HAVANT THICKET WINTER STORAGE RESERVOIR
FACTUAL REPORT ON GROUND INVESTIGATION

Report No A9031-19

PART 1 OF 2

April 2020

Issue No 4

Carried out for:
Portsmouth Water Limited
PO Box No 8
West Street
Havant
Hampshire
PO9 1LG

Investigation Supervisor:
Atkins
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW

Askern Rd, Carcroft,
Doncaster, DN6 8DG
Tel: +44 (0) 1302723456
email: geo.docaster@socotec.com

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ISSUE No DATE	STATUS	PREPARED BY	CHECKED BY	APPROVED BY
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2 Feb 2020	Complete Draft report	NAME and QUALIFICATIONS T Clifford BEng (Hons) FGS SIGNATURE	NAME and QUALIFICATIONS M Stanley BSc (Hons) FGS SIGNATURE	NAME and QUALIFICATIONS M Stanley BSc (Hons) FGS SIGNATURE
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CONTENTS

Page

1 INTRODUCTION 1

2 SITE SETTING 1

2.1 Location and Description 1
2.2 Published Geology 2

3 FIELDWORK 3

3.1 General 3
3.2 Exploratory Holes 3
3.3 Field Testing 5
3.4 Groundwater Monitoring 6

4 LABORATORY TESTING 7

4.1 Geotechnical Testing 7
4.2 Geoenvironmental Testing 8
4.3 Topsoil Analysis 8

5 REFERENCES 9

APPENDIX A FIGURES AND DRAWINGS

APPENDIX B EXPLORATORY HOLE RECORDS

APPENDIX C FIELD TESTING

APPENDIX D INSTRUMENTATION AND MONITORING

APPENDIX E GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX F GEOENVIRONMENTAL LABORATORY TEST RESULTS

APPENDIX G PHOTOGRAPHS

1 INTRODUCTION

SOCOTEC UK Limited was commissioned in November 2019 by Portsmouth Water Limited (Portsmouth Water), to carry out a ground investigation in Havant, Hampshire. The investigation was required to obtain information for a proposed reservoir, Havant Thicket Winter Storage Reservoir (HTWSR).

The Investigation Supervisor on behalf of Portsmouth Water was Atkins.

The scope of the investigation was specified by Atkins and comprised cable percussion and rotary boreholes, trial pits, in situ testing, monitoring, laboratory testing and reporting. 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 4 November 2019 and 30 January 2020.

This report presents the factual records of the fieldwork, monitoring 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 proposed HTWSR site lies within a shallow valley located between Havant, Leigh Park and Rowlands Castle, approximate 3.2 km north of Havant town centre, Hampshire. The National Grid reference for the site is SU 715 097. See Site Location Plan in Appendix A.

The site has an area of approximately 160 Hectares and comprises predominantly open grassland, with some woodland, hedgerows and ditches. The site is mostly utilised for animal grazing with public access retained via a bridleway across the middle of the site, with a permissive path around most of the perimeter of the site and along ‘The Avenue’.

To the north and west the site is bounded by wooded areas, the A3(M) is beyond to the west. To the east is Red Hill, a residential area, and to the south is the town of Havant.

2.2 Published Geology

The published geological map of the area, (BGS sheet 316, 1998) and the BGS Geoindex Onshore Online viewer (2020) show the site partially underlain by Head Deposits comprising clay, silt, sand and gravel. This covers an area across the centre of the site, with localised areas around the remainder of the site.

The underlying bedrock is shown to be the London Clay Formation.

Information provided by Atkins indicates that the geology of the site comprises Quaternary deposits of Head, underlain sequentially by the London Clay, Harwich and Reading Formations. The Culver Chalk Formation underlies the entire site.

3 FIELDWORK

3.1 General

The exploratory hole locations were selected by Atkins and set out by SOCOTEC from co-ordinates provided. The as-dug co-ordinates and ground elevations were surveyed by SOCOTEC, using GPS equipment, to National Grid and Ordnance Datum. In accordance with the specification, co-ordinates are to be the nearest 0.5 m and elevations are to the nearest 0.05 m OD. The locations are shown on the Site Plan in Appendix A.

The fieldwork was carried out during a period of heavy rain and strong winds, which contributed to some challenging working conditions. As a consequence, surface conditions across the site were very wet, with some areas of standing water. The conditions resulted in difficult access across much of the site, and led to significant rutting in places.

3.2 Exploratory Holes

An Exploratory Hole Summary is presented in Appendix B, including details of hole types, depths, dates and additional comments on installations and other relevant remarks. A table summarising the quantity and depths of the holes is also presented below.

TABLE 1 : SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	DEPTH RANGE (m)
Cable Percussion Boring	20	2.50-34.45
Rotary Core Drilling (including dynamic sampling and rotary open hole drilling)	4	38.50-72.20
Trial Pits	17	1.50-4.50

The exploratory hole logs are presented in Appendix B. These include descriptions of the strata encountered together with details of the equipment and methods used, sampling and field testing carried out, water depths and other field observations. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, along with other explanatory information. Soil and rock material descriptions are in accordance with BS EN ISO 14688-1 (2018), BS EN ISO 14689 (2018) and the guidance of 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 certificates are included in Appendix B. The results are presented on the logs as uncorrected N values.

Split tube sample descriptions were carried out on undisturbed samples from boreholes ATK-BH-01 and ATK-BH-02, as scheduled by Atkins. The samples were extruded from the sample tubes, then photographed before and after splitting; the sample descriptions are presented in Appendix B.

Twelve shallow trial pits were undertaken adjacent to selected exploratory holes to facilitate the recovery of topsoil samples; the trial pits were nominally located within 1 m of the original exploratory holes, on areas not previously excavated. The trial pits have been designated the same ID as the corresponding exploratory holes, plus the suffix "-TSS", e.g. ATK-CP-09-TSS. Logs are not included for these trial pits as they were not extended below the topsoil, however details are included in the Exploratory Hole Summary in Appendix B and in the AGS data.

The trial pits designated with the nomenclature "TPM" were specified to be for man entry. However, due to the ground conditions the technique was amended, and they were carried out as standard machine excavated trial pits. After excavation, trial pit ATK-TPM-05 was allowed to stand open overnight to assess the short term stability. The trial pit was suitably fenced and protected at the surface to prevent access. On inspection the following day, the pit was noted to have collapsed on all faces.

Photographs of the rotary drilled cores, trial pits and split samples are presented in Appendix G.

On completion of the fieldwork, geotechnical samples were transported to the Doncaster laboratory of SOCOTEC for testing and temporary retention. Geoenvironmental samples were transported from site directly to the SOCOTEC laboratory at Bretby, near Burton upon Trent.

