.385	
16	14	%
2.19	2.27	Mg/m3
1.89	1.99	Mg/m3
97	101	%
2	0	оС

not measured

Specimen taken 20

UKAS TESTING 1157 SOCOTEC	20 mm fro	nm from base of sample			
	TESTING	SOCOTEC			

Project No	A8015-18
Project Name	VPI IMMINGHAM

kPa

Applied

Pressure

kPa

50

100

200

400

50

Figure
OED

C۷

m2/year

1.7

2.5

3.2

3.4

mv

m2/MN

0.350

0.183

0.131

0.074

0.020

Voids

ratio

0.4526

0.4272

0.4141

0.3955

0.3749

0.3846

CV

m2/year

1.8

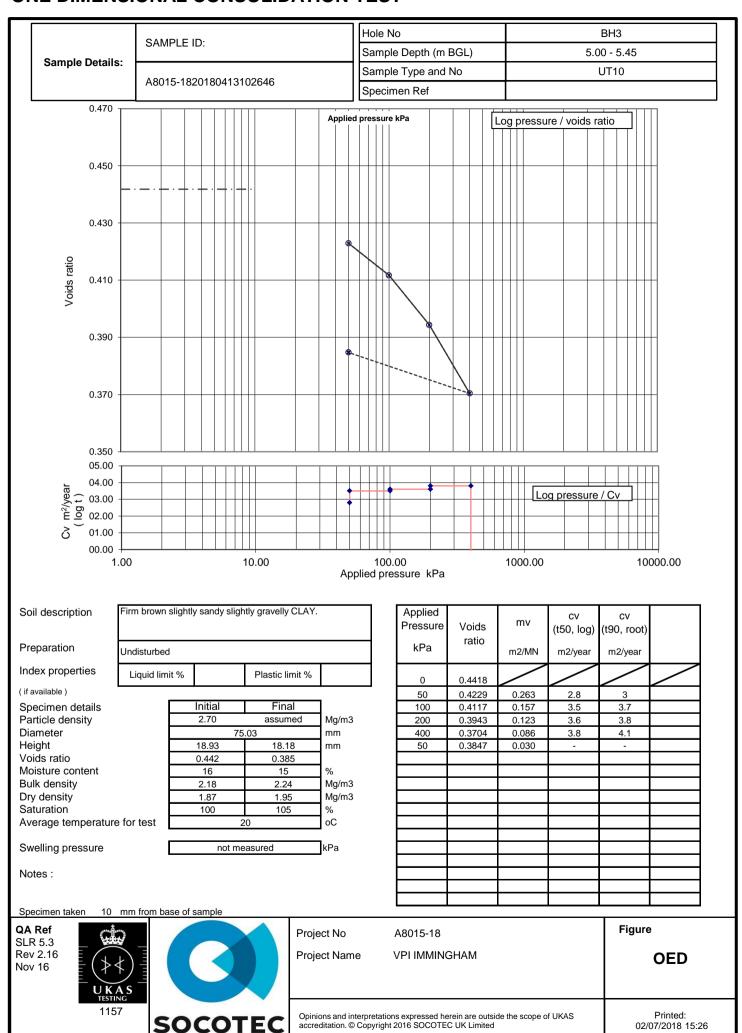
2.7

3.3

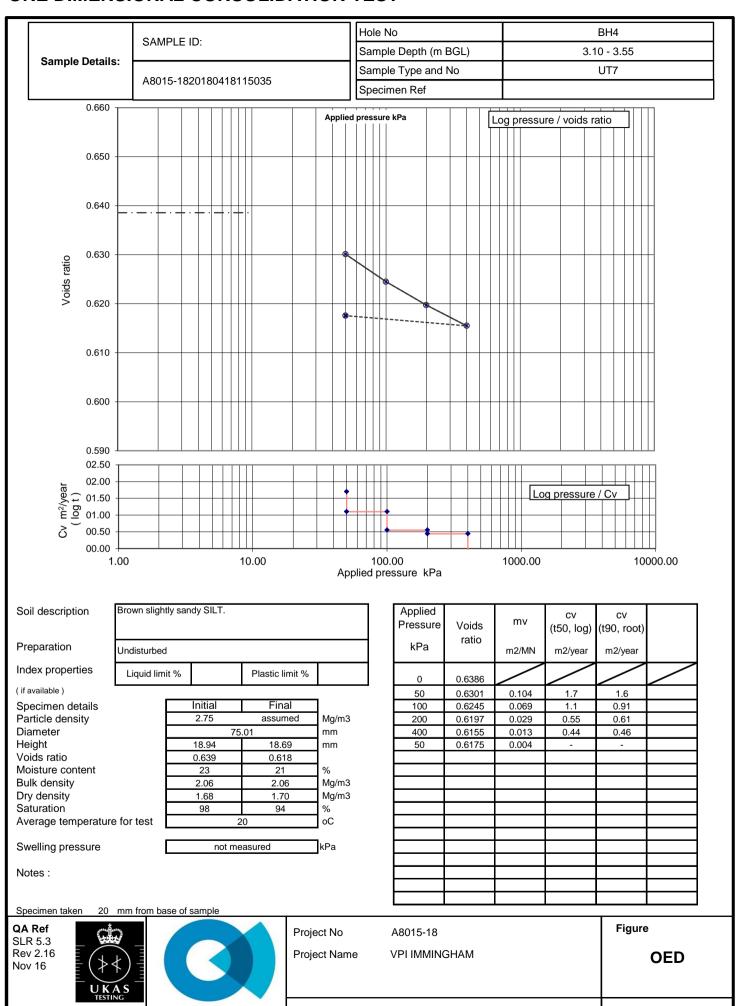
(t50, log) (t90, root)

7
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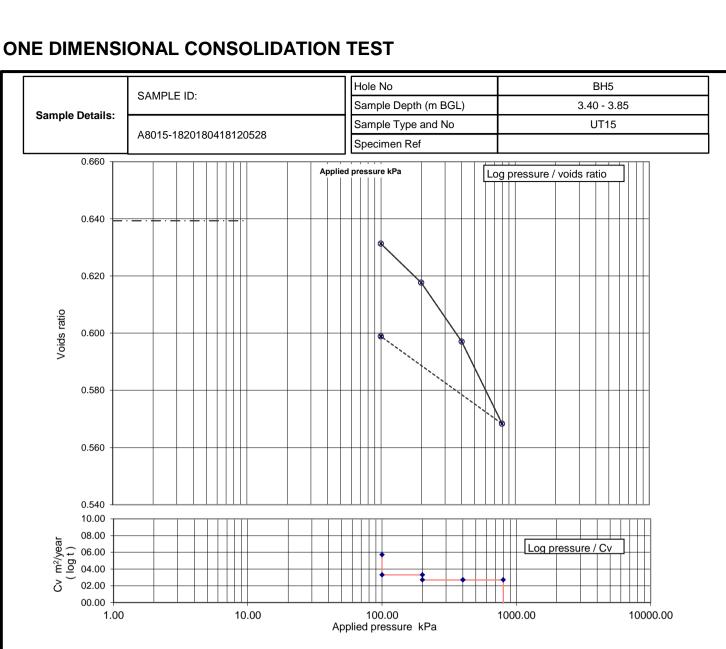


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Soil description

Preparation

Index properties

( if available )

Specimen details Particle density Diameter Height Voids ratio Moisture content Bulk density Dry density Saturation

Swelling pressure

Notes:

Average temperature for test

Firm to stiff brown slightly sandy slightly gravelly CLAY.	
Gravel is chalk.	

Undisturbed

Liquid limit % Plastic limit %

Initial	Final	
2.75	assumed	Mg/m3
75	.17	mm
18.97	18.50	mm
0.639	0.599	
23	22	%
2.06	2.10	Mg/m3
1.68	1.72	Mg/m3
99	102	%
2	20	оС

>50

Specimen taken 10 mm from base of sample

QA Ref SLR 5.3 Rev 2.16 Nov 16 UKAS TESTING		
	SLR 5.3 Rev 2.16	

him him	
	SOCOTEC

Project No	A8015-18
Project Name	VPI IMMII

kPa

5-18	Figure
MMINGHAM	

C۷

m2/year

5.7

3.3

2.7

mv

m2/MN

0.098

0.084

0.064

0.045

0.028

Voids

ratio

0.6393

0.6313

0.6176

0.5970

0.5683

0.5989

CV

m2/year

6.1

1.8

2.9

(t50, log) (t90, root)

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Applied

Pressure

kPa

50

100

200

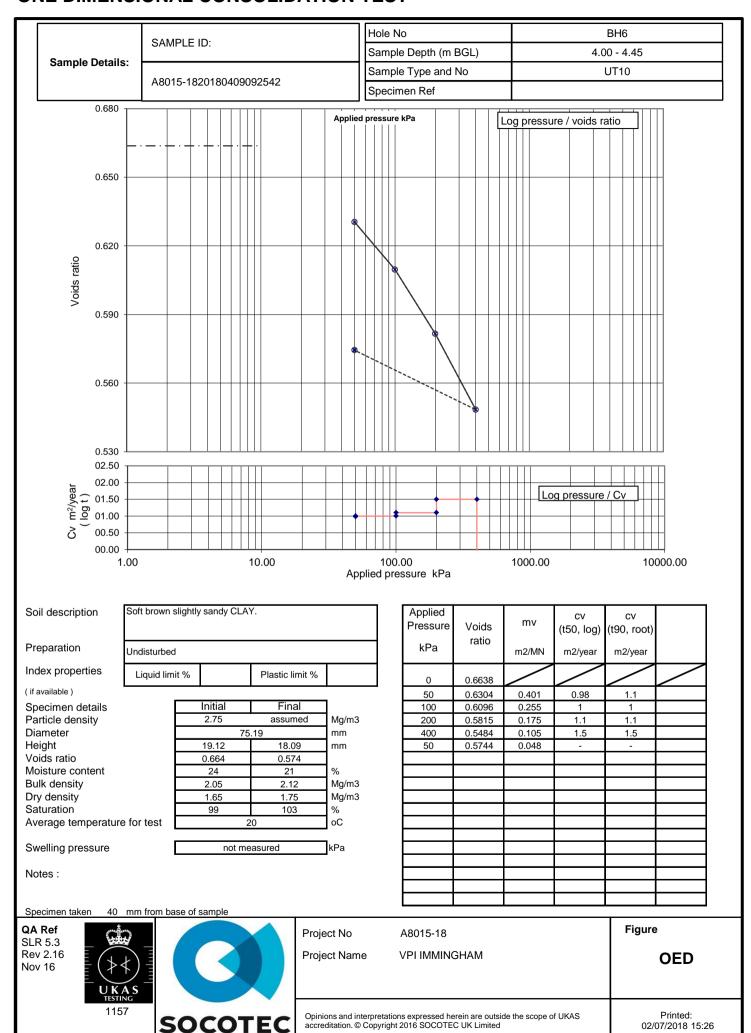
400

800

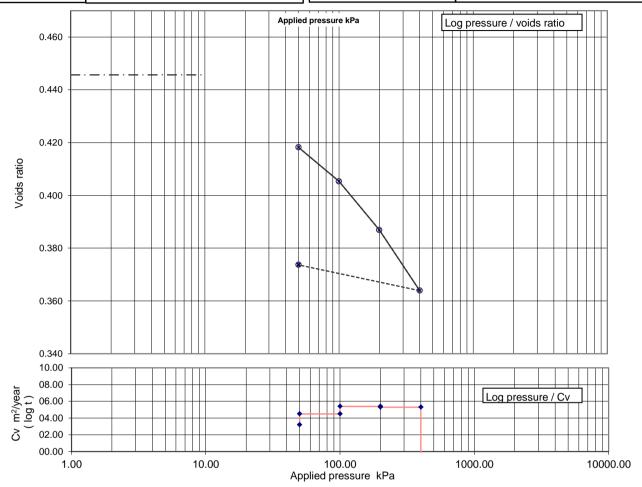
100

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**OED** 



BH6 SAMPLE ID: Sample Depth (m BGL) 9.00 - 9.45 Sample Details: UT19 Sample Type and No A8015-1820180409092658 Specimen Ref



Soil description

Preparation

Index properties

( if available )

Specimen details Particle density Diameter Height Voids ratio Moisture content Bulk density Dry density Saturation

Average temperature for test Swelling pressure

Firm brown slightly sandy slightly gravelly CLAY. Gravel is chalk.			
Undisturbed			
Liquid limit %		Plastic limit %	

Initial	Final	
2.65	assumed	Mg/m3
75	.04	mm
18.96	18.02	mm
0.446	0.374	
17	15	%
2.14	2.21	Mg/m3
1.83	1.93	Mg/m3
98	105	%
2	20	οС

kPa

not measured

Notes:

Specimen taken 10 mm from base of sample

QA Ref **SLR 5.3** Rev 2.16 Nov 16



	Р
	Р
OCOTEC	O a

Project No	A8015-18
Project Name	VPI IMMINGHAM

Figure	•
	OED

C۷

m2/year

3.2

4.5

5.4

mv

m2/MN

0.380

0.182

0.131

0.083

0.020

Voids

ratio

0.4456

0.4182

0.4053

0.3868

0.3639

0.3737

CV

m2/year

3.3

4.8

5.7

(t50, log) (t90, root)

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Applied

Pressure

kPa

50

100

200

400

50

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# Determination of consolidation properties using a hydraulic cell BS 1377: Part 6: 1990

- [		SAMPLE ID:		<u>  [</u>	Hole No				BH2		
ı	Sample	SAIVIPLE ID.			Sample Dep	th (m BGL)		1.2	20 - 1.65		
	Details:				Sample Typ	e and No			UT7		
		A8015-182018041301142	28		Specimen Ref						
L	Specimen	I Firm brown slightly sandy sli	ightly g								
	Description										
	Test Method	BS 1377: Part 6: 1990, claus	se 3.7				Da	ite of test	26/0	06/2018	
PE	ECIMEN DETAILS	Type of sample Preparation		Undisturbe	d						
		Treparation					Initial	Final			
		Height					Initial 19.32	ГШа	mm		
		Diameter					71.94		mm		
		Bulk density					2.08	3.52	Mg/m3		
		Moisture content					18.0	23.0	%		
		Dry density					1.76	2.67	Mg/m3		
		Voids Ratio					0.502				
		Degree of Saturation					95		%		
		Particle density					2.65		Mg/m3	Assumed	
W	ELLING	Swelling pressure							kPa		
		Water taken in during	swellin	g stage					ml		
	URATION	Call massacras in ansacras					ı	50	Tun-		
ac	k pressure	Cell pressure incremen	nts						kPa		
		Pressure differential						10	kPa		
		Final diaphragm press	ure					460	kPa		
		Final back pressure						443	kPa		
		Final pore pressure rat	tio, δu	/ δσ				1.00			
		Water taken in during	saturat	ion stage				28.9	ml		
		Voids ratio at end of sa	aturatio	n stage				0.500			
10	NSOLIDATION STA	GES					•				
	Type of drainage	Radial outwards			Centre drai	n ( if applica	able)				
	Type of loading	Free strain			Diameter	( -11	,		mm		
	PWP location	Centre base			Material				ļ		
		Commo Base		<u>.</u>	Method of f	ormation				<u> </u>	
	Stage number		I	1	2	3	4	5		$\neg$	
	Diaphragm pressi	ure		475	500	550	650	500		kPa	
	Back pressure			450	450	450	450	450		kPa	
	Initial Pore pressu	ıre built up		459	476	486	493	362		kPa	
	Final pore pressu			450	450	451	450	450		kPa	
		actual) at end of stage		25	50	99	200	50	1	kPa	
	Voids at start	at one of olago		0.500	0.173	0.173	0.121	0.102	<u> </u>	<b></b>	
	Voids at start			0.300	0.173	0.173	0.121	-0.009		$\dashv$	
									<del>                                     </del>	<b>-</b>	
	PWP dissipation			100	100	97	100	100	<u> </u>	%	
	Settlement in stag			0.37	0.24	0.17	0.29	-0.12	<del>                                     </del>	mm	
	Volume change ir	n stage (water ou	ut = +ve)	14.5	2.6	2.7	1.0	5.8		ml 	
	Mv			7.4	1.6	0.9	0.17	-0.671	<u> </u>	m2/MN	
	Cro			400	1.5	1.4	0.53	0	0	m2/year	
	Csec			0	0	0	0			_	
	CSEC			Settlement, root time, t90	Settlement, root time, t90	Settlement, root time, t90	Settlement, root time, t90				
	Cro method				20.6	21.5	21.0	19.6		оС	
		mperature		20.6	20.0					-	
	Cro method	mperature		20.6	20.0						
	Cro method  Average stage tel  Remarks	mperature	<u> </u> 						Figur	'e	
	Cro method  Average stage tel Remarks  Ref		Pro	20.6 Dject No	A801				Figur	e	
LD	Cro method  Average stage tel  Remarks		Pro	oject No	A801		1		Figur		
LD	Cro method  Average stage tel Remarks  Ref 2,3,5/9		Pro		A801	5-18	1		Figur	HC	
LD	Cro method  Average stage tel Remarks  Ref 2,3,5/9		Pro Pro	oject No	A801	5-18	1		Figur		
LD	Cro method  Average stage tel Remarks  Ref 2,3,5/9	socote C	Pro Pro	oject No oject Name	A801 VPI II	5-18 MMINGHAN	<b>1</b> ditation. ⊚ Copy	right 2017	Figur		