3.3 Field Testing

3.3.1 Variable Head Permeability Testing

Variable head permeability testing, including both rising and falling head tests, were carried out in general accordance with BS EN ISO 22282-2 (2012). Tests were carried out in selected boreholes, at depths specified by Atkins, and also in selected installations during the post fieldwork monitoring. A summary of the testing is presented in the table below and the results are presented in Appendix C.

TABLE 2 : SUMMARY OF VARIABLE HEAD TESTING

BOREHOLE	TESTS IN BOREHOLES (DURING FIELDWORK)			TESTS IN INSTALLATIONS (POST FIELDWORK)	
	TEST NO.	DEPTH (m BGL)	DATE	TEST NO.	DATE
ATK-CP-01	1	3.00	07-Nov-2019	2	28-Jan-2020
ATK-CP-02	1	1.90	08-Nov-2019	3	30-Jan-2020
	2	7.00	01-Nov-2019		
ATK-CP-03	1	5.50	06-Dec-2019	-	
ATK-CP-04	1	5.00	15-Nov-2019	3	29-Jan-2020
	2	11.50	18-Nov-2019		
ATK-CP-05	1	7.50	20-Nov-2019	3	29-Jan-2020
	2	13.00	21-Nov-2019		
ATK-CP-06	1	2.00	04-Dec-2019	2	30-Jan-2020
ATK-CP-10	1	11.00	22-Nov-2019	-	
ATK-CP-12	-			1	29-Jan-2020
ATK-CP-13A	-			1	29-Jan-2020
ATK-CP-15	1	16.00	02-Dec-2019	2	30-Jan-2020
ATK-CP-16	-			1	29-Jan-2020
ATK-RC-01	-			1	04-Feb-2020
ATK-RC-02	-			1	30-Jan-2020
ATK-RC-02A	-			1	30-Jan-2020
ATK-RC-03	-			1	30-Jan-2020

3.3.2 Soakaway (Infiltration) Testing

Two soakaway tests were scheduled to be undertaken in shallow hand excavated trial pits adjacent to trial pits ATK-TP-05 and ATK-TP-07, the pits were excavated and designated ATK-TP-05i and ATK-TP-07i.

Temporary standpipes, nominally 50 mm diameter, were installed in the trials pits and the annulus filled with a gravel filter, as detailed on the trial pits logs.

Due to the saturated nature of the shallow strata, the groundwater in the pits was recorded rising before commencement of the tests (before filling with water by the technician). The tests were therefore cancelled in agreement with Atkins.

3.4 Groundwater Monitoring

Groundwater monitoring instrumentation was installed in selected boreholes, as specified by Atkins; details are shown on the relevant borehole logs and summarised in Appendix D.

The design and type of some instrumentation was changed by Atkins during the fieldwork, informed by the findings as works progressed. This included the installation of vibrating wire piezometers (VWPs) in three boreholes.

After completion SOCOTEC were instructed to install data-loggers in selected installations. This included data-loggers for the three exploratory holes installed with VWPs, and diver data-loggers in each of the standpipes and standpipe piezometers.

Records of monitoring carried out by SOCOTEC during and after the fieldwork period are presented in Appendix D.

The installation records, calibration certificates and initial readings, recorded by SOCOTEC, for the VWPs are presented in Appendix D. SOCOTEC were not required to download data from the data-loggers during monitoring.

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by Atkins and was carried out in accordance with BS 1377 (1990), BS EN ISO 17892 (2014) Part 1 and 2 and ISRM (2007) unless otherwise stated within the test report. The testing is summarised below and the results are presented in Appendix E.

The table below presents the quantities of tests scheduled.

TABLE 3 : SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	QUANTITY
Water Content Determination	167
Atterberg Limit Determination	154
Particle Size Distribution Analysis	71
Particle Density	1
Linear Density	2
Determination of Shrinkage Characteristics	16
Light Compaction - 2.5 kg rammer	52
Heavy Compaction - 4.5 kg rammer	8
Moisture Condition Value (MCV) Test	41
Moisture Condition Value (MCV) / Moisture Content	30
Unconsolidated Undrained Triaxial Compression Tests	38
Shear Strength by Pilcon Hand method	294
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure	11
One Dimensional Consolidation Test	15
Determination of Permeability in a Triaxial Cell	9
Small Shear Box	10
Determination of residual shear strength using ring shear apparatus	4
Determination of Dispersibility - Pinhole Method	24
Determination of Dispersibility – Dispersion Method	In progress (26)
Chemical Testing – BRE Suite	12

At the time of reporting testing of samples for Dispersibility (by Dispersion Method) were ongoing; the results will be issued as an Addendum report when complete.

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by Atkins on the soil samples recovered during the fieldwork, and water samples taken by SOCOTEC from the installations. The results are presented in Appendix F.

There were some samples which were reported as having deviated due to holding times being exceeded; alternative samples were recovered and further testing carried. The results for the deviant samples have been excluded from the report.

Six soil samples were screened for the possible presence of asbestos, no asbestos fibres were identified.

4.3 Topsoil Analysis

A suite of analysis was scheduled by Atkins on samples of topsoil recovered during the fieldwork, testing was in accordance with BS 3882 : 2015. The results are presented in Appendix F.

5 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 316 : 1998 : Fareham. 1:50000 geological map (solid and drift). British Geological Survey.

BGS GeoIndex Onshore : 2020. 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 : 2018 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description

BS EN ISO 14688-2 : 2018 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification

BS EN ISO 14689 : 2018 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description

BS EN ISO 17892-1 : 2014 : Geotechnical investigation and testing – Laboratory Testing of soil – Determination of water content.

BS EN ISO 17892-2 : 2014 : Geotechnical investigation and testing – Laboratory Testing of soil – Determination of bulk density.

BS EN ISO 22282-1:2012 : Geotechnical investigation and testing – Geohydraulic testing – Part 1 General rules

BS EN ISO 22282-2:2012 : Geotechnical investigation and testing – Geohydraulic testing – Part 2 Water permeability tests in a borehole using open systems

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.

ISRM : 2007 : The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA).

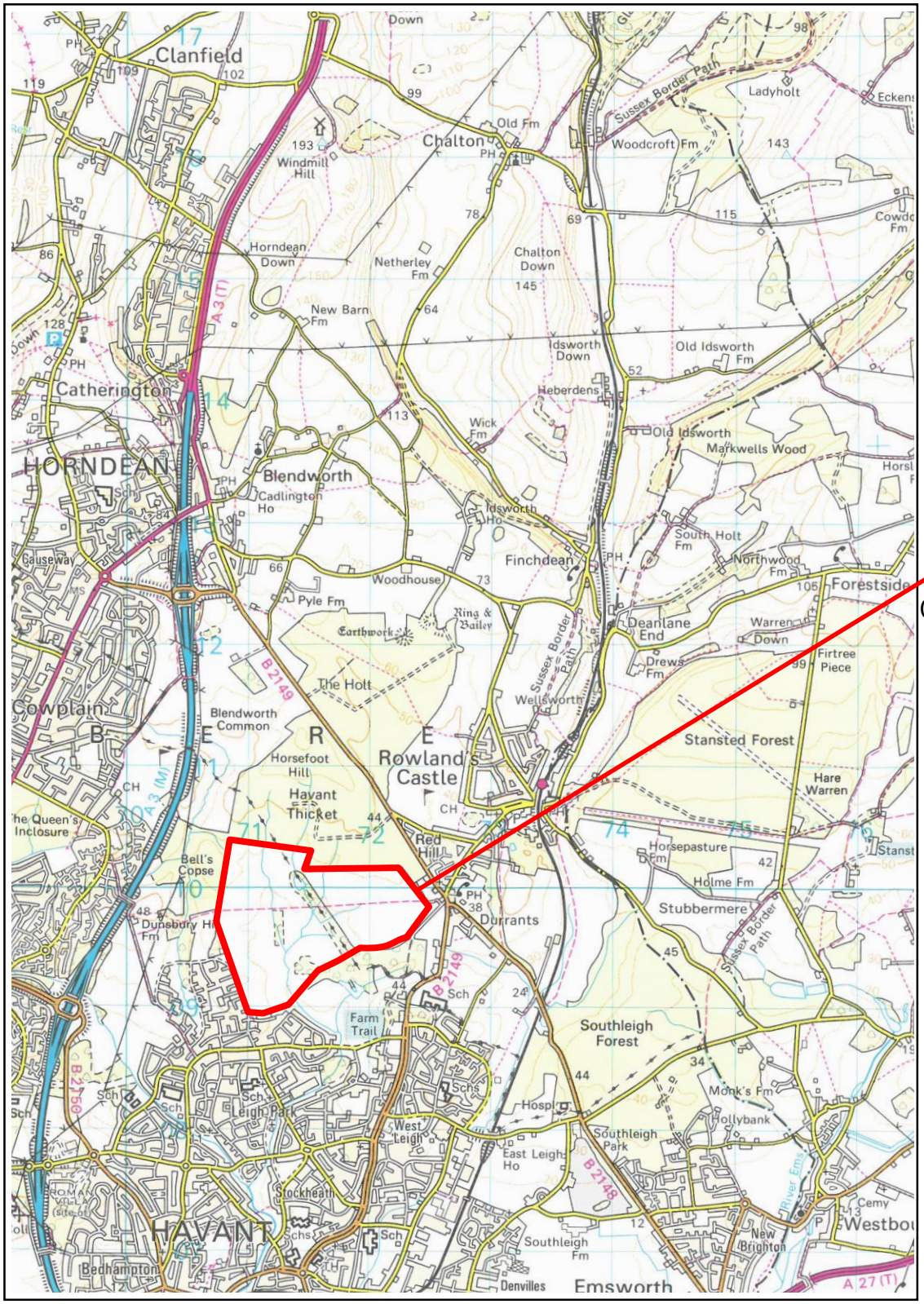
BS 3882 : 2015 : Specification for Topsoil

APPENDIX A
FIGURES AND DRAWINGS

Site Location Plan	A1
Site Plan	A2

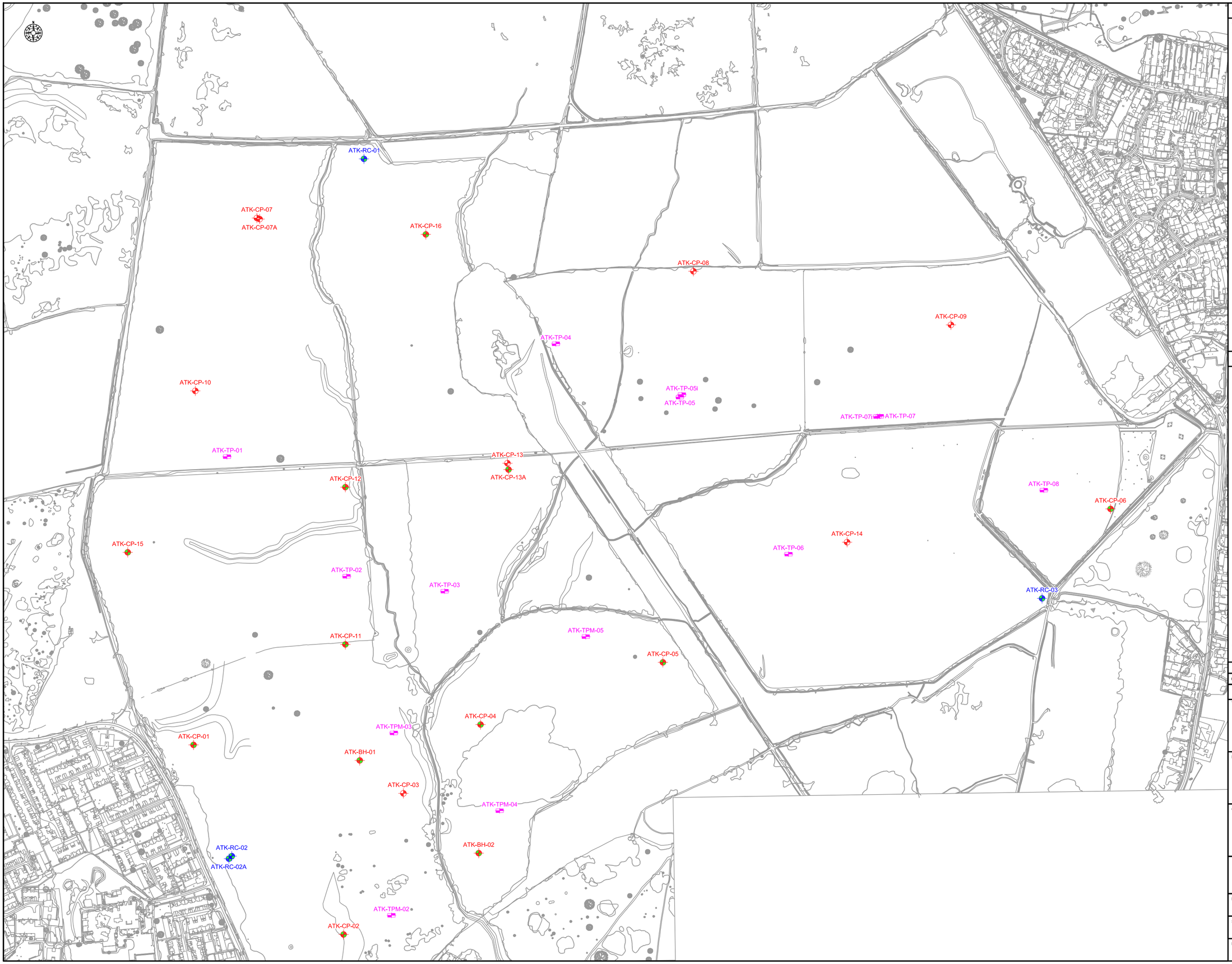
Site Location Plan

SOCOTEC



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Notes: Scale 1:50 000	**Project** HAVANT THICKET WINTER STORAGE RESERVOIR **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Figure** **A1**