			Hole No		BH2	
Sample	SAMPLE ID:		Sample Depti	n (m BGL)	1.20 - 1.65	
Details:	A 90.1 E 1.92.01.9	0412011429	Sample Type	and No	UT7	
	A8015-182018	0413011426	Specimen Re	f		
hical data			o v Log Effectiv	ve Stress ading stage		
0.60						
0.50		<del></del>		- Initial voids ratio		
0.40						
0.30						
0.20			•	•		
0.10					•	
0.00						
1		10		100		10
-0.10		<del></del>				
-0.20						
-0.30						
-0.40			Effective Stress	kPa		
400						
300						
200						
100						

Voids ratio plotted at effective stress at the end of the stage. Cro plotted at the average effective stress during the stage.

**QA Ref** SLD 3, 5/9 Rev 2.7



Project No	A8015-18
Project Name	VPI IMMINGHAM

rigure	
	HC

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# Determination of consolidation properties using a hydraulic cell BS 1377: Part 6: 1990

		SAMPLE ID:		Hole No			BH4			
	Sample	SAMPLE ID:		Sample Dep	th (m BGL)		2.0	00 - 2.45		
	Details:			Sample Typ	e and No			UT4		
		A8015-1820180418115015		Specimen R						
L	Specimen Description	l		Оросинон то						
		D0.4077 D +0.4000 1 -0.1				l p.		200/	00/0040	
	Test Method	BS 1377: Part 6: 1990, clause 3.				] Da	ate of test	26/0	06/2018	
3PE	CIMEN DETAILS	Type of sample Preparation	Undisturb	ped						
		Height Diameter Bulk density Moisture content Dry density Voids Ratio Degree of Saturation				Initial  18.86 72.13 2.04 22.0 1.67 0.585 100	3.32 25.0 2.41	mm mm Mg/m3 % Mg/m3	<b>[</b>	
SWI	ELLING	Particle density  Swelling pressure  Water taken in during swell	ing stage			2.65		Mg/m3 kPa ml	Assumed	
	URATION k pressure	Cell pressure increments Pressure differential Final diaphragm pressure Final back pressure Final pore pressure ratio, δ Water taken in during satur Voids ratio at end of satura	ation stage				50 10 310 298 0.99 27.2 0.560	kPa kPa kPa kPa ml		
10	NSOLIDATION STA	GES					0.000	-1		
	Type of drainage	Radial outwards			n ( if applica	able)		7		
	Type of loading	Free strain		Diameter				mm	_	
	PWP location	Centre base		Material Method of	formation				<u> </u>	
	Stage number		1	2	3	4	5	1	_	
	Diaphragm pressi	ure	325	350	400	500	350		kPa	
	Back pressure		300	300	300	300	300		kPa	
	Initial Pore pressu	ure built up	315	321	335	330	255	1	kPa	
	Final pore pressu		300	300	300	300	294		kPa	
		actual) at end of stage	25	50	100	200	56		kPa	
	Voids at start	-	0.560	0.312	0.312	0.235	0.182			
	Voids at end		0.388	0.312	0.235	0.182	0.102		_]	
	PWP dissipation		100	100	100	100	86		%	
	Settlement in stag		0.00	0.11	0.26	0.21	-0.09		mm	
	Volume change in	n stage (water out = +ve	· —	3.7	3.7	2.6	3.9		ml	
	Mv		4.4	2.2	1.2	0.43	-0.471		m2/MN	
	Cro		0	36	8.6	7	0	0	m2/year	
	Csec Cro method		Settlement		Settlement,	Settlement,			1	
	Average stage ter	mnerature	root time, t9	o root time, t90 20.8	root time, t90	root time, t90 21.1	21.8	-	oC	
	Remarks	IIpolatule	21.1	20.0	20.3	Z1.1	21.0			
LD	<b>Ref</b> 3, 5/9 2.7		Project No Project Nam	A801 le VPH	5-18 MMINGHAN	Л		Figur	HC	
		SOCOTEC	Test carried out	outside the scope	of UKAS accre	ditation. © Copy	right 2017	31/0	Printed: 07/2018 12:23	

## Determination of consolidation properties using a hydraulic cell

		SAMPLE II	<b>.</b>		Hole No			BH4	BH4			
	Sample	SAMPLE	J.		Sa	nple Dept	h (m BGL)		2.00 - 2.			
	Details:	A8015-182	01804181150	015		mple Type			UT4			
		A0013-102	A8015-1820180418115015			ecimen Re	ef					
aph	nical data		V		s <b>Ratio v Lo</b> ç ●Loading stage		ve Stress ading stage					
	0.60				- Loading stage	701110	ading stage					
	0.55			Ш								
	0.50						:- Initial voic	s ratio —				
	0.45											
0	0.40			++								
Voids Ratio	0.35											
ō >	0.30											
	0.25											
	0.20			+								
	0.15			+								
	0.10			10			11	00			1000	
				10		Stress					1000	
	40											
_	30											
CIO IIIAyeai	20 -											
2	10											
	0 1			10		e stress		00			1000	
	Voids ratio plott Cro plotted at th											
Re	<b>ef</b> , 5/9			1	Project No Project Name	A8015 VPI IM	5-18 IMINGHAM		F	igure HC	;	
		500	OTE		Test carried out outsid	le the scope	of UKAS accredita	ation. © Copyright 20	017	Printe 31/07/2018		

# Determination of consolidation properties using a hydraulic cell BS 1377: Part 6: 1990

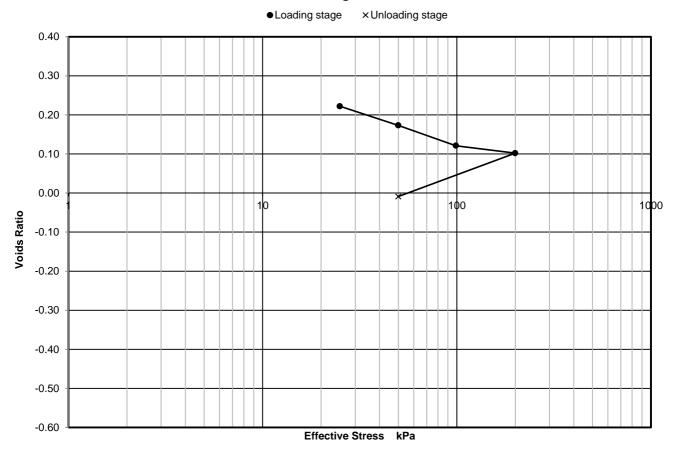
- 1		SAMPLE ID:		<u>  [</u>	Hole No			BH5			
	Sample	SAMPLE ID:		Sample Depth (m BGL)				1.20 - 1.65			
	Details:				Sample Typ	e and No			UT7		
		A8015-18201804181204	<b>l</b> 19	-     ⊢	Specimen Ref						
L		Orticle from horses of ability	L		•	<u> </u>					
	Specimen Description	Soft to firm brown slightly s	andy sii	gntiy gravei	IIY CLAY.						
	Test Method	BS 1377: Part 6: 1990, cla	use 3.7				Da	ite of test	11/0	07/2018	
PE	CIMEN DETAILS	Type of sample Preparation		Undisturbe	d						
		Пераганоп	ļ				Initial	Final			
		Height					18.55	FIIIdI	mm		
		Diameter Bulk density					72.06 2.24	4.58	mm Mg/m3		
		Moisture content					15.0	20.0	%		
		Dry density					1.95	4.02	Mg/m3		
		Voids Ratio					0.359		_Ivig/1113		
		Degree of Saturation					111		%		
		Particle density					2.65		Mg/m3	Assumed	
WE	ELLING	Swelling pressure							kPa		
		Water taken in during	g swellin	g stage					ml		
	URATION pressure	Cell pressure increme	onto					50	kPa		
aun	piessuie	Pressure differential	CIIIS					10	kPa		
		Final diaphragm pres	curo					360	kPa		
			sure					341	kPa		
		Final back pressure	otio Su	/ Sa				0.96	KFa		
		Final pore pressure ra Water taken in during						22.3	-l <sub>ml</sub>		
		Voids ratio at end of		-				0.290	┨''''		
· O N	ISOLIDATION STA		Saturatio	n stage			ı	0.290	J		
OIN	Type of drainage	Radial outwards			Contro droi	n ( if applica	abla)				
	• • • • • • • • • • • • • • • • • • • •	Free strain				ii ( ii appiica	ibie)		٦		
	Type of loading PWP location				Diameter				mm		
	PWP location	Centre base			Material Method of f	ormation					
	Ota wa washan		ŀ	4	0	2	4			_	
	Stage number Diaphragm pressi	uro		1 375	2 400	3 450	550	5 400		⊢	
							330			IVDa	
		uie					350			kPa	
	Back pressure			350	350	350	350 422	350		kPa	
	Initial Pore pressu	ure built up		350 356	350 369	350 385	422	350 246		kPa kPa	
	Initial Pore pressu	ure built up re		350 356 350	350 369 350	350 385 350	422 350	350 246 350		kPa kPa kPa	
	Initial Pore pressu Final pore pressu Effective stress (a	ure built up		350 356 350 25	350 369 350 50	350 385 350 100	422 350 200	350 246 350 50		kPa kPa	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start	ure built up re		350 356 350 25 0.290	350 369 350 50 0.145	350 385 350 100 0.145	422 350 200 0.093	350 246 350 50 0.041		kPa kPa kPa	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end	ure built up re		350 356 350 25 0.290 0.215	350 369 350 50 0.145 0.145	350 385 350 100 0.145 0.093	422 350 200 0.093 0.041	350 246 350 50 0.041 -0.340		kPa kPa kPa kPa kPa	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation	ure built up re actual) at end of stage		350 356 350 25 0.290 0.215 100	350 369 350 50 0.145 0.145 100	350 385 350 100 0.145 0.093 100	422 350 200 0.093 0.041 100	350 246 350 50 0.041 -0.340 100		kPa kPa kPa kPa kPa	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag	ure built up re actual) at end of stage ge		350 356 350 25 0.290 0.215 100 0.01	350 369 350 50 0.145 0.145 100 0.19	350 385 350 100 0.145 0.093 100 0.22	422 350 200 0.093 0.041 100 0.22	350 246 350 50 0.041 -0.340 100 -0.62		kPa kPa kPa kPa kPa %	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in	ure built up re actual) at end of stage ge	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2	350 369 350 50 0.145 0.145 100 0.19 3.9	350 385 350 100 0.145 0.093 100 0.22 2.9	422 350 200 0.093 0.041 100 0.22 2.9	350 246 350 50 0.041 -0.340 100 -0.62 21.2		kPa kPa kPa kPa % mm ml	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv	ure built up re actual) at end of stage ge	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91	422 350 200 0.093 0.041 100 0.22 2.9 0.48	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44		kPa kPa kPa kPa kPa mm ml m2/MN	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv Cro	ure built up re actual) at end of stage ge	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7	350 246 350 50 0.041 -0.340 100 -0.62 21.2	0	kPa kPa kPa kPa % mm ml	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv Cro Csec	ure built up re actual) at end of stage ge	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44	0	kPa kPa kPa kPa kPa % mm ml m2/MN	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv Cro	ure built up re actual) at end of stage ge	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44	0	kPa kPa kPa kPa kPa mm ml m2/MN	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv Cro Csec	ure built up re actual) at end of stage ge n stage (water o	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44	0	kPa kPa kPa kPa kPa % mm ml m2/MN	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change in Mv Cro Csec Cro method	ure built up re actual) at end of stage ge n stage (water o	out = +ve)	350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0	0	kPa kPa kPa kPa % mm ml m2/MN m2/year	
ı A	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change ir Mv Cro Csec Cro method Average stage ter Remarks	ure built up re actual) at end of stage ge n stage (water o		350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190 20.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190 20.1	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190 20.3	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0		kPa kPa kPa kPa % mm ml m2/MN m2/year	
<b>∂A F</b>	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change ir Mv Cro Csec Cro method Average stage ter Remarks	ure built up re actual) at end of stage  ge n stage (water of		350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190 20.3	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0	O Figur	kPa kPa kPa kPa % mm ml m2/MN m2/year	
LD	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change ir Mv Cro Csec Cro method Average stage ter Remarks  Ref 3, 5/9	ure built up re actual) at end of stage  ge n stage (water of		350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190 20.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190 20.1	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190 20.3	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90 21.3	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0		kPa kPa kPa kPa % mm ml m2/MN m2/year	
LD	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change ir Mv Cro Csec Cro method Average stage ter Remarks  Ref 3, 5/9	ure built up re actual) at end of stage  ge n stage (water of		350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190 20.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190 20.1	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190 20.3	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90 21.3	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0		kPa kPa kPa kPa % mm ml m2/MN m2/year	
	Initial Pore pressu Final pore pressu Effective stress (a Voids at start Voids at end PWP dissipation Settlement in stag Volume change ir Mv Cro Csec Cro method Average stage ter Remarks  Ref 3, 5/9	ure built up re actual) at end of stage ge n stage (water o		350 356 350 25 0.290 0.215 100 0.01 4.2 2.3 1.3 0 Settlement, root time, 190 20.3	350 369 350 50 0.145 0.145 100 0.19 3.9 2.3 29 0 Settlement, root time, 190 20.1	350 385 350 100 0.145 0.093 100 0.22 2.9 0.91 19 0 Settlement, root time, 190 20.3	422 350 200 0.093 0.041 100 0.22 2.9 0.48 2.7 0 Settlement, root time, t90 21.3	350 246 350 50 0.041 -0.340 100 -0.62 21.2 -2.44 0		kPa kPa kPa kPa % mm ml m2/MN m2/year	

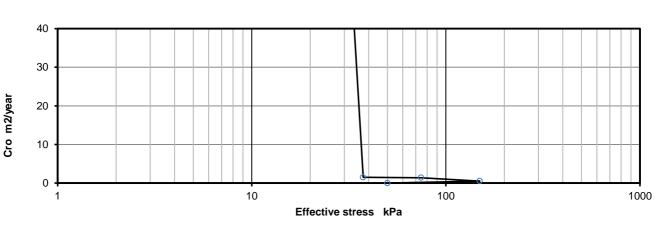
# Determination of consolidation properties using a hydraulic cell BS 1377: Part 6: 1990