GENERAL NOTES

1. Reproduced from Portsmouth Water's Drawing
2. Hole Locations to National Grid Co-ordinate Reference System
3. Plan produced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, SOCOTEC UK Limited. All rights reserved. Licence Number 100006060

LEGEND TO SYMBOLS

- Borehole (CP)
- Borehole (CP with Installation)
- Borehole (RC with Installation)
- Trial Pit

Scale: 1:2000

0 20m 40 80 120 160 200

Rev	Drawn	Date	Approv.	Date	Modification Details
1	AW	3/4/2020	TC	3/4/2020	Position with installations marked

AMENDMENTS

Title

SITE PLAN

Project

HAVANT THICKET
WINTER STORAGE
RESERVOIR

Client

PORTSMOUTH WATER

SOCOTEC

Date	Drawn By	Approv. By
13/03/2020	BS	PC

Sheet Size	Scale	Project No
A0	1:2000	A9031-19

Drawing No	Rev
A2	1

APPENDIX B

EXPLORATORY HOLE RECORDS

Exploratory Hole Summary		B1
Key to Exploratory Hole Records		Key
SPT Hammer Energy Ratio Report		JD02, JD04, RD01 and TH70
Borehole Logs		ATK-BH-01 and ATK-BH-02
		ATK-CP-01 to ATK-CP-16, ATK-CP-07A and ATK-CP-13A
		ATK-RC-01 to ATK-RC-03
Trial Pit Logs		ATK-TP-01 to ATK-TP-08
		ATK-TPM-02 to ATK-TPM-05
Split Tube Sample Description:		
	ATK-BH-01	UT6, UT8, UT10, UT16, UT18, UT20, UT22, UT24, UT26 and UT27
	ATK-BH-02	UT5, UT7, UT8, UT9, UT11, UT17, UT19 and UT21

Exploratory Hole Summary

Table: B1	Contract No. A9031-19	Contract: HAVANT THICKET WINTER STORAGE RESERVOIR

Hole ID	Scheduled Depth (m)	Ground Level (mOD)	Hole Type	Top Depth (m)	Base Depth (m)	Start Date	End Date	Monitoring Well	Remarks
ATK-BH-01	10.00	25.73	CP	0.00	12.00	2019-12-09	2019-12-10	✔	
ATK-BH-02	10.00	21.45	CP	0.00	9.20	2019-12-12	2019-12-16	✔	
ATK-CP-01	35.00	37.45	CP	0.00	30.30	2019-11-07	2019-11-12	✔	Terminated due to hard strata.
ATK-CP-02	30.00	30.03	CP	0.00	34.45	2019-11-08	2019-11-14	✔	
ATK-CP-02-TSS	-	30.03	TP	0.00	0.40	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-CP-02. No log included.
ATK-CP-03	20.00	22.72	CP	0.00	9.00	2019-12-05	2019-12-06	-	Terminated due to possible artesian groundwater in deeper strata.
ATK-CP-04	20.00	24.90	CP	0.00	12.20	2019-11-15	2019-11-18	✔	Terminated due to hard strata.
ATK-CP-05	20.00	27.91	CP	0.00	20.00	2019-11-19	2019-11-21	✔	
ATK-CP-06	15.00	34.73	CP	0.00	14.80	2019-12-04	2019-12-05	✔	
ATK-CP-07	10.00	38.75	CP	0.00	2.70	2019-11-26	2019-11-26	-	Borehole terminated due to hard strata, relocated and designated ATK-CP-07A.
ATK-CP-07A	10.00	38.66	CP	0.00	10.35	2019-11-26	2019-11-28	-	
ATK-CP-07-TSS	-	38.75	TP	0.00	0.20	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-CP-07. No log included.
ATK-CP-08	10.00	38.47	CP	0.00	10.44	2019-11-26	2019-11-27	-	
ATK-CP-08-TSS	-	38.47	TP	0.00	0.20	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-CP-08. No log included.
ATK-CP-09	10.00	39.17	CP	0.00	10.10	2019-11-27	2019-11-28	-	
ATK-CP-09-TSS	-	39.17	TP	0.00	0.20	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-CP-09. No log included.
ATK-CP-10	15.00	36.10	CP	0.00	11.50	2019-11-21	2019-11-22	-	Terminated due to hard strata.
ATK-CP-11	10.00	26.15	CP	0.00	11.26	2019-12-17	2019-12-17	✔	
ATK-CP-12	10.00	26.90	CP	0.00	10.45	2019-11-18	2019-11-20	✔	
ATK-CP-13	10.00	29.91	CP	0.00	2.50	2019-11-22	2019-11-22	-	Borehole terminated due to obstruction, relocated and designated ATK-CP-13A.
ATK-CP-13A	10.00	29.75	CP	0.00	10.50	2019-11-25	2019-11-25	✔	
ATK-CP-13-TSS	-	29.91	TP	0.00	0.10	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-CP-13. No log included.
ATK-CP-14	15.00	33.61	CP	0.00	5.40	2019-12-11	2019-12-11	-	Borehole terminated due to slow progress. Unable to safely relocate rig, location cancelled.

Exploratory Hole Summary

Table: B1		Contract No. A9031-19					Contract: HAVANT THICKET WINTER STORAGE RESERVOIR		
Hole ID	Scheduled Depth (m)	Ground Level (mOD)	Hole Type	Top Depth (m)	Base Depth (m)	Start Date	End Date	Monitoring Well	Remarks
ATK-CP-15	30.00	33.45	CP	0.00	30.28	2019-11-28	2019-12-04	✔	
ATK-CP-16	-	37.70	CP	0.00	10.45	2019-12-17	2019-12-18	✔	Panel of experts additional hole.
ATK-RC-01	35.00	40.53	DS	0.00	4.50	2019-12-03	2019-12-03	✔	
			RC	4.50	38.50	2019-12-04	2019-12-09		
ATK-RC-01-TSS	-	40.53	TP	0.00	0.40	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-RC-01. No log included.
ATK-RC-02	60.00	39.87	CP	0.00	6.50	2019-11-13	2019-11-13	✔	Relocated and designated ATK-RC-02A for improved core recovery.
			RC	6.50	72.20	2019-11-18	2019-12-12		
ATK-RC-02A	60.00	39.85	RO	0.00	6.30	2019-12-13	2019-12-13	✔	Carried out to recover additional core.
			RC	6.30	40.00	2019-12-13	2019-12-17		
ATK-RC-03	40.00	31.52	DS	0.00	10.00	2019-12-16	2019-12-17	✔	
			RO	10.00	45.00	2019-12-18	2019-12-18		
			RC	45.00	48.00	2019-12-18	2019-12-18		