	CAMPLE ID.	Hole No	BH5
Sample	SAMPLE ID:	Sample Depth (m BGL)	1.20 - 1.65
Details:	A8015-1820180418120419	Sample Type and No	UT7
	A6015-1620180418120419	Specimen Ref	

#### **Graphical data**

#### Voids Ratio v Log Effective Stress





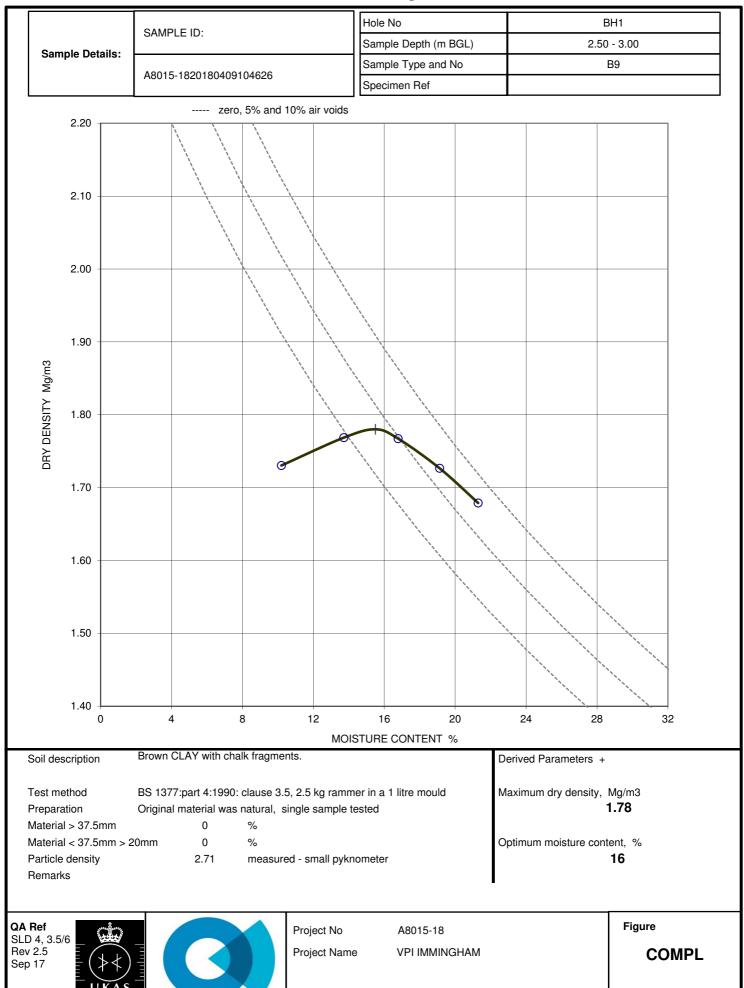
Voids ratio plotted at effective stress at the end of the stage. Cro plotted at the average effective stress during the stage.

QA Ref
SLD 3, 5/9
Rev 2.7



Project No	A8015-18	Figure
Project Name	VPI IMMINGHAM	HC

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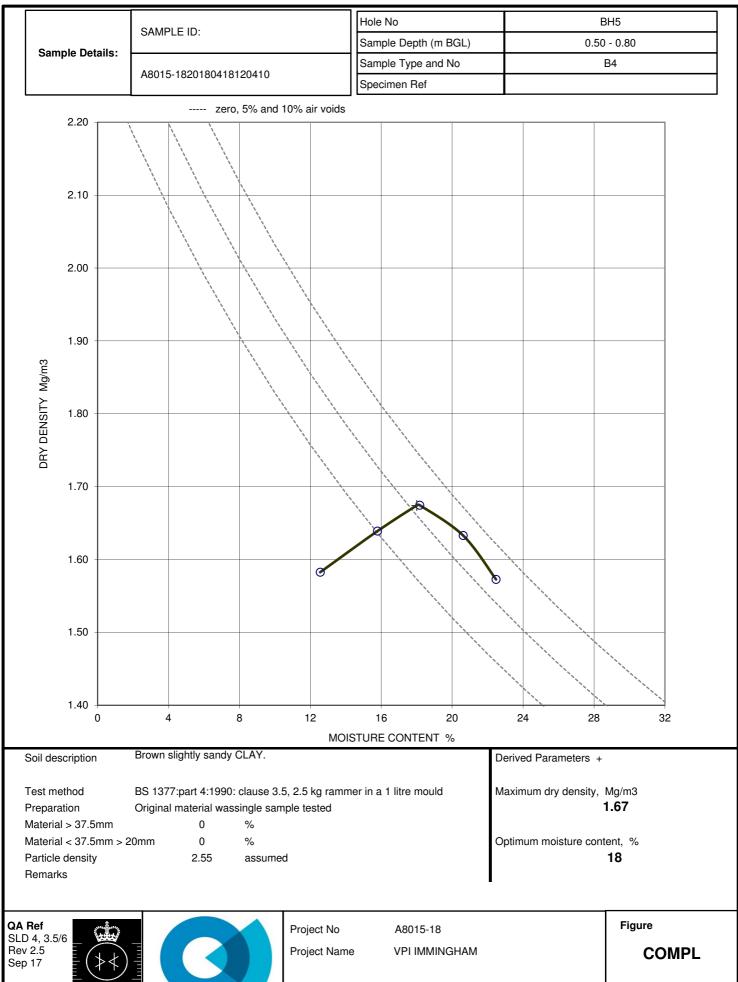


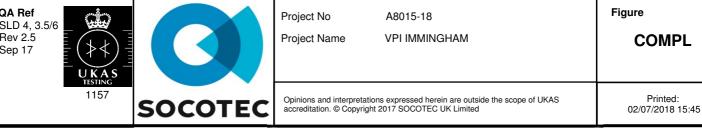
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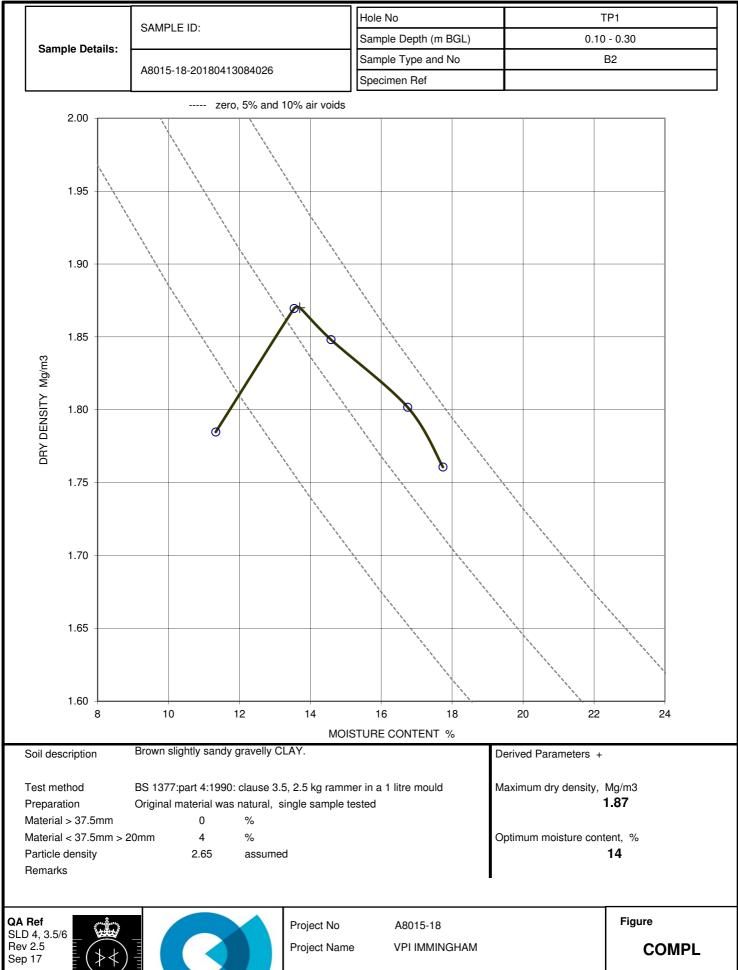
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02/07/2018 15:44



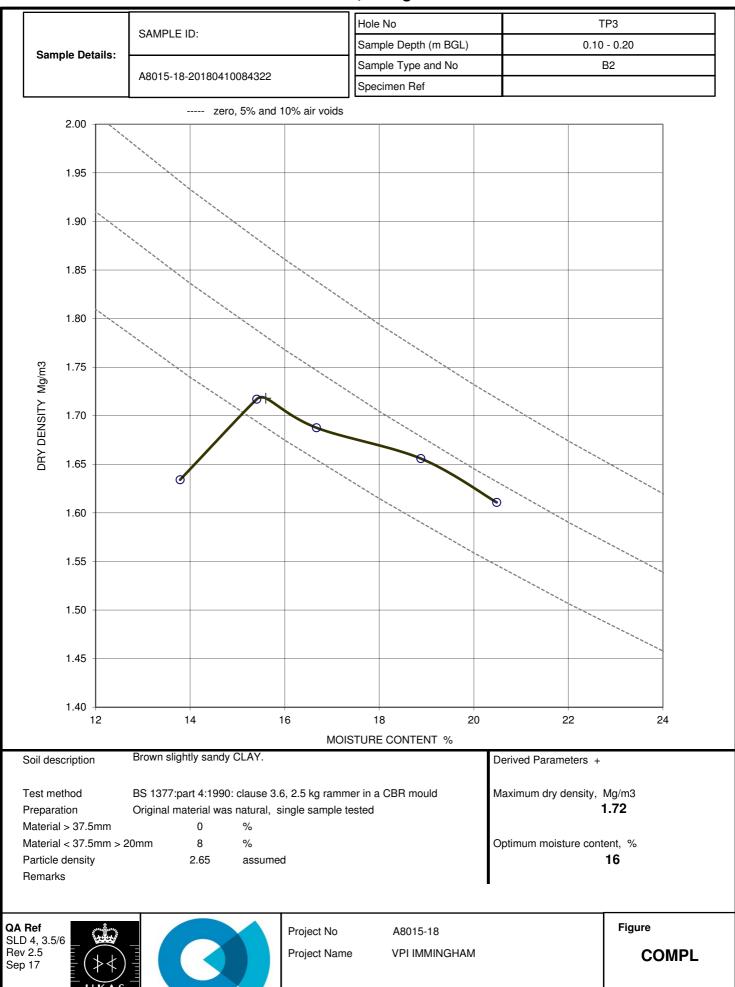






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Printed: 02/07/2018 15:45

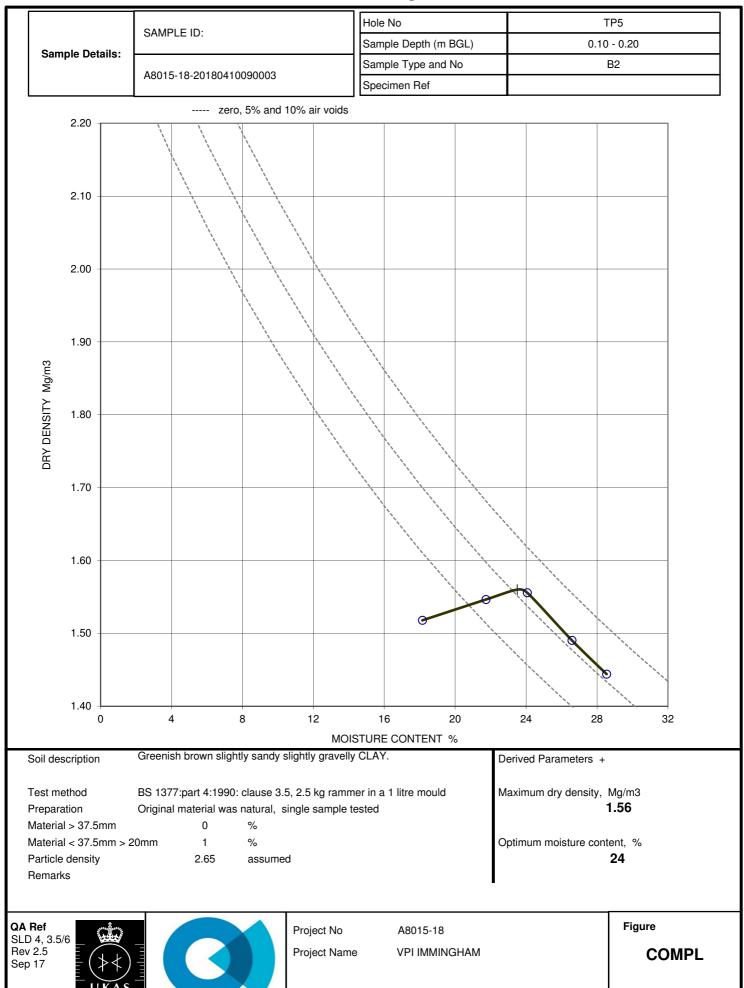


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05/07/2018 11:42

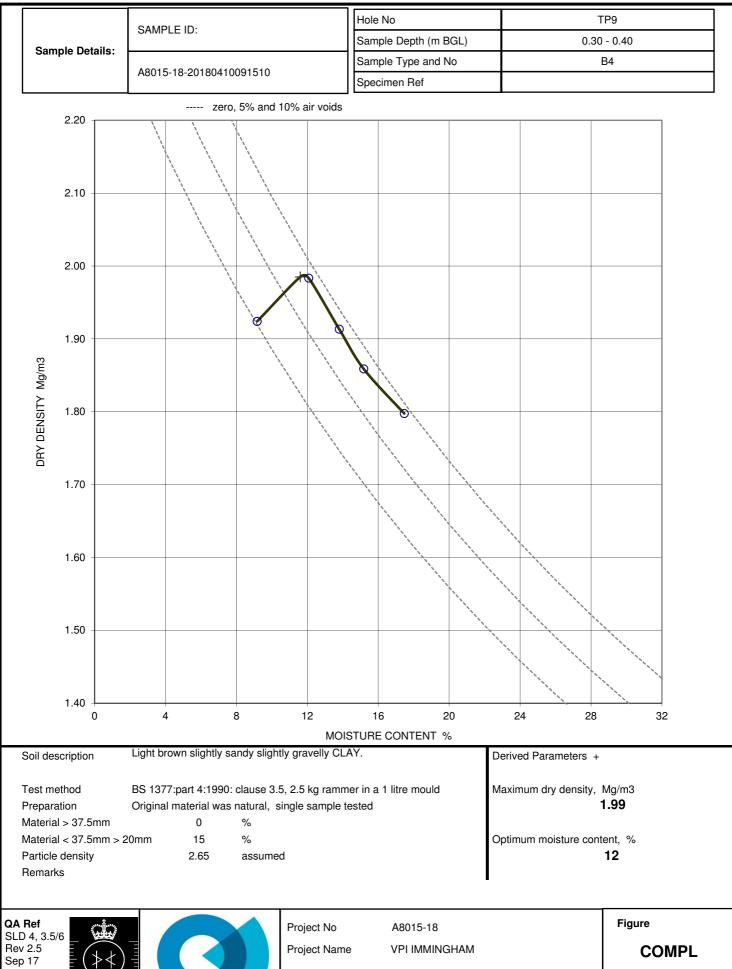


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02/07/2018 15:46

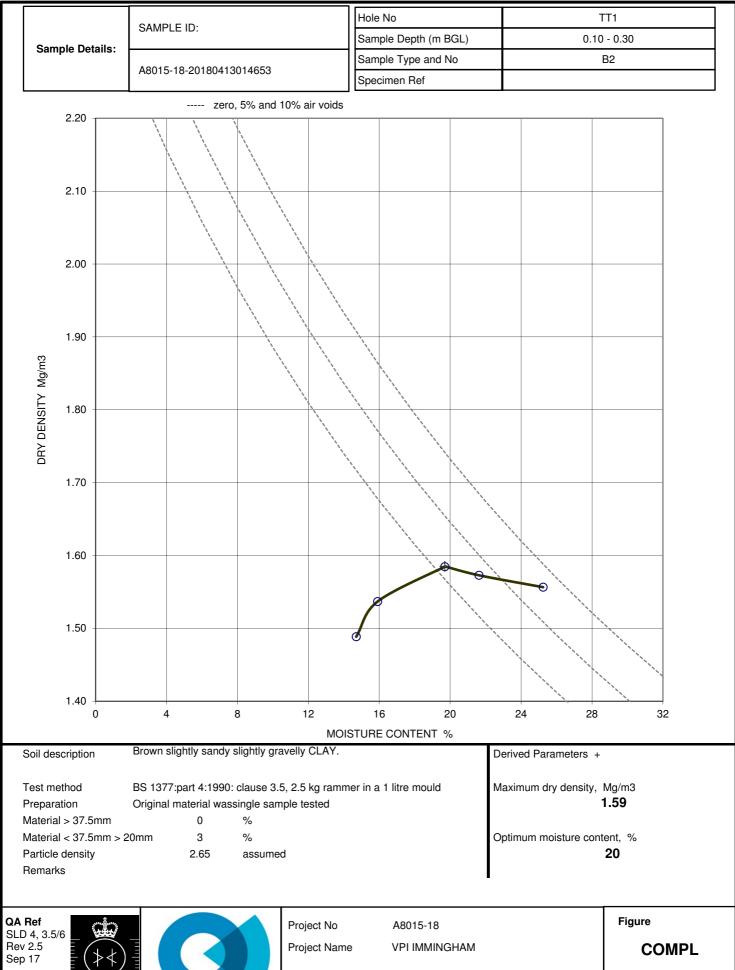






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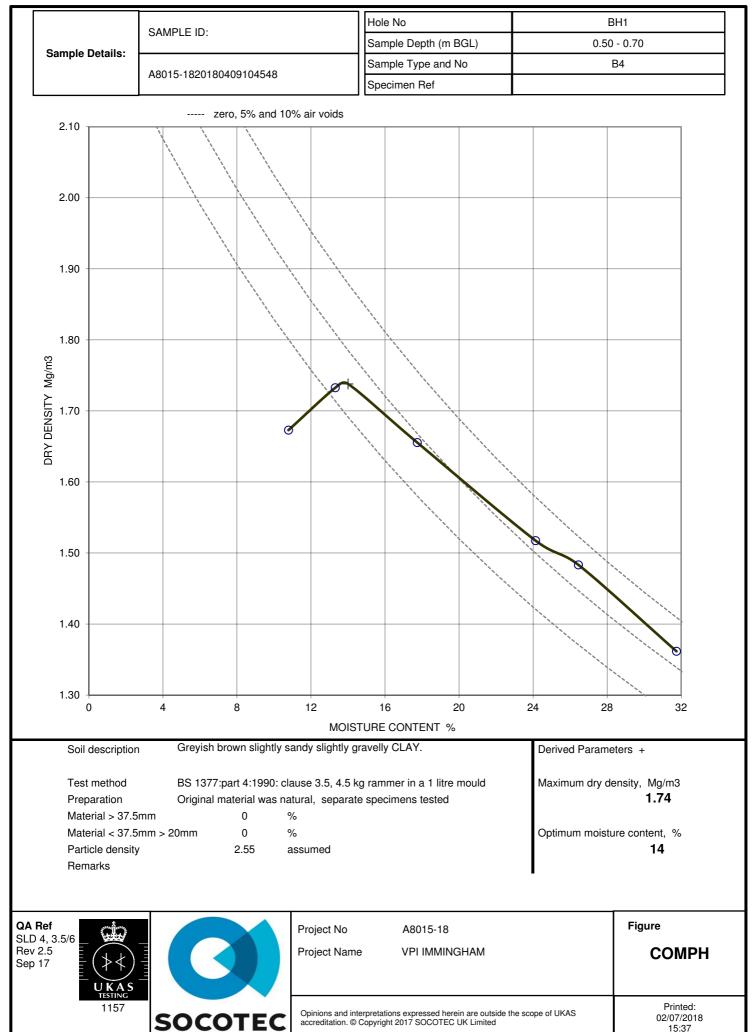




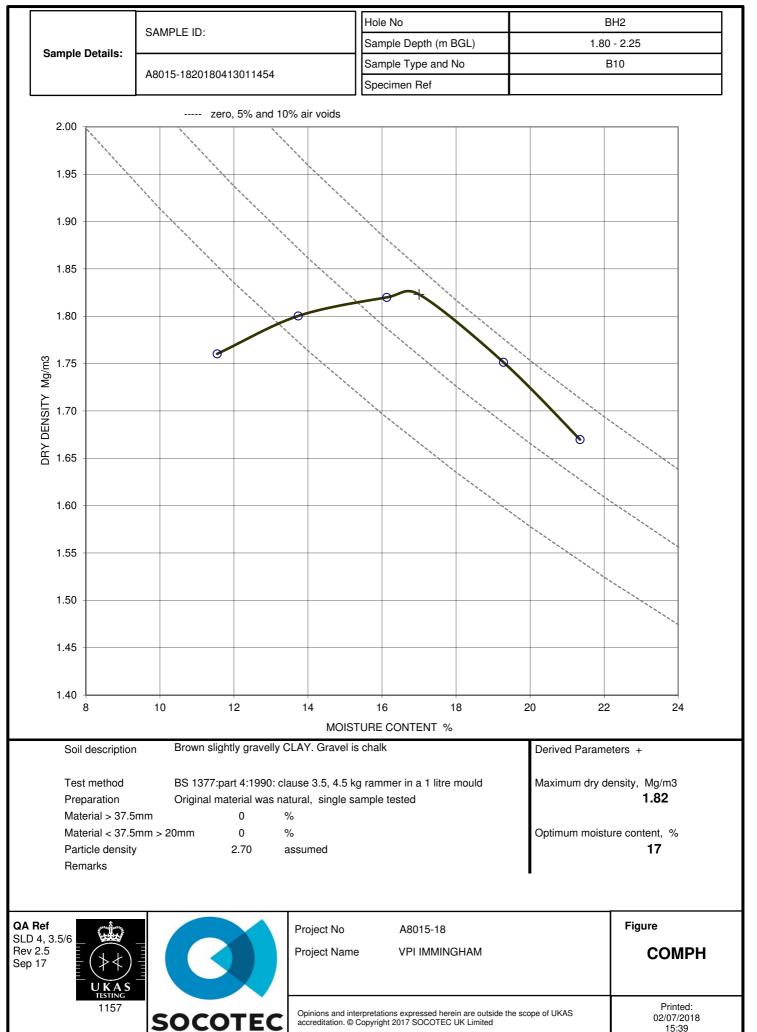
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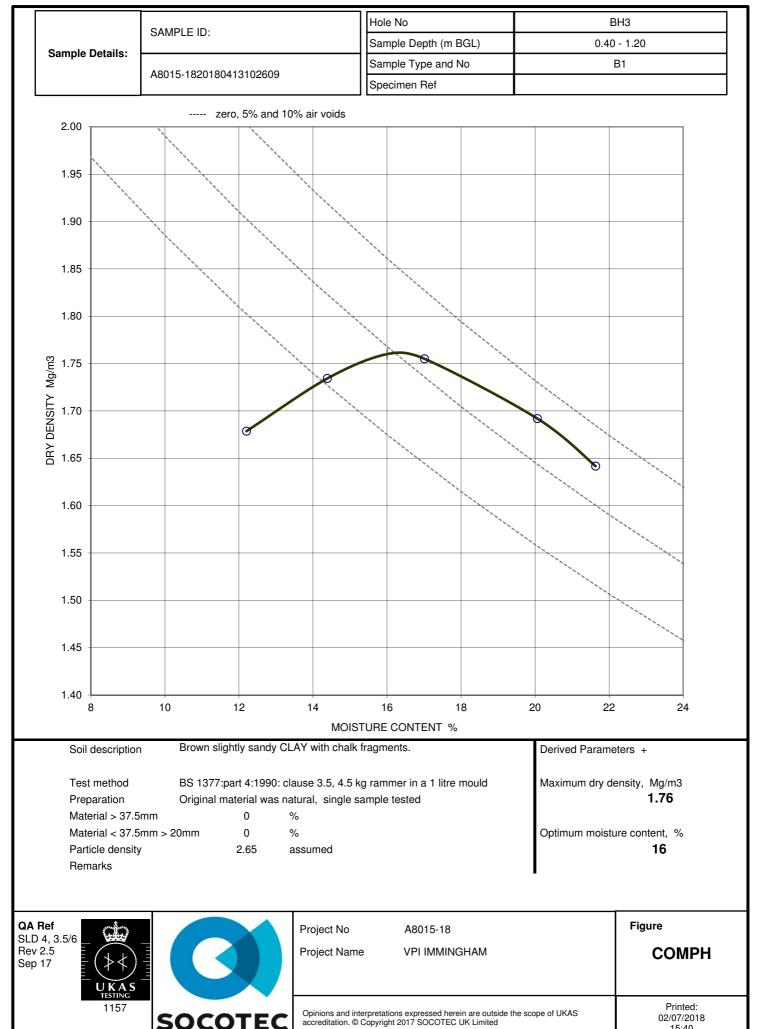


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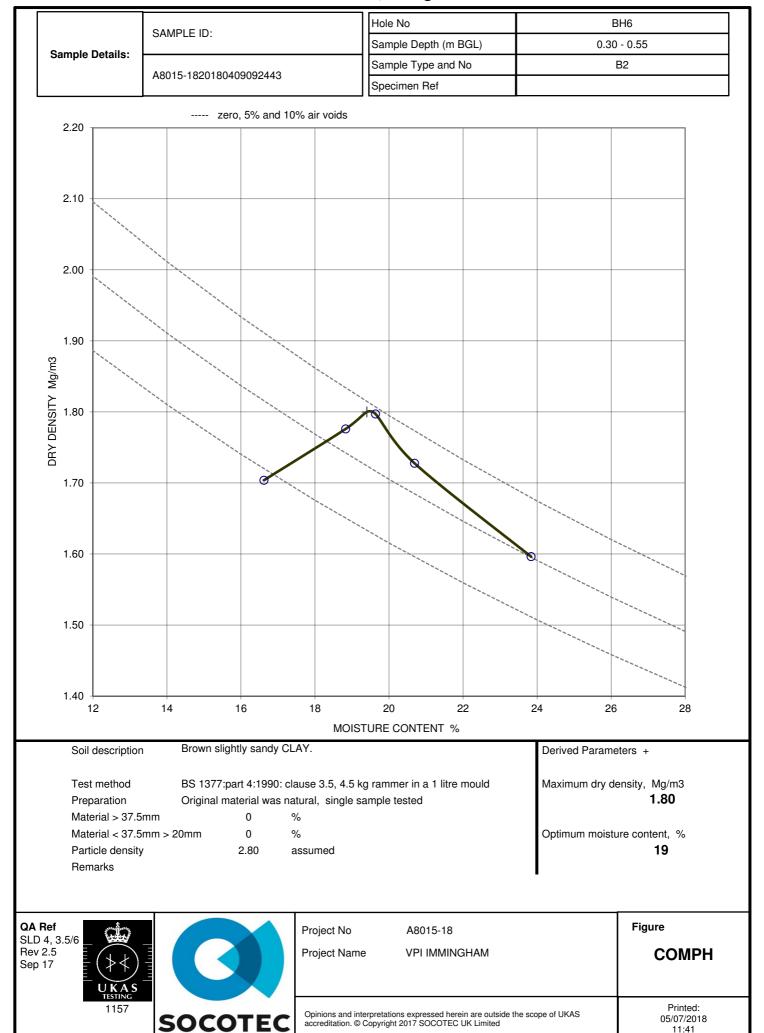


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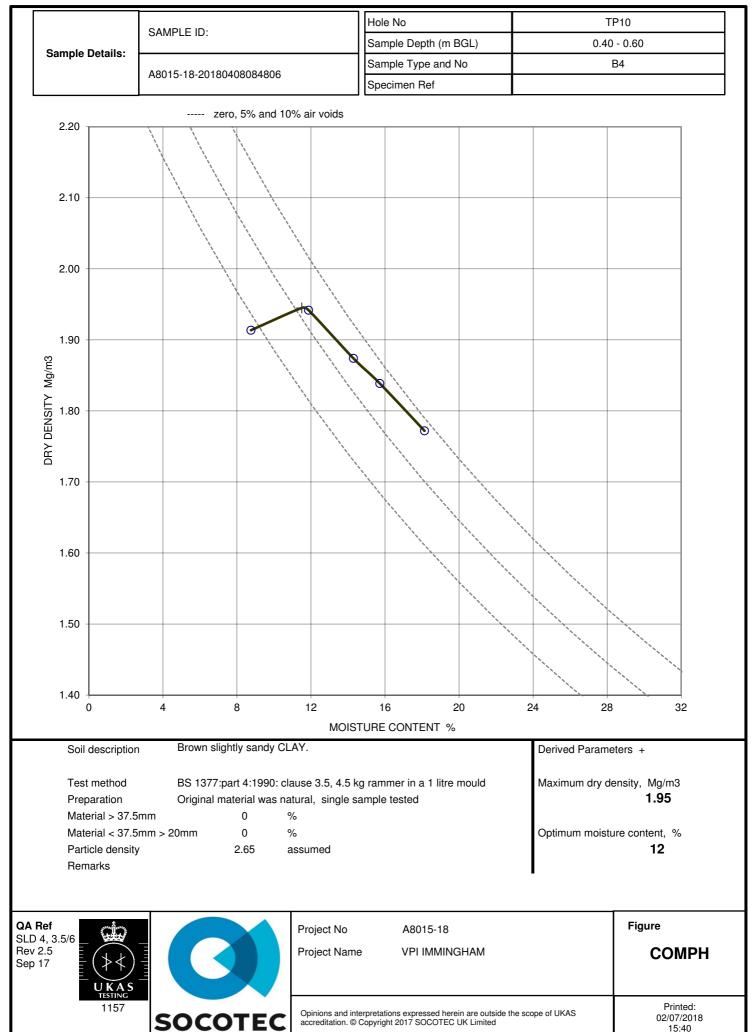
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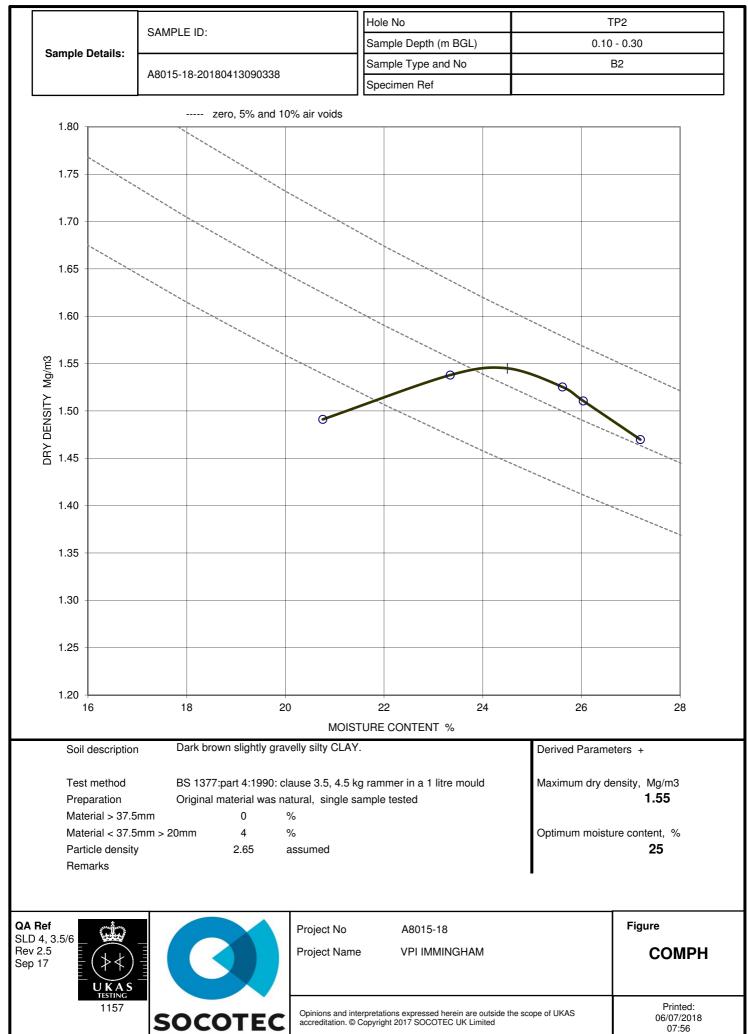
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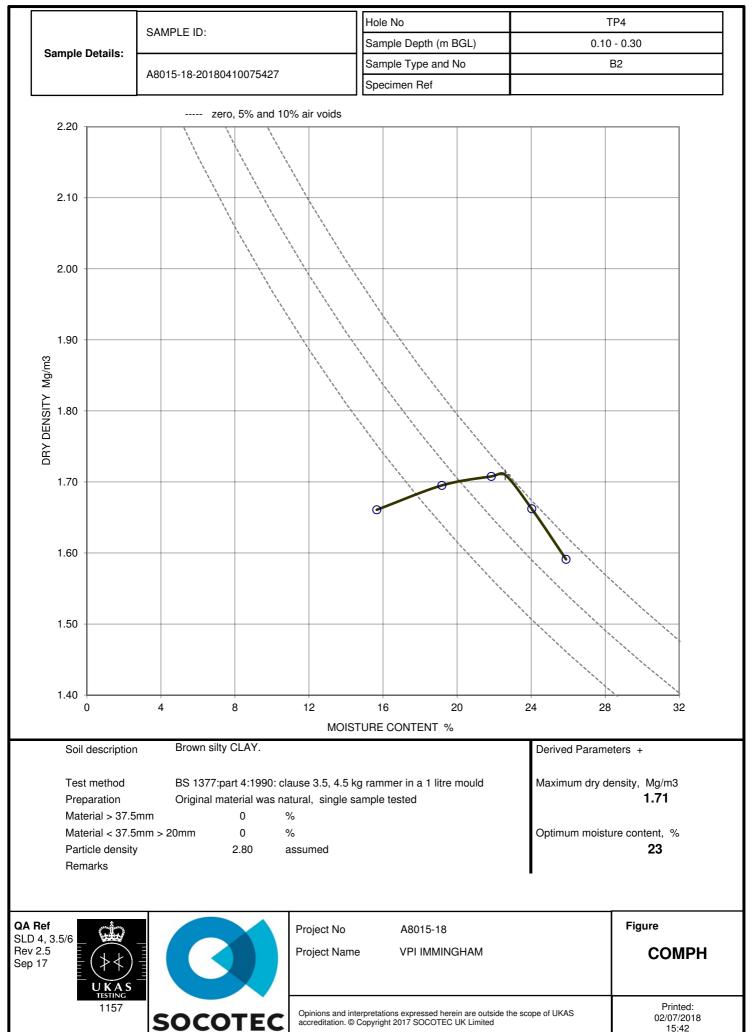