Exploratory Hole Summary

Table: B1		Contract No. A9031-19					Contract: HAVANT THICKET WINTER STORAGE RESERVOIR		
Hole ID	Scheduled Depth (m)	Ground Level (mOD)	Hole Type	Top Depth (m)	Base Depth (m)	Start Date	End Date	Monitoring Well	Remarks
ATK-TP-01	4.50	32.55	TP	0.00	3.70	2019-11-13	2019-11-13	-	Terminated due to instability of long faces.
ATK-TP-02	4.50	26.62	TP	0.00	2.50	2019-11-12	2019-11-12	-	
ATK-TP-03	4.50	25.37	TP	0.00	3.80	2019-11-14	2019-11-14	-	
ATK-TP-04	4.50	33.39	TP	0.00	3.40	2019-11-26	2019-11-26	-	Unstable below 3.00 m.
ATK-TP-04-TSS	-	33.39	TP	0.00	0.20	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-04. No log included.
ATK-TP-05	4.50	32.57	TP	0.00	2.00	2019-11-26	2019-11-26	-	Unstable below 2.00 m.
ATK-TP-05i	1.50	32.43	TP	0.00	1.50	2019-12-05	2019-12-05	-	Carried out adjacent to ATK-TP05 to undertake Soakaway Infiltration Test.
ATK-TP-05-TSS	-	32.57	TP	0.00	0.30	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-05. No log included.
ATK-TP-06	4.50	32.07	TP	0.00	3.60	2019-12-10	2019-12-10	-	
ATK-TP-06-TSS	-	32.07	TP	0.00	0.10	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-06. No log included.
ATK-TP-07	4.50	34.55	TP	0.00	1.70	2019-11-26	2019-11-26	-	Terminated due to instability of long faces.
ATK-TP-07i	1.50	34.52	TP	0.00	1.50	2019-12-05	2019-12-05	-	Carried out adjacent to ATK-TP07 to undertake Soakaway Infiltration Test.
ATK-TP-07-TSS	-	34.55	TP	0.00	0.30	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-07. No log included.
ATK-TP-08	4.50	34.01	TP	0.00	2.50	2019-11-27	2019-11-27	-	Unstable below 2.50 m.
ATK-TP-08-TSS	-	34.01	TP	0.00	0.30	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-08. No log included.
ATK-TPM-01	6.50	-	TP	Descoped during fieldwork.					
ATK-TPM-02	6.50	21.79	TP	0.00	3.70	2019-12-02	2019-12-02	-	
ATK-TPM-03	6.50	23.36	TP	0.00	3.80	2019-11-30	2019-11-30	-	
ATK-TPM-04	6.50	23.04	TP	0.00	3.90	2019-12-02	2019-12-02	-	
ATK-TPM-05	6.50	26.86	TP	0.00	4.50	2019-11-20	2019-11-20	-	TPM used to assess stability for possible man entry.
ATK-TPM-05-TSS	-	26.86	TP	0.00	0.30	2019-12-10	2019-12-10	-	Undertaken to recover topsoil sample after completion of ATK-TP-05. No log included.
ATK-TPM-06	6.50	-	TP	Descoped during fieldwork.					
ATK-TPM-07	6.50	-	TP	Descoped during fieldwork.					

Key to Exploratory Hole Records

SOCOTEC

SAMPLES

Undisturbed

U	Driven tube sample	nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	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	Non-intact - used where the core is fragmented (ie no Solid Core).
NA	Not-applicable - 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 in the following run (length in m)
AZCL	Assessed zone of core loss

GROUNDWATER

▼	Groundwater entry
▽	Depth to groundwater after standing period

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:

SP	Standpipe
SPIE	Standpipe piezometer
PPIE	Pneumatic piezometer
EPIE	Electronic piezometer

Plain Pipe 

Slotted Pipe 

Piezometer Tip 

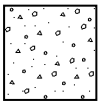
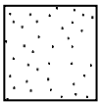
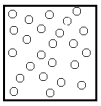
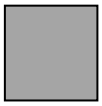
Inclinometer or Slip Indicator The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

ICE The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:
ICM Biaxial inclinometer
SLIP Inclinometer tubing for use with probe
Slip indicator

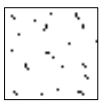
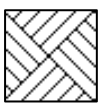
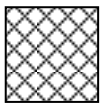
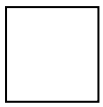
Settlement Points or Pressure Cells The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column. The type of instrument installed is indicated by a code in the Legend column:

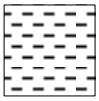
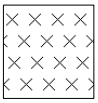
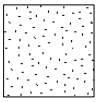
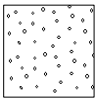
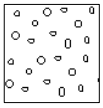
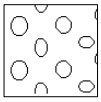
ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point
EPCE	Electronic embedment pressure cell
PPCE	Electronic push in pressure cell

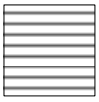
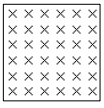
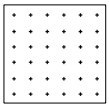
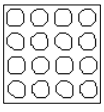
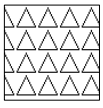
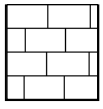
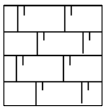
INSTALLATION / BACKFILL LEGENDS A legend describing the installation is shown in the rightmost column. Legend symbols used to describe the backfill materials are indicated below.