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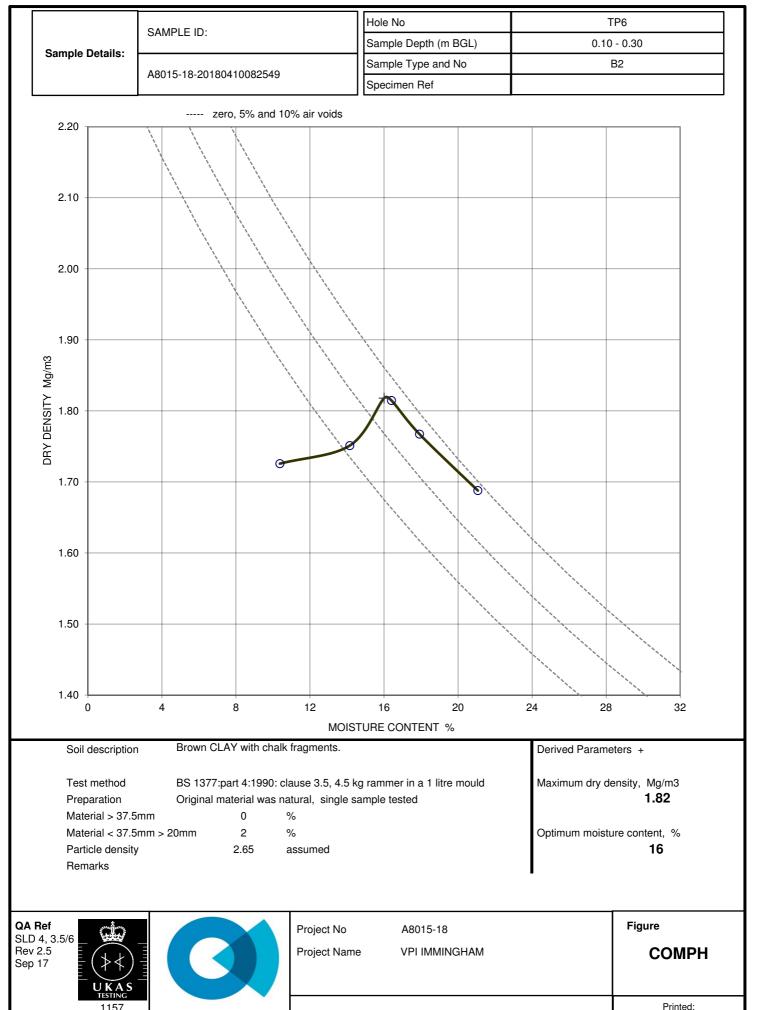


15:40





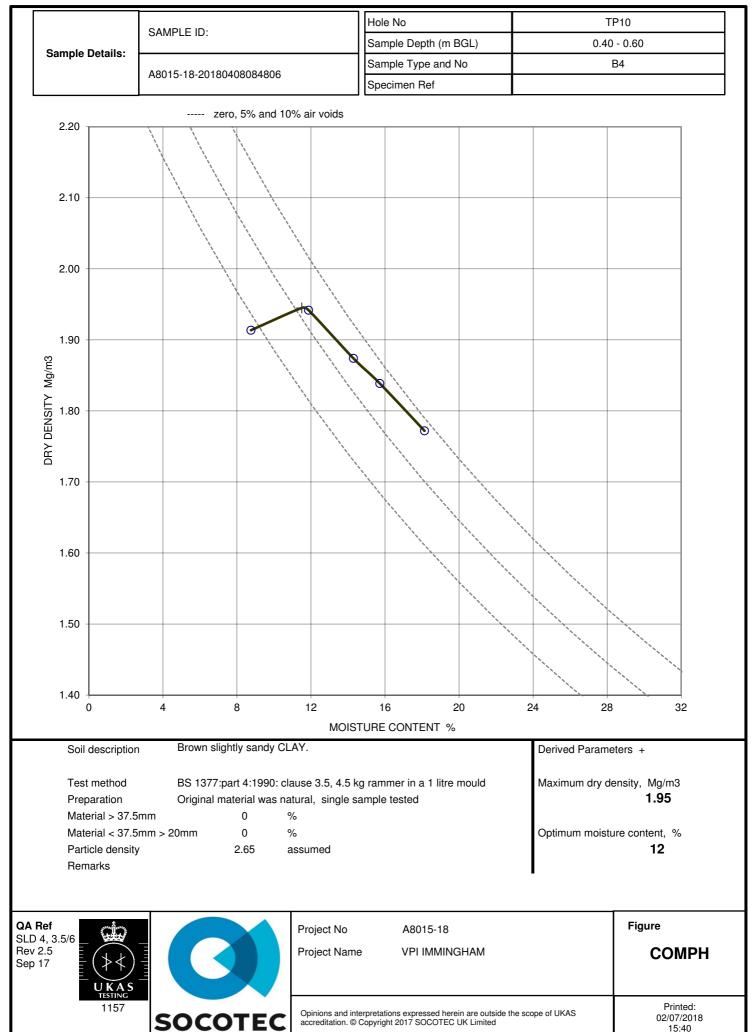
15:42



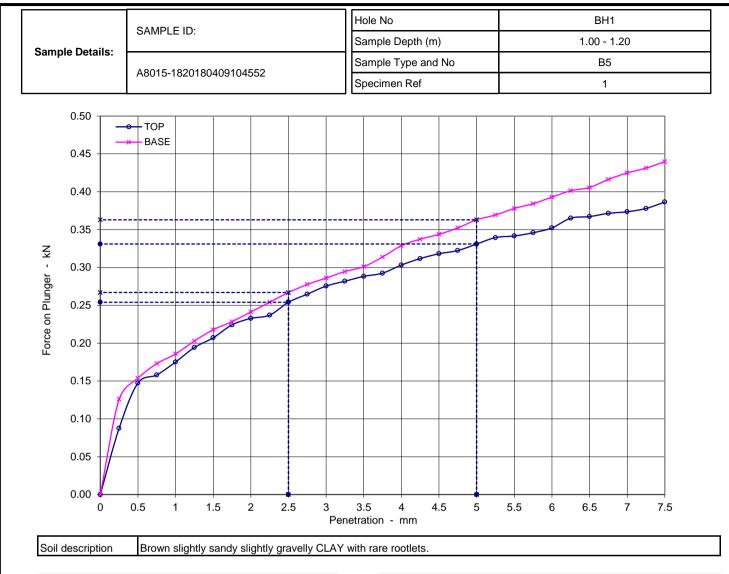
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02/07/2018 15:42

SOCOTEC



15:40



Test Conditions		
Sample Retained on 20 mm sieve	%	27

	Method of Compaction			
Preparation	Recompacted - Rammer compaction with specified effort ( 4.5kg )			
гера	Soaked test NO			
Д	Soaking Period days	N/A		
	Amount of Swell mm	N/A		

Surcharge applied	kg	16
	kPa	10

Notes	
140162	

Sample Conditions				
Initial Moisture Content	%	22.0		
Bulk Density	Mg/m³	2.02		
Dry Density	Mg/m³	1.66		
Moisture Content - TOP	%	22.0		
Moisture Content - BASE	%	21.0		

Penetration mm	CBR Values %	
Penetration min	TOP	BASE
2.5	1.9	2.0
5	1.7	1.8

Accepted CBR %	1.9	2.0
----------------	-----	-----

QA Ref SLR 2 Rev 2.7 Apr 15



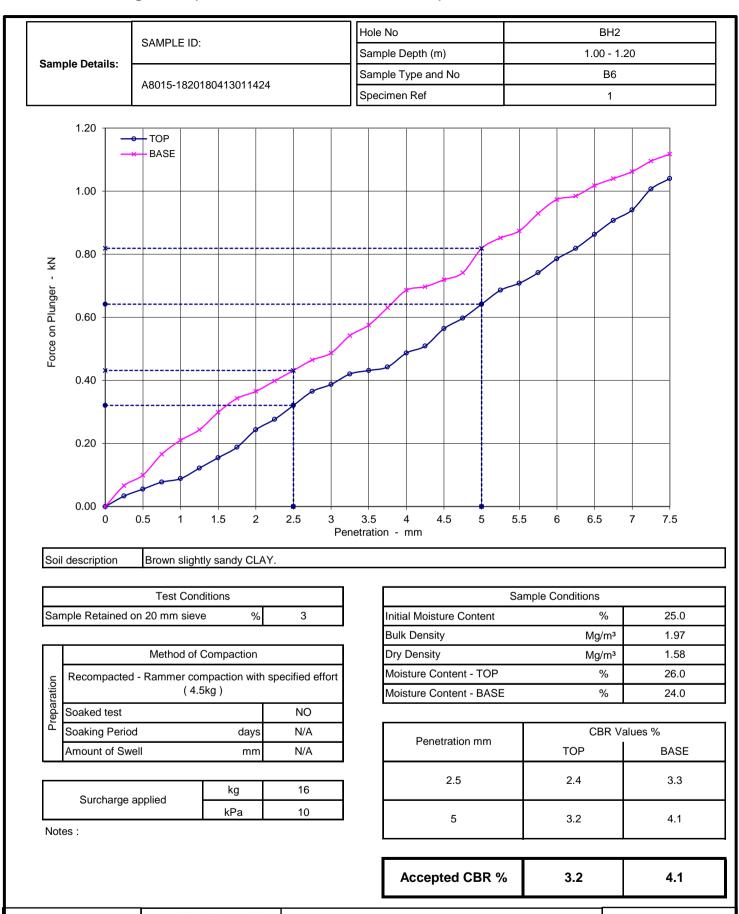
Project	INO
Project	Name

A8015-18 VPI IMMINGHAM Figure

CBR

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QA Ref SLR 2 Rev 2.7 Apr 15

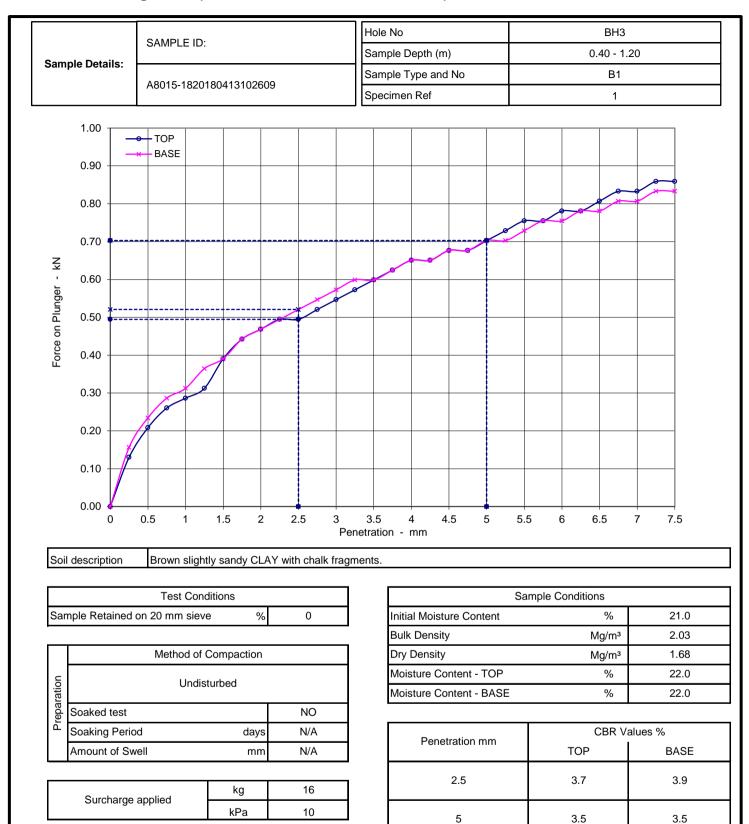
Project No A8015-18
Project Name VPI IMMINGHAM

CBR

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Notes:

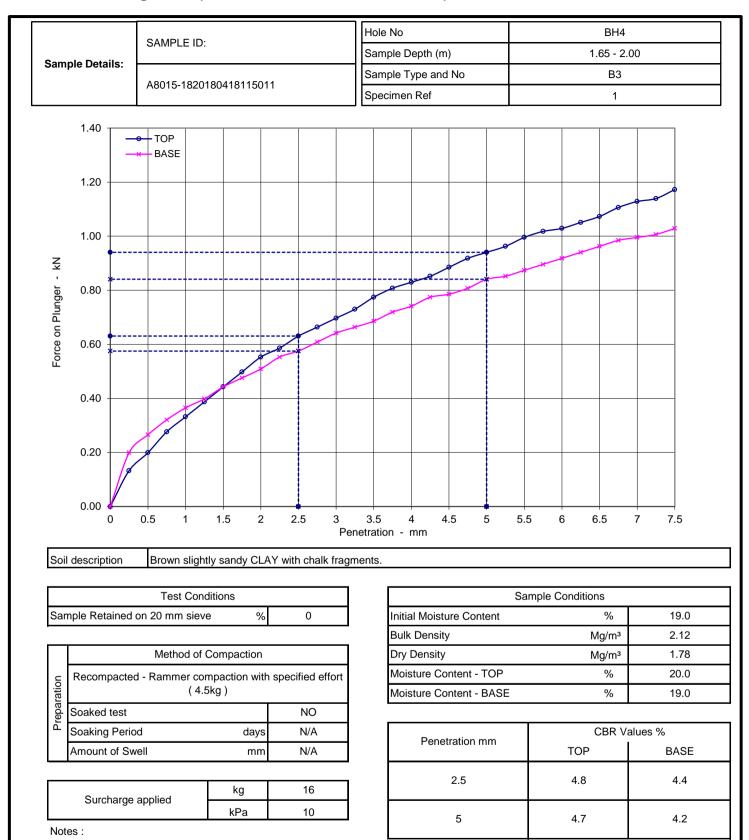


QA Ref SLR 2 Rev 2.7 Apr 15	Project No Project Name	A8015-18 VPI IMMINGHAM	Figure CBR	
	SOCOTEC	Test carried out outside the SOCOTEC UK Limited	e scope of UKAS accreditation. © Copyright 2015	Printed: 14/08/2018 11:15

Accepted CBR %

3.7

3.9

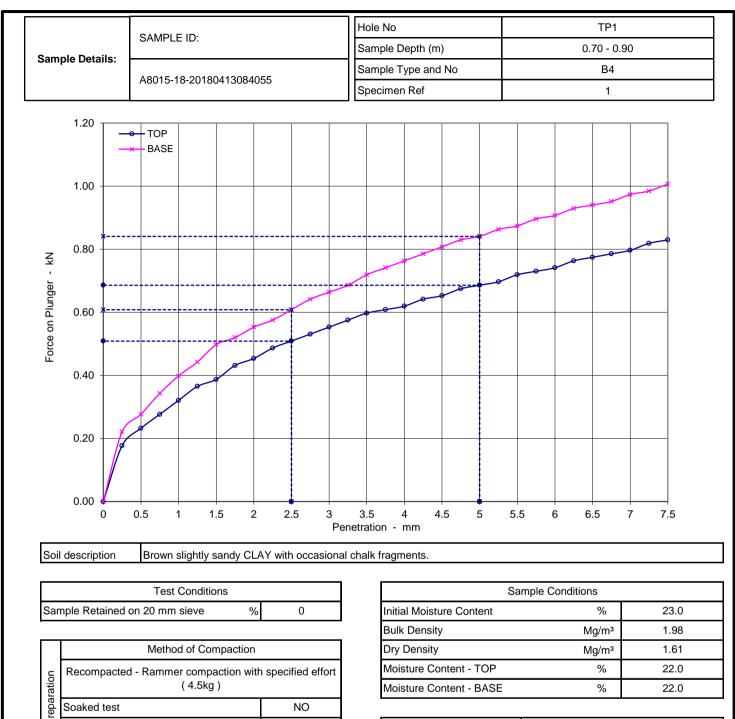


QA Ref SLR 2 Rev 2.7 Apr 15		Project No Project Name	A8015-18 VPI IMMINGHAM	Figure CBR
	SOCOTEC	Test carried out outside the SOCOTEC UK Limited	e scope of UKAS accreditation. © Copyright 2015	Printed: 14/08/2018 11:15

Accepted CBR %

4.8

4.4



22	, i	• ,	
Prepai	Soaked test		NO
٩	Soaking Period	days	N/A
	Amount of Swell	mm	N/A
		1	40

Curcharge applied	kg	16
Surcharge applied	kPa	10

Notes:

Penetration mm	CBR V	alues %
renetiation min	TOP	BASE
2.5	3.9	4.6
5	3.4	4.2

Accepted CBR %	3.9	4.6
----------------	-----	-----

QA Ref SLR 2 Rev 2.7 Apr 15



Project No	
Project Name	

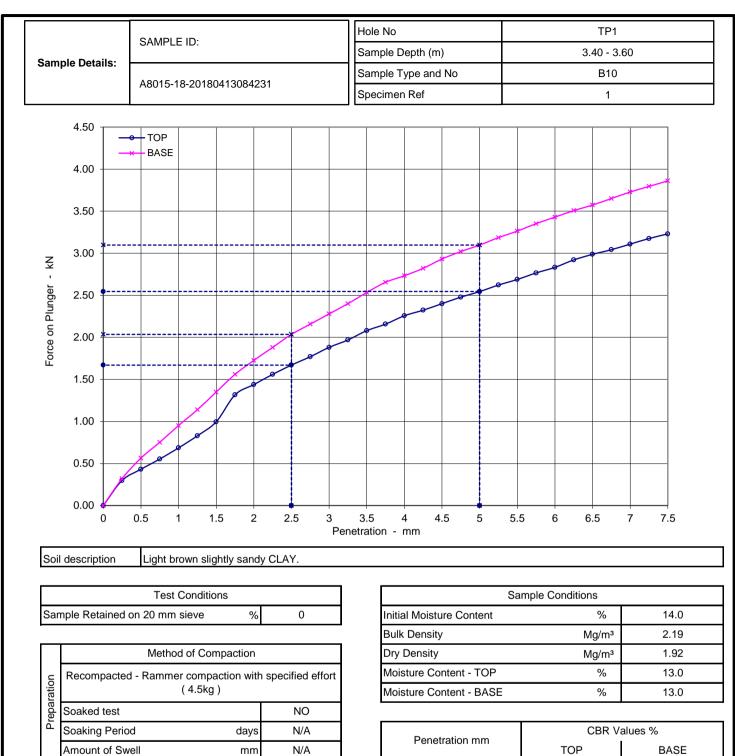
A8015-18
VPI IMMINGHAM

Figure

**CBR** 

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Penetration mm	CBR V	alues %
	TOP	BASE
2.5	13.0	15.0
5	13.0	15.0

Accepted CBR %	13.0	15.0
----------------	------	------

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QA Ref SLR 2 Rev 2.7 Apr 15

Surcharge applied

Notes:

kg

kPa

16

10

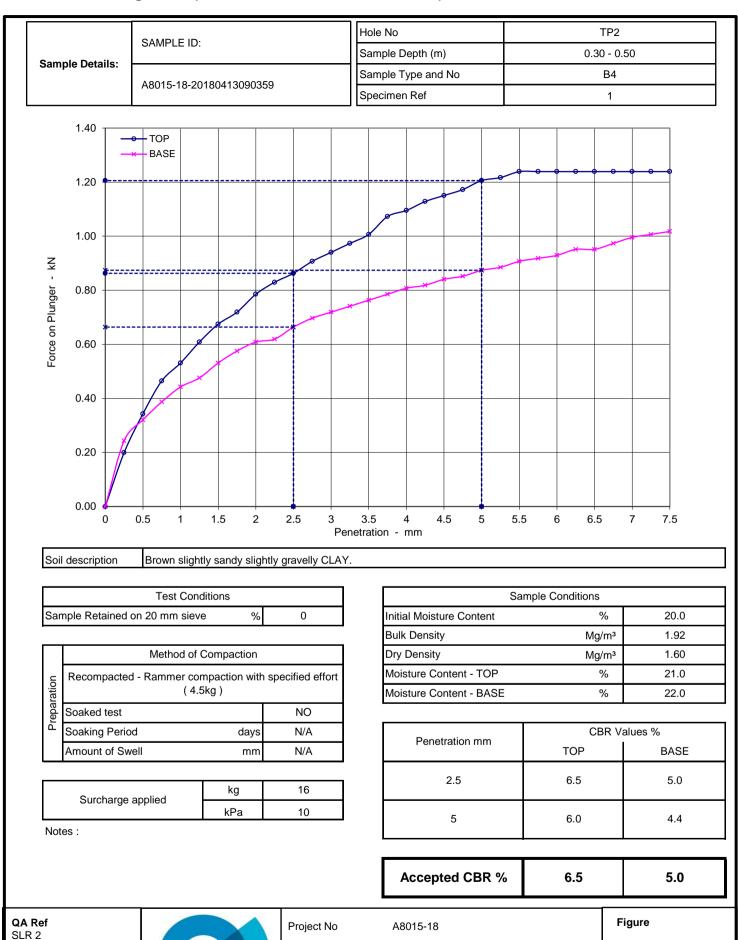
SOCOTEC UK Limited

Project No	A8015-18	Figure
Project Name	VPI IMMINGHAM	CBR

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Rev 2.7

Apr 15



Project Name

SOCOTEC UK Limited

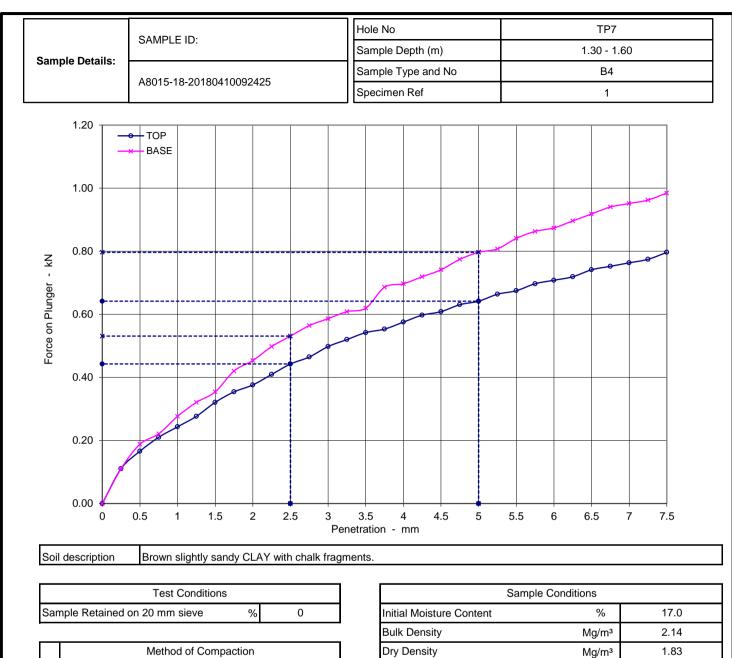
SOCOTEC

**VPI IMMINGHAM** 

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**CBR** 

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	Method of Compaction	
Preparation	Recompacted - Rammer compaction with specified effort ( 4.5kg )	
гера	Soaked test	NO
P	Soaking Period days	N/A
	Amount of Swell mm	N/A

Surcharge applied	kg	16
Suicharge applied	kPa	10

Notes	
140162	

Sample Conditions		
Initial Moisture Content	%	17.0
Bulk Density	Mg/m³	2.14
Dry Density	Mg/m³	1.83
Moisture Content - TOP	%	17.0
Moisture Content - BASE	%	17.0

Penetration mm	CBR Values %	
Penetration mm	TOP	BASE
2.5	3.4	4.0
5	3.2	4.0

Accepted CBR %	3.4	4.0
----------------	-----	-----

QA Ref SLR 2 Rev 2.7 Apr 15



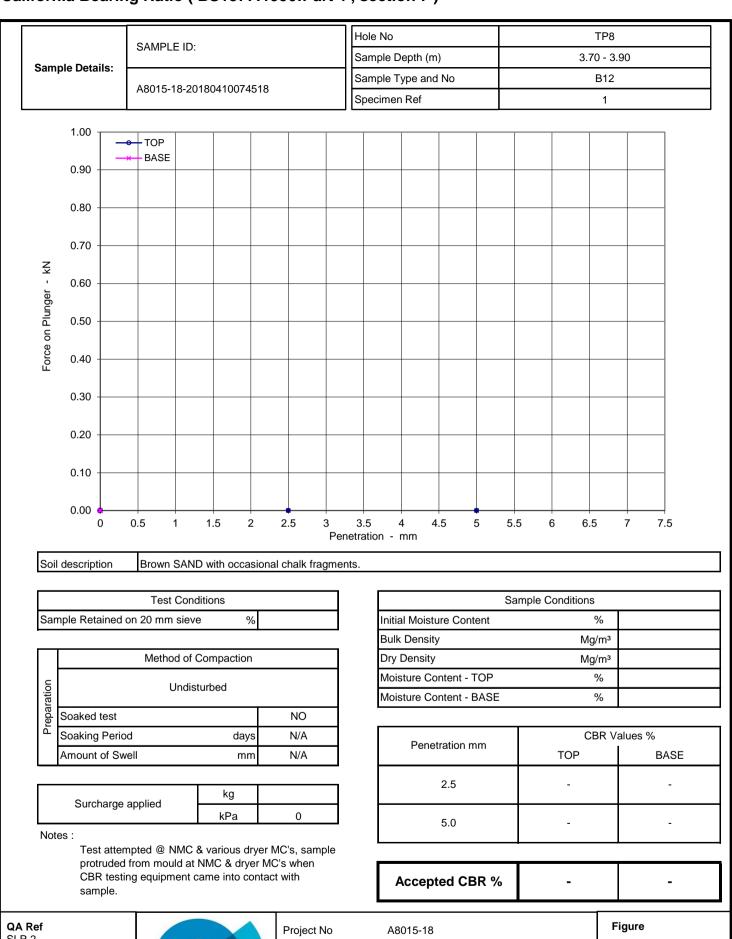
Project	No
Project	Name

A8015-18 VPI IMMINGHAM Figure

**CBR** 

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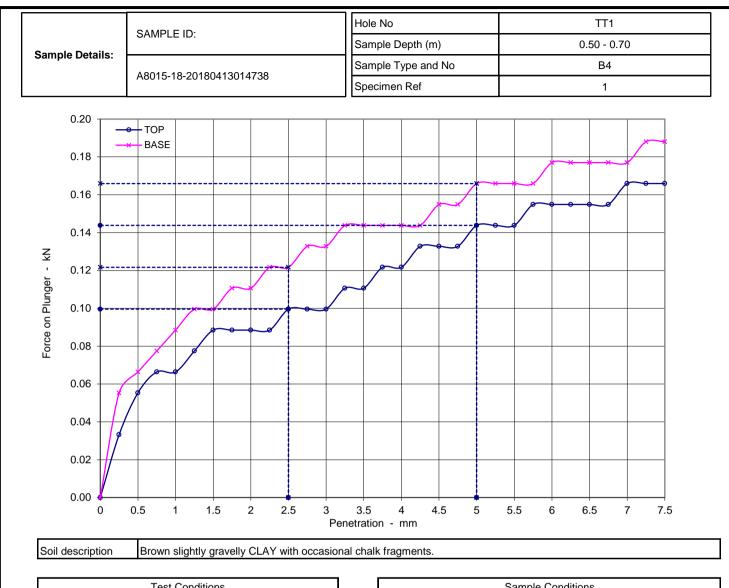
SLR 2
Rev 2.7
Apr 15

Project Name VPI IMMINGHAM

CBR

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Test Conditions		
Sample Retained on 20 mm sieve	%	2

	Method of Compaction	
Preparation	Recompacted - Rammer compaction with specified effort ( 4.5kg )	
гера	Soaked test	NO
P	Soaking Period days	N/A
	Amount of Swell mm	N/A

Surcharge applied	kg	16
Surcharge applied	kPa	10

Notes	
140162	

Sample Conditions		
Initial Moisture Content	%	27.0
Bulk Density	Mg/m³	2.40
Dry Density	Mg/m³	1.90
Moisture Content - TOP	%	25.0
Moisture Content - BASE	%	26.0