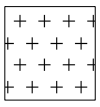
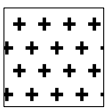
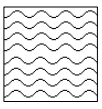
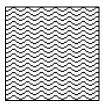
Macadam 
Concrete 
Grout 
Bentonite 
Sand 
Gravel 
Arisings 

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 
Concrete 
Topsoil 
Made Ground / Fill 
Peat 
Void or No Information 

Clay 
Silt 
Sand 
Gravel 
Cobbles 
Boulders 
Coal 

Mudstone 
Siltstone 
Sandstone 
Conglomerate 
Breccia 
Limestone 
Chalk 

Igneous (Fine) 
Igneous (Med) 
Igneous (Coarse) 
Metamorphic (Fine) 
Metamorphic (Med) 
Metamorphic (Coarse) 
Tuff 

Notes:	**Project**	**Key**
See report text for full references of standards.	**Project No.**	
Updated October 2018	**Carried out for**	Sheet 2 of 3

Key to Exploratory Hole Records

SOCOTEC

NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2018 and 14689-1:2018 respectively and the guidance of 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 14688-1:2018 : Geotechnical investigation and testing - Identification and classification of soil. Part 1 Identification and description. British Standards Institution

2 BS EN ISO 14689-1 : 2018 : 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 Calibration Report

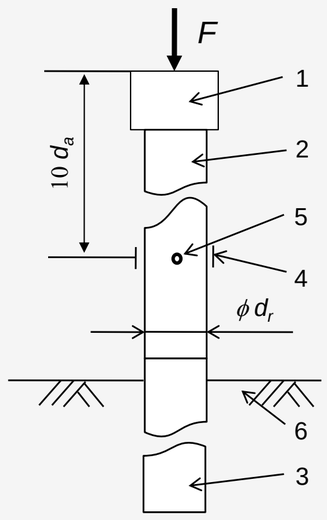
www.equipegroup.com

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Client		JACKSON DRILLING
Test No		EQU2194
Test Depth (m)		6.90
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

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



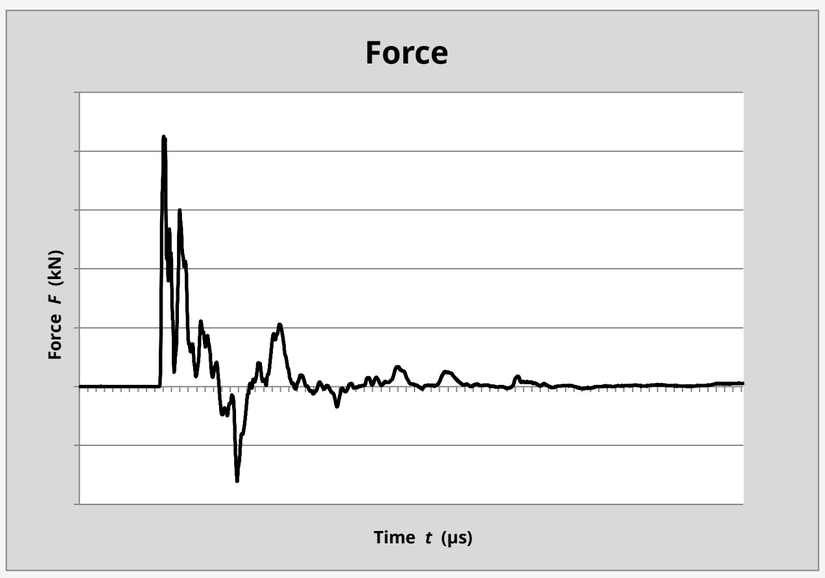
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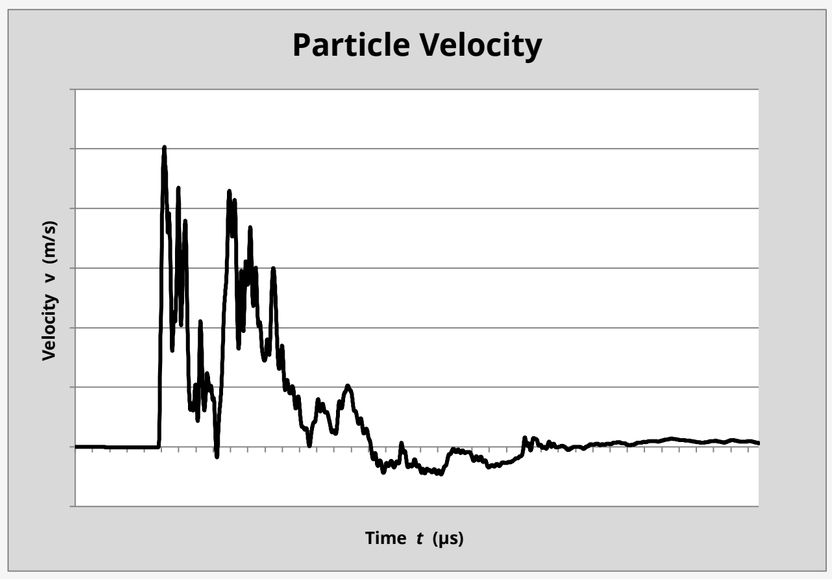
1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

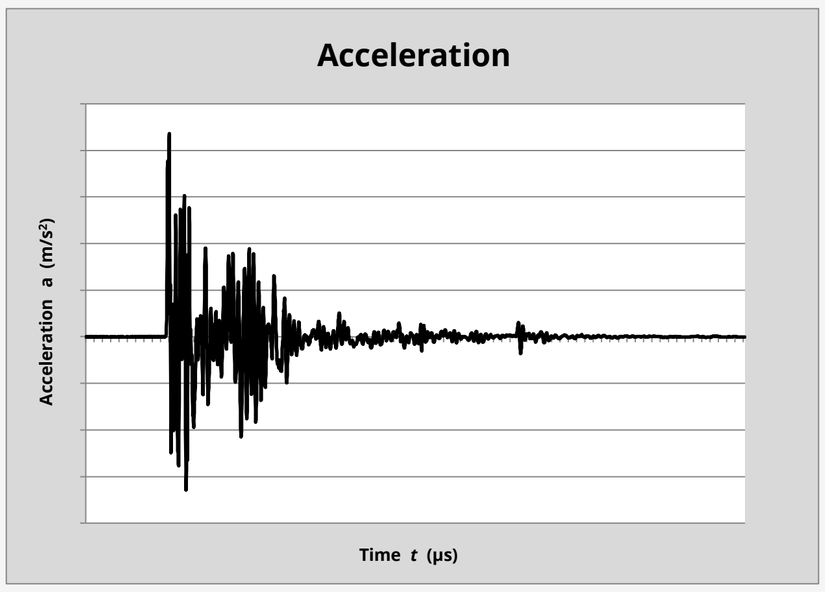
F Force
d_r Diameter of rod

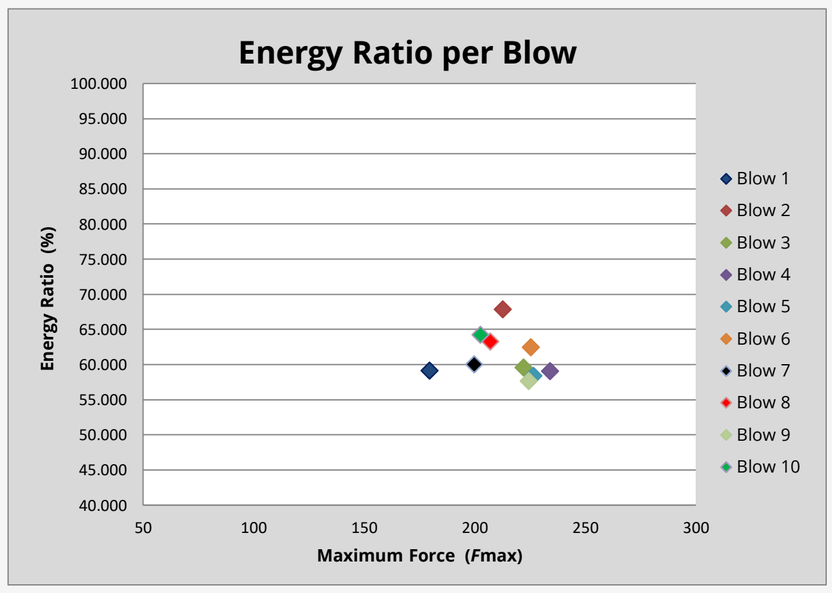
Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST	VALID UNTIL	HAMMER ID
19/12/2018	19/12/2019	JD02









Observations:
1.