Penetration mm	CBR Values %							
Penetration min	TOP	BASE						
2.5	0.8	0.9						
5	0.7	0.8						

Accepted CBR %	0.8	0.9
----------------	-----	-----

QA Ref SLR 2 Rev 2.7 Apr 15



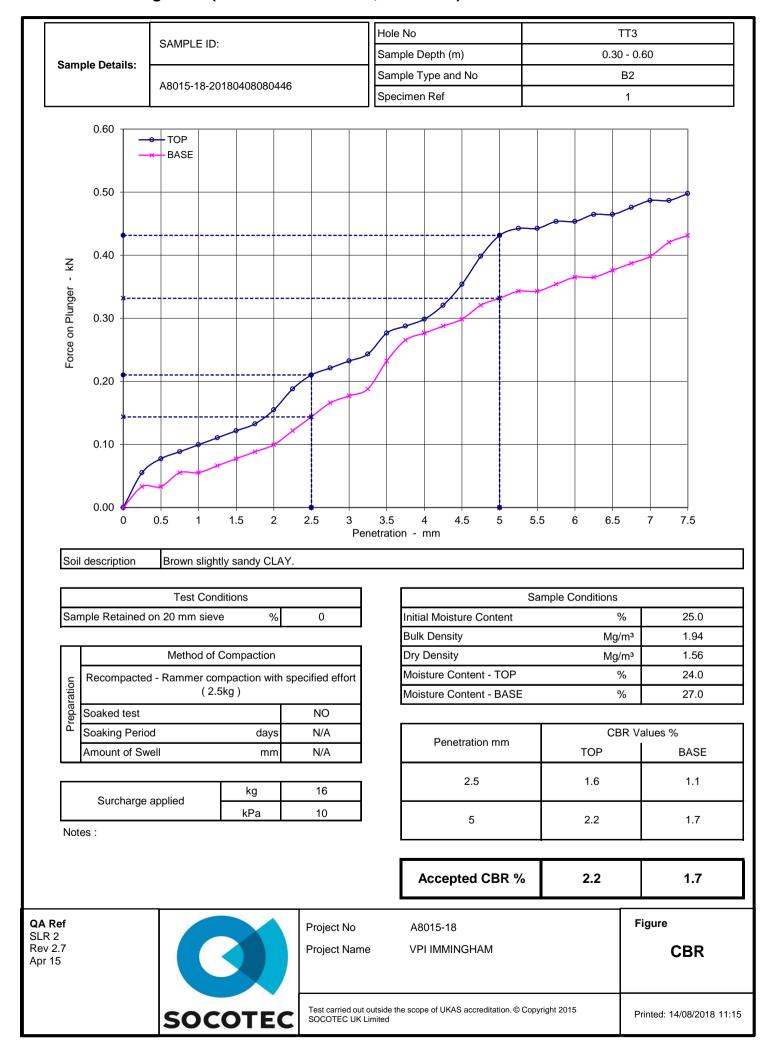
Project No
Project Name

A8015-18 VPI IMMINGHAM Figure

**CBR** 

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Printed: 14/08/2018 11:15



### **TEST REPORT**

Report No. EFS/187041 (Ver. 1)

SOCOTEC UK Doncaster Askern Road Carcroft Doncaster South Yorkshire DN6 8DG

#### Site: A8015-18 VPI Immingham

The 4 samples described in this report were registered for analysis by SOCOTEC UK Limited on 23-Jun-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 03-Jul-2018

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of SOCOTEC UK Lim
Tim Barnes Operations Director Energy & Waste Services

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Date of Issue: 03-Jul-2018

	Units :	%												
	Method Codes : Method Reporting Limits :	ORGMAT 0.1												
	Method Reporting Limits :	0.1												
LAB ID Number CL/	Sample Client Sample Description Date	Organic Matter %												
1910777	BH4 D 2 1.20	1.4												
1910778	TP02 D 3 0.30	7.1												
1910779	BH5 D 13 2.90	1.4												
1910780	BH2 D 3 0.60	16.7												
									1					
	SOCOTEC 3			SOCOT Tim Cliffo	EC UK Doncaste	r		<u>                                     </u>	Sample Analysis					
,	Prothy Puningg Park Ashby Pand	Contact		Tilli Cillio	iu				Data Pri	atod .		03-Jul-2018		
	Bretby Business Park, Ashby Road								Date Printed					
	Burton-on-Trent, Staffordshire, DE15 0YZ	A8015-18 VPI Immingham						Report Number EFS/187041						
	Tel +44 (0) 1283 554400						,		Table Number 1					
	Fax +44 (0) 1283 554422													

**Report No** 

## SOCOTEC UK Ltd Environmental Chemistry Analytical and Deviating Sample Overview

Customer SOCOTEC UK Doncaster Site A8015-18 VPI Immingham

S187041

Consignment No S75653 Date Logged 23-Jun-2018

In-House Report Due 29-Jun-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

		MethodID	CustServ	ORGMAT
ID Number	Description	Sampled	REPORT A	Organic Matter %
01 (4040777	DUA 4 00 4 05	<u> </u>	1	1
CL/1910777	BH4 1.20-1.65	D	D	D
CL/1910778	TP02 0.30	D	D	D
CL/1910779	BH5 2.90-3.35	D	D	D
CL/1910780	BH2 0.60	D	D	D

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

#### Deviating Sample Key

- A The sample was received in an inappropriate container for this analysis
- The sample was received without the correct preservation for this analysis
- C Headspace present in the sample container
- The sampling date was not supplied so holding time may be compromised applicable to all analysis
- Sample processing did not commence within the appropriate holding time
- Sample processing did not commence within the appropriate handling time

#### Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

Analysis Subcontracted - Note: due date may vary

Report Number: EFS/187041

# **Method Descriptions**

Matrix	MethodID	Analysis Basis	Method Description
Soil	ORGMAT		Acid Dichromate oxidation of the sample followed by colorimetric
		@ < 35°C	analysis of the extract

## **Report Notes**

#### **Generic Notes**

#### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
   All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

#### **Waters Analysis**

Unless stated otherwise results are expressed as mg/l

**Nil**: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

#### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup>@ 15°C

#### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

#### **Asbestos Analysis**

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite

**NAIIS** No Asbestos Identified in Sample **NADIS** No Asbestos Detected In Sample

#### **Symbol Reference**

- ^ Sub-contracted analysis.
- **\$\$** Unable to analyse due to the nature of the sample
- ¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

- ¥ Results for guidance only due to possible interference
- & Blank corrected result
- I.S Insufficient sample to complete requested analysis
- I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined N.Det Not detected

N.F No Flow

**NS** Information Not Supplied

Req Analysis requested, see attached sheets for results

- **P** Raised detection limit due to nature of the sample
- \* All accreditation has been removed by the laboratory for this result
- # MCERTS accreditation has been removed for this result
- § accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Page 5 of 5 EFS/187041 Ver. 1

#### **Sample Descriptions**

Client : SOCOTEC UK Doncaster
Site : A8015-18 VPI Immingham

Report Number: \$18\_7041

Note: major constituent in upper case

Lab ID Number  CL/1910777  CL/1910778  CL/1910779  CL/1910780	Client ID  BH4 D 2 1.20 TP02 D 3 0.30 BH5 D 13 2.90 BH2 D 3 0.60	Description  CLAY  SILT  CLAY  SILT
CL/1910778 CL/1910779 CL/1910780	TP02 D 3 0.30 BH5 D 13 2.90 BH2 D 3 0.60	SILT CLAY SILT
CL/1910779 CL/1910780	BH5 D 13 2.90 BH2 D 3 0.60	CLAY SILT
CL/1910780	BH2 D 3 0.60	SILT
CLISIONO	BH2 U 3 U.6U	
1		

Appendix A Page 1 of 1 03/07/2018EFS/187041 Ver. 1

### **TEST REPORT**



Report No. EFS/187043 (Ver. 1)

SOCOTEC UK Doncaster Askern Road Carcroft Doncaster South Yorkshire DN6 8DG

#### Site: A8015-18 VPI Immingham

The 12 samples described in this report were registered for analysis by SOCOTEC UK Limited on 23-Jun-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Jul-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of SOCOTEC UK Lim
Tim Barnes Operations Director Energy & Waste Services

Date of Issue: 04-Jul-2018

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/kg	mg/l	%	%	pH Units										
		d Codes :	ICPACIDS	ICPWSS	ORGMAT	TSBRE1	WSLM50										
	Method Reportin		20	10	0.1	0.005											
	UKAS AC	credited :	Yes	Yes	No	No	No										
LAB ID Number CL/	Client Sample Description	Sample Date	SO4 (acid sol)	SO4 (H2O sol) mg/l	Organic Matter %	Total Sulphur.	рН (ВЅ1377)										
1910790	BH2 D 14 2.80				1.6												
1910791	BH3 D 4 2.00				1.4												
1910792	BH3 D 6 3.00		433	116		0.041	8.4										
1910793	BH6 D 26 13.70		200	23		0.029	8.7										
1910794	TP1 D 1 0.10				3.6												
1910795	TP2 D 11 4.00		276	56		0.031	8.8										
1910796	TP3 D 9 3.40				1.5												
1910797	TP5 D 1 0.10				3.6												
1910798	TP6 D 3 0.40		1420	479		0.085	7.8										
1910799	TP8 D 7 2.00				1.9												
1910800	TP9 D 5 0.80				3.1												
1910801	TT2 B 6 2.00		643	118		0.039	7.5										
	SOCOTEC (		Client Na	ame	SOCOTEC UK Doncaster				Sam	ple Ana	alysis						
			Contact		Tim Clifford												
E	Bretby Business Park, Ashby Road								Date Pri	nted		(	04-Jul-2018				
E	Burton-on-Trent, Staffordshire, DE15 0YZ								Report Number			EFS/187043					
	Tel +44 (0) 1283 554400			A8015-18 VPI Immingham								Table Number			1		
	Fax +44 (0) 1283 554422																

Report No

## SOCOTEC UK Ltd Environmental Chemistry Analytical and Deviating Sample Overview

Customer SOCOTEC UK Doncaster Site A8015-18 VPI Immingham

S187043

Consignment No S75655

Date Logged 23-Jun-2018

In-House Report Due 29-Jun-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

	Suits for any subcontracted analy	MethodID	CustServ	Dep.Opt		<u>,                                      </u>	ICPACIDS	ICPBRE	ICPWSS	KONECL	KoneNO3	ORGMAT	TSBRE1	WSLM50
ID Number	Description	Sampled	REPORT A	DO CI if pH<5.5	DO Mg if SO4(W)>3000	DO NO3 if pH<5.5	SO4 (acid sol)	Magnesium (BRE)	SO4 (H2O sol) mg/l	Chloride:(2:1)	Nitrate (BRE 2:1): mg/l	Organic Matter %	Total Sulphur.	рН (BS1377)
							✓		✓					
CL/1910790	BH2 2.80-3.25	D	D									D		
CL/1910791	BH3 2.00-2.45	D	D									D		
CL/1910792	BH3 3.00-3.45	D	D	D	D	D	D	D	D	D	D		D	D
CL/1910793	BH6 13.70	D	D				D	D	D	D	D		D	D
CL/1910794	TP1 0.10	D	D									D		
CL/1910795	TP2 4.00	D	D				D	D	D	D	D		D	D
CL/1910796	TP3 3.40	D	D									D		
CL/1910797	TP5 0.10	D	D									D		
CL/1910798	TP6 0.40	D	D				D	D	D	D	D		D	D
CL/1910799	TP8 2.00	D	D									D		
CL/1910800	TP9 0.80	D	D									D		
CL/1910801	TT2 2.00-2.15	D	D				D	D	D	D	D		D	D

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

#### **Deviating Sample Key**

- A The sample was received in an inappropriate container for this analysis
- B The sample was received without the correct preservation for this analysis
- C Headspace present in the sample container
- D The sampling date was not supplied so holding time may be compromised applicable to all analysis
- Sample processing did not commence within the appropriate holding time
- Sample processing did not commence within the appropriate handling time

#### Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

Analysis Subcontracted - Note: due date may vary

Where individual results are flagged see report notes for status.

Report Number: EFS/187043

# **Method Descriptions**

Matrix	MethodID	Analysis	Method Description
		Basis	
Soil	ICPACIDS	Oven Dried	Determination of Total Sulphate in soil samples by Hydrochloric
		@ < 35°C	Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried	Determination of Water Soluble Sulphate in soil samples by water
		@ < 35°C	extraction followed by ICPOES detection
Soil	ORGMAT	Oven Dried	Acid Dichromate oxidation of the sample followed by colorimetric
		@ < 35°C	analysis of the extract
Soil	TSBRE1	Oven Dried	Determination of Total Carbon and/or Total Sulphur in solid
		@ < 35°C	samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried	Determination of pH of 2.5:1 deionised water to soil extracts using
		@ < 35°C	pH probe.

## **Report Notes**

#### **Generic Notes**

#### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
   All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

#### **Waters Analysis**

Unless stated otherwise results are expressed as mg/l

**Nil**: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

#### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup>@ 15°C

#### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

#### **Asbestos Analysis**

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite

**NAIIS** No Asbestos Identified in Sample **NADIS** No Asbestos Detected In Sample

#### **Symbol Reference**

- ^ Sub-contracted analysis.
- **\$\$** Unable to analyse due to the nature of the sample
- ¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

- ¥ Results for guidance only due to possible interference
- & Blank corrected result
- I.S Insufficient sample to complete requested analysis
- I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined N.Det Not detected

N.F No Flow

**NS** Information Not Supplied

Req Analysis requested, see attached sheets for results

- **P** Raised detection limit due to nature of the sample
- \* All accreditation has been removed by the laboratory for this result
- # MCERTS accreditation has been removed for this result
- § accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Page 5 of 5 EFS/187043 Ver. 1

#### **Sample Descriptions**

Client : SOCOTEC UK Doncaster
Site : A8015-18 VPI Immingham

Report Number: \$18\_7043

Note: major constituent in upper case

		Note: major constituent in upper case
Lab ID Number	Client ID	Description
CL/1910790	BH2 D 14 2.80	CLAY
CL/1910791	BH3 D 4 2.00	CLAY
CL/1910792	BH3 D 6 3.00	CLAY
CL/1910793	BH6 D 26 13.70	CLAY
CL/1910794	TP1 D 1 0.10	SILT
CL/1910/94	TPT D T 0.10	SILI
CL/1910795	TP2 D 11 4.00	SAND
CL/1910796	TP3 D 9 3.40	SILT
CL/1910797	TP5 D 1 0.10	CLAY
CL/1910798	TP6 D 3 0.40	SILT
CL/1910799	TP8 D 7 2.00	CLAY
CL/1910/99	TP0 D 7 2.00	OLT
CL/1910800	TP9 D 5 0.80	SILT
CL/1910801	TT2 B 6 2.00	SILT
-		
1		

Appendix A Page 1 of 1 04/07/2018EFS/187043 Ver. 1

### **TEST REPORT**



Report No. EFS/187204 (Ver. 1)

SOCOTEC UK Doncaster Askern Road Carcroft Doncaster South Yorkshire DN6 8DG

#### Site: A8015-18 VPI Immingham

The 11 samples described in this report were registered for analysis by SOCOTEC UK Limited on 28-Jun-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 09-Jul-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of SOCOTEC UK Lim
Tim Barnes Operations Director Energy & Waste Services