E_{meas} =	**0.288** kN-m	
E_{theor} =	**0.473** kN-m	

Energy Ratio = $\frac{E_{meas}}{E_{theor}}$ (E_r) **60.95%**

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Equipe SPT Analyzer Operators: **AF**

Prepared by:	20/12/2018	**Checked by:**	20/12/2018	**Date:** 20/12/2018

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Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

SPT Calibration Report

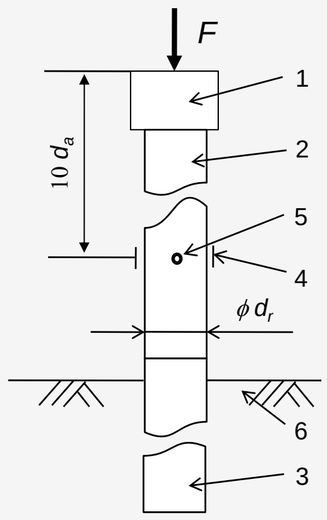
www.equipegroup.com

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Client		JACKSON DRILLING
Test No		EQU2193
Test Depth (m)		6.70
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

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



Key

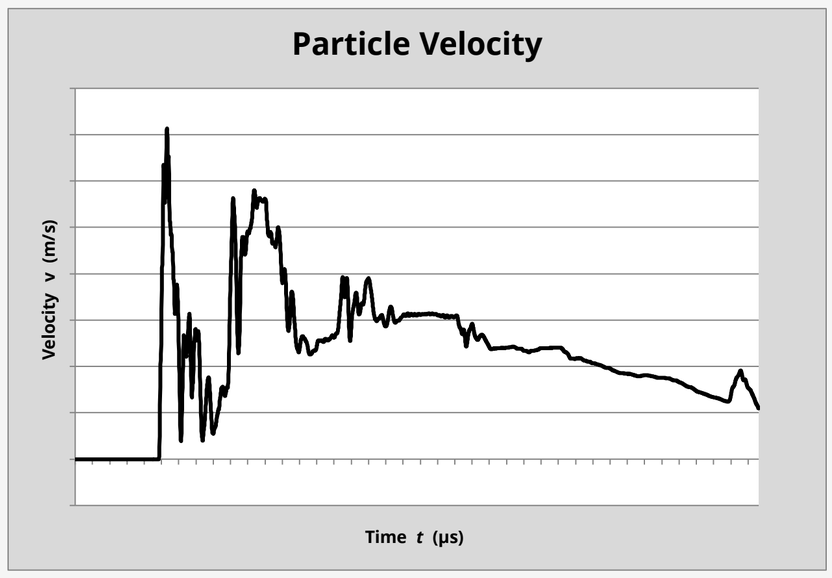
1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

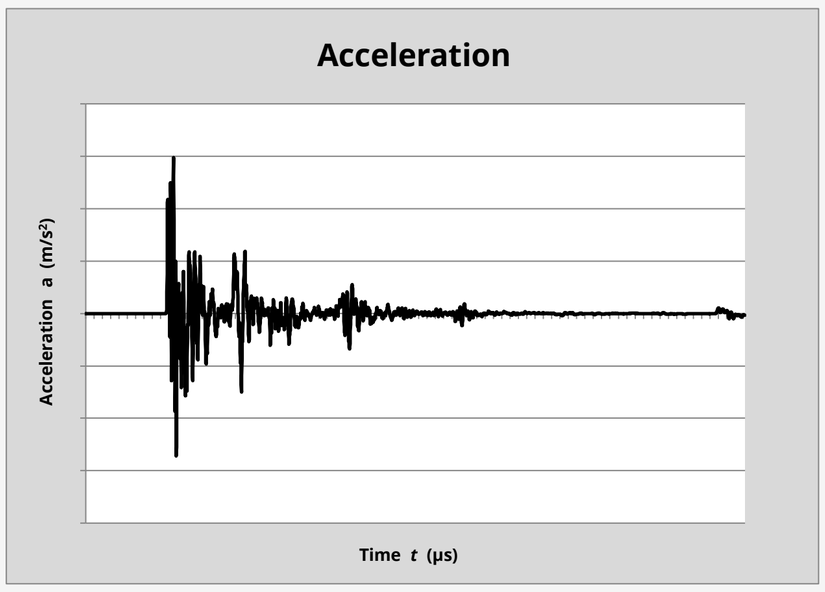
F Force
d_r Diameter of rod

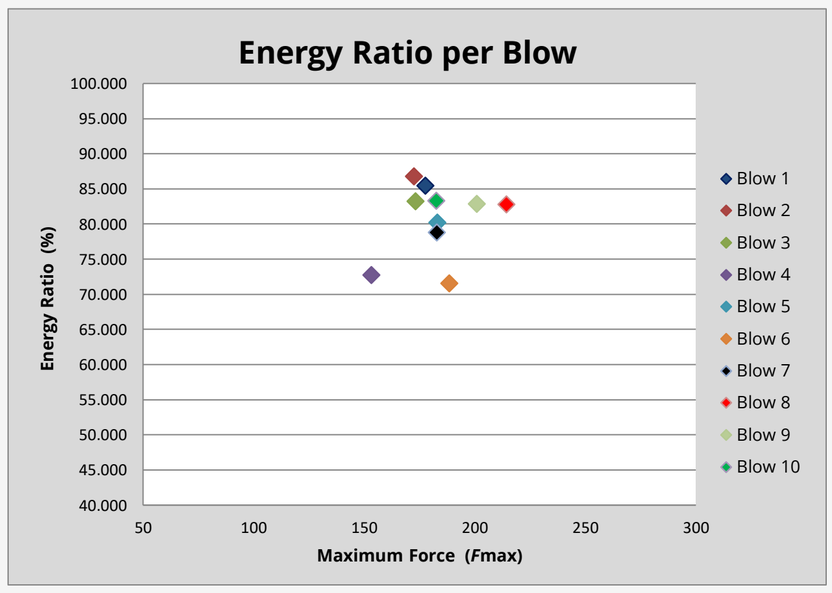
Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST	VALID UNTIL	HAMMER ID
19/12/2018	19/12/2019	JD04









Observations:
1.