Date of Issue: 09-Jul-2018

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/kg	mg/l	%	%	pH Units										
		d Codes :	ICPACIDS	ICPWSS	ORGMAT	TSBRE1	WSLM50										
	Method Reportin		20	10	0.1	0.005											
	UKAS AC	credited :	Yes	Yes	No	No	No										
LABID Number CL/	Client Sample Description	Sample Date	SO4 (acid sol)	SO4 (H2O sol) mg/l	Organic Matter %	Total Sulphur.	рН (ВS1377)										
1911581	TT02 B 6 2.00		498	79		0.033	7.8										
1911582	TT03 B 4 1.30				2.6												
1911583	BH5 B 18 4.00		737	205		0.153	8.0										
1911584	BH6 B 1 0.00				3.2												
1911585	TP02 B 10 3.40				1.6												
1911586	TP6 B 6 1.00				1.4												
1911587	TP09 B 6 0.80		626	121		0.053	7.6										
1911588	BH1 D 3 0.45				13.7												
1911589	BH1 B 5 1.00		1260	847		0.068	7.8										
1911590	BH2 B 13 2.20		1170	530		0.075	8.1										
1911591	BH2 B 31 5.70		604	178		0.319	8.5										
					1	1	1										
					1												
					1		1										
					1												
	<b>SOCOTEC</b>		Client Na	ame	SOCOTEC UK Doncaster					Sam	ple Ana	alysis					
			Contact		Tim Clifford												
	Bretby Business Park, Ashby Road									Printed			9-Jul-2018				
E	Burton-on-Trent, Staffordshire, DE15 0YZ				Δ801	5-18 V	/PI In	mingh	am		Repor		EFS/187204				
	Tel +44 (0) 1283 554400			7001	5 10	V 1 1 111	911	uIII		Table	Table Number			1			
	Fax +44 (0) 1283 554422																

### SOCOTEC UK Ltd Environmental Chemistry Analytical and Deviating Sample Overview

Customer SOCOTEC UK Doncaster Site A8015-18 VPI Immingham Consignment No S75795

Date Logged 28-Jun-2018

Report No S187204

In-House Report Due 04-Jul-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

	suits for any subcontracted analy	MethodID	CustServ	Dep.Opt	Í		ICPACIDS	ICPBRE	ICPWSS	KONECL	KoneNO3	ORGMAT	TSBRE1	WSLM50
ID Number	Description	Sampled	REPORT A	DO CI if pH<5.5	DO Mg if SO4(W)>3000	DO NO3 if pH<5.5	SO4 (acid sol)	Magnesium (BRE)	SO4 (H2O sol) mg/l	Chloride:(2:1)	Nitrate (BRE 2:1): mg/l	Organic Matter %	Total Sulphur.	pH (BS1377)
							✓		✓					
CL/1911581	TT02 2.00-2.15	D	D	D	D	D	D	D	D	D	D		D	D
CL/1911582	TT03 1.30-1.60	D	D									D		
CL/1911583	BH5 4.00-4.45	D	D				D	D	D	D	D		D	D
CL/1911584	BH6 0.00-0.30	D	D									D		
CL/1911585	TP02 3.40-3.50	D	D									D		
CL/1911586	TP6 1.00-1.20	D	D									D		
CL/1911587	TP09 0.80-1.00	D	D				D	D	D	D	D		D	D
CL/1911588	BH1 0.45	D	D									D		
CL/1911589	BH1 1.00-1.20	D	D				D	D	D	D	D		D	D
CL/1911590	BH2 2.20-2.70	D	D				D	D	D	D	D		D	D
CL/1911591	BH2 5.70-6.15	D	D				D	D	D	D	D		D	D

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

#### Deviating Sample Key

- A The sample was received in an inappropriate container for this analysis
- The sample was received without the correct preservation for this analysis
- C Headspace present in the sample container
- D The sampling date was not supplied so holding time may be compromised applicable to all analysis
- E Sample processing did not commence within the appropriate holding time
- Sample processing did not commence within the appropriate handling time

#### Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

Analysis Subcontracted - Note: due date may vary

Report Number: EFS/187204

# **Method Descriptions**

Matrix	MethodID	Analysis	Method Description
		Basis	
Soil	ICPACIDS	Oven Dried	Determination of Total Sulphate in soil samples by Hydrochloric
		@ < 35°C	Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried	Determination of Water Soluble Sulphate in soil samples by water
		@ < 35°C	extraction followed by ICPOES detection
Soil	ORGMAT	Oven Dried	Acid Dichromate oxidation of the sample followed by colorimetric
		@ < 35°C	analysis of the extract
Soil	TSBRE1	Oven Dried	Determination of Total Carbon and/or Total Sulphur in solid
		@ < 35°C	samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried	Determination of pH of 2.5:1 deionised water to soil extracts using
		@ < 35°C	pH probe.

## **Report Notes**

#### **Generic Notes**

#### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
   All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

#### **Waters Analysis**

Unless stated otherwise results are expressed as mg/l

**Nil**: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

#### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup>@ 15°C

#### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

#### **Asbestos Analysis**

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite

**NAIIS** No Asbestos Identified in Sample **NADIS** No Asbestos Detected In Sample

#### **Symbol Reference**

- ^ Sub-contracted analysis.
- **\$\$** Unable to analyse due to the nature of the sample
- ¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

- ¥ Results for guidance only due to possible interference
- & Blank corrected result
- I.S Insufficient sample to complete requested analysis
- I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined N.Det Not detected

N.F No Flow

**NS** Information Not Supplied

Req Analysis requested, see attached sheets for results

- **P** Raised detection limit due to nature of the sample
- \* All accreditation has been removed by the laboratory for this result
- # MCERTS accreditation has been removed for this result
- § accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Page 5 of 5 EFS/187204 Ver. 1

#### **Sample Descriptions**

Client : SOCOTEC UK Doncaster
Site : A8015-18 VPI Immingham

Report Number: \$18\_7204

Note: major constituent in upper case

Lab ID Number	Client ID	Note: major constituent in upper case  Description
		SILT
CL/1911581 CL/1911582	TT02 B 6 2.00 TT03 B 4 1.30	SILT
CL/1911582 CL/1911583	BH5 B 18 4.00	CLAY
CL/1911583 CL/1911584	BH6 B 1 0.00	GRAVEL
CL/1911584 CL/1911585	TP02 B 10 3.40	CLAY
CL/1911586	TP6 B 6 1.00	CLAY
CL/1911587	TP09 B 6 0.80	CLAY
CL/1911588	BH1 D 3 0.45	SILT
CL/1911589	BH1 B 5 1.00	CLAY
CL/1911590	BH2 B 13 2.20	CLAY
CL/1911591	BH2 B 31 5.70	CLAY
00/10/1001	BHZ B 31 3.70	OL) (I
	1	

Appendix A Page 1 of 1 09/07/2018EFS/187204 Ver. 1

### **TEST REPORT**

Report No. EFS/187902 (Ver. 1)

SOCOTEC UK Doncaster Askern Road Carcroft Doncaster South Yorkshire DN6 8DG

#### Site: A8015-18 VPI Immingham

The 1 sample described in this report were registered for analysis by SOCOTEC UK Limited on 19-Jul-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 25-Jul-2018

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of SOCOTEC UK Lim
Tim Barnes Operations Director Energy & Waste Services

viana.

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Date of Issue: 25-Jul-2018

	Units :	%											
	Method Codes :	ORGMAT 0.1											
	Method Reporting Limits :												
_													
LAB ID Number	S	Organic Matter %											
0	Client Sample Description Sample Date	ani											
l E	Client Sample Description	ი ≤											
ber	Dat	atte											
CL/	(D)	ÿr %											
_													
1914695	BH1 D 7 1.65	1.1											
	2 2 733												
	SOCOTEC (		OF A CHARLES OF THE PART OF TH				 Sample Analysis						
			Client Name SOCOTEC UK Doncaster  Contact Tim Clifford						Sam	pie Ana	แหรเร		
	Brothy Business Park, Ashby Road	Jonata		010	· <del></del>			Data Bri	ntod		25 Jul 2040		
	Bretby Business Park, Ashby Road							Date Printed			25-Jul-2018		
	Burton-on-Trent, Staffordshire, DE15 0YZ		A8015-18 VPI Immingham					Report Number			EFS/187902 1		
	Tel +44 (0) 1283 554400			AUU 13-10 VET IIIIIIIIIIIIIIIIIIIII				Table Number					
Fax +44 (0) 1283 554422													

**Report No** 

## SOCOTEC UK Ltd Environmental Chemistry Analytical and Deviating Sample Overview

Customer SOCOTEC UK Doncaster Site A8015-18 VPI Immingham

S187902

Consignment No S75653 Date Logged 19-Jul-2018

In-House Report Due 25-Jul-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

		(		
		MethodID	CustServ	ORGMAT
ID Number	Description	Sampled	REPORT A	Organic Matter %
CL/1914695	BH1 1.65-1.80	D	D	D

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

#### Deviating Sample Key

- A The sample was received in an inappropriate container for this analysis
- The sample was received without the correct preservation for this analysis
- Headspace present in the sample container
- The sampling date was not supplied so holding time may be compromised applicable to all analysis
- Sample processing did not commence within the appropriate holding time
- Sample processing did not commence within the appropriate handling time

#### Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

Analysis Subcontracted - Note: due date may vary

Report Number: EFS/187902

# **Method Descriptions**

Matrix	MethodID	Analysis Basis	Method Description
Soil	ORGMAT		Acid Dichromate oxidation of the sample followed by colorimetric
		@ < 35°C	analysis of the extract

## **Report Notes**

#### **Generic Notes**

#### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
   All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

#### **Waters Analysis**

Unless stated otherwise results are expressed as mg/l

**Nil**: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

#### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup>@ 15°C

#### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

#### **Asbestos Analysis**

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite

**NAIIS** No Asbestos Identified in Sample **NADIS** No Asbestos Detected In Sample

#### **Symbol Reference**

- ^ Sub-contracted analysis.
- **\$\$** Unable to analyse due to the nature of the sample
- ¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

- ¥ Results for guidance only due to possible interference
- & Blank corrected result
- I.S Insufficient sample to complete requested analysis
- I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined N.Det Not detected

N.F No Flow

**NS** Information Not Supplied

Req Analysis requested, see attached sheets for results

- **P** Raised detection limit due to nature of the sample
- \* All accreditation has been removed by the laboratory for this result
- # MCERTS accreditation has been removed for this result
- § accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Page 5 of 5 EFS/187902 Ver. 1

#### **Sample Descriptions**

Client : SOCOTEC UK Doncaster
Site : A8015-18 VPI Immingham

Report Number: \$18\_7902

Note: major constituent in upper case

I		Note: major constituent in upper case
Lab ID Number	Client ID	Description
CL/1914695	BH1 D 7 1.65	Brown Stone CLAY

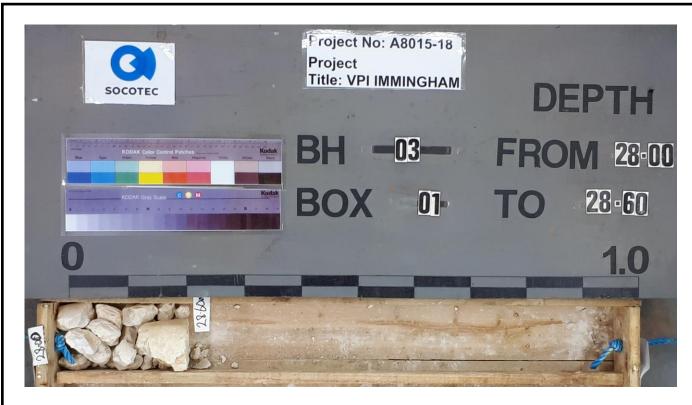
Appendix A Page 1 of 1 25/07/2018EFS/187902 Ver. 1



### APPENDIX E PHOTOGRAPHS

Rotary Cores Plate 1 to 6
Trial Pits Plate 7 to 21





Notes:

Project VPI IMMINGHAM

Proiect No. A8015-18

Project No. A8015-16
Carried out for AECOM







Notes:

Project

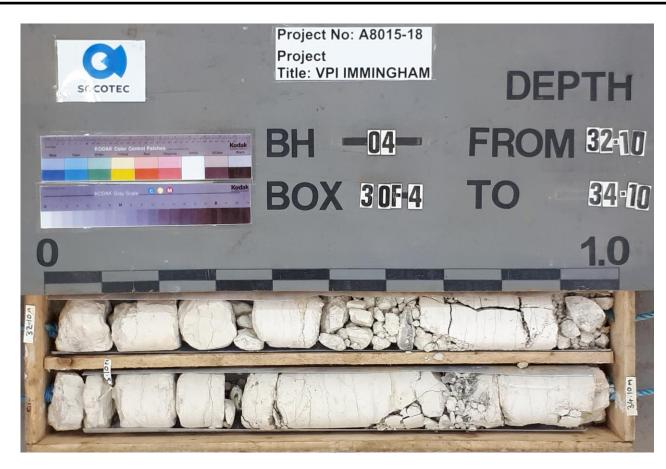
VPI IMMINGHAM

Project No.
Carried out for

A8015-18 AECOM Plate

2







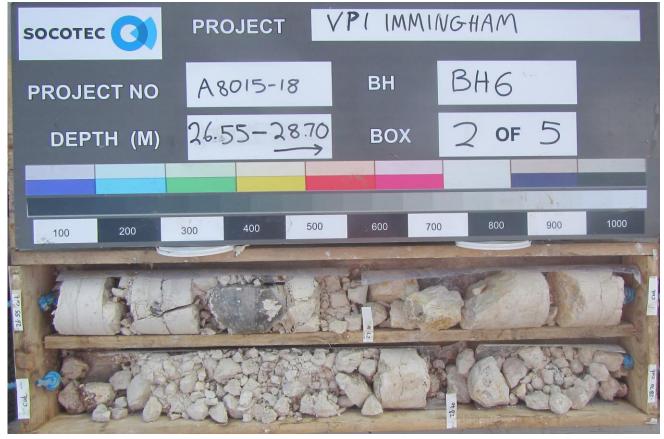
Project VPI IMMINGHAM Plate

Project No. A8015-18 Carried out for AECOM

Notes:







Notes:

Project

VPI IMMINGHAM

Project No. A8015-18 Carried out for AECOM Plate

4







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate

5





Notes:

Project VPI IMMINGHAM

Project No. A8015-18
Carried out for AECOM

Plate

6







Notes:

Project

VPI IMMINGHAM

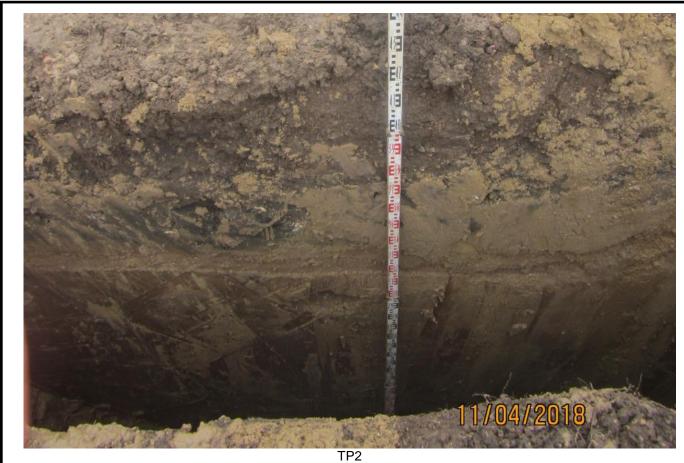
Project No. Carried out for A8015-18 AECOM Plate





TP1 Spoil







Notes:

Project

VPI IMMINGHAM

Project No. A8015-18 Carried out for AECOM Plate





TP2 Spoil







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate





TP3 Spoil







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate





TP6 Spoil





TP9 Spoil







Notes:

Project
Project No.
Carried out for

VPI IMMINGHAM A8015-18 AECOM Plate





TP10 Spoil







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate





TT02 Spoil







Notes:

Project

VPI IMMINGHAM

Project No. Carried out for A8015-18 AECOM Plate