E_{meas} = **0.381** kN-m

E_{theor} = **0.473** kN-m

Energy Ratio = $\frac{E_{meas}}{E_{theor}}$ (E_r) **80.47%**

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Equipe SPT Analyzer Operators: **AF**

Prepared by: 20/12/2018 **Checked by:** 20/12/2018 **Date:** 20/12/2018

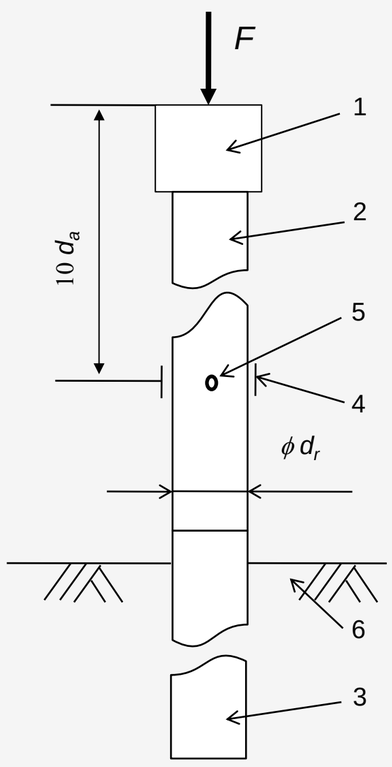
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer	SPT HAMMER
Test No	EQU2270
Client	JACKSON DRILLING
Test Depth (m)	8.40
Mass of hammer	m = 63.5kg
Falling height	h = 0.76m
E_{theor} =	$m \times g \times h$ = 473J

Characteristics of the instrumented rod

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



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

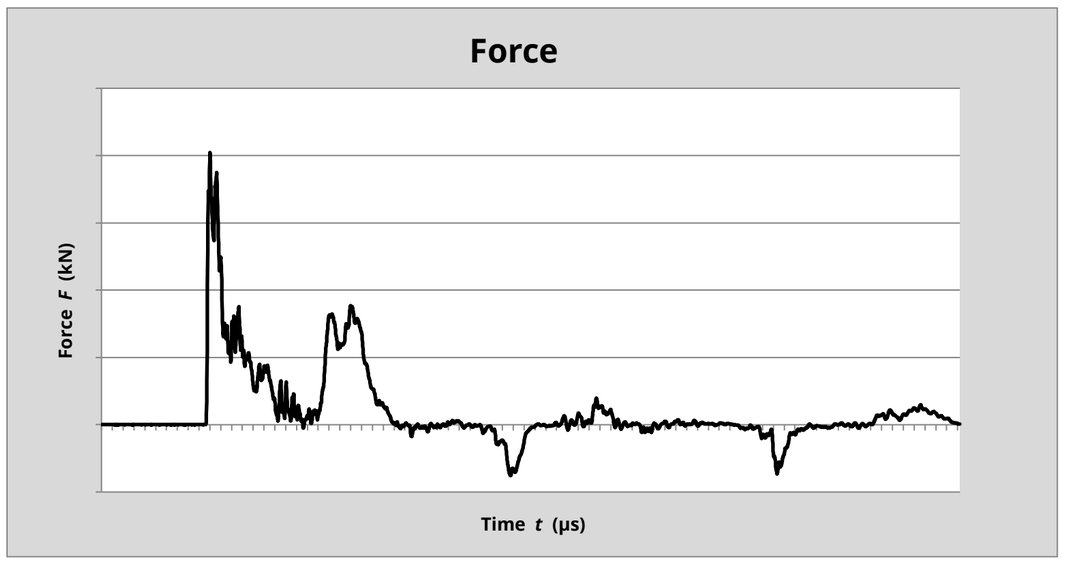
F Force
d_r Diameter of rod

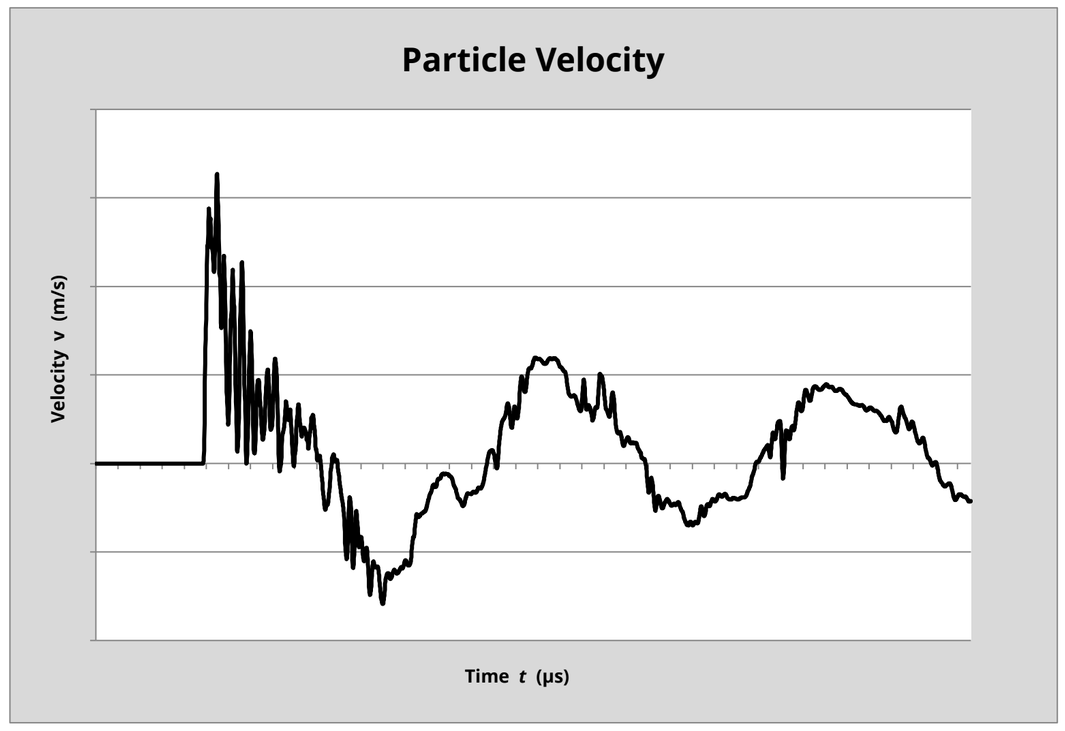
Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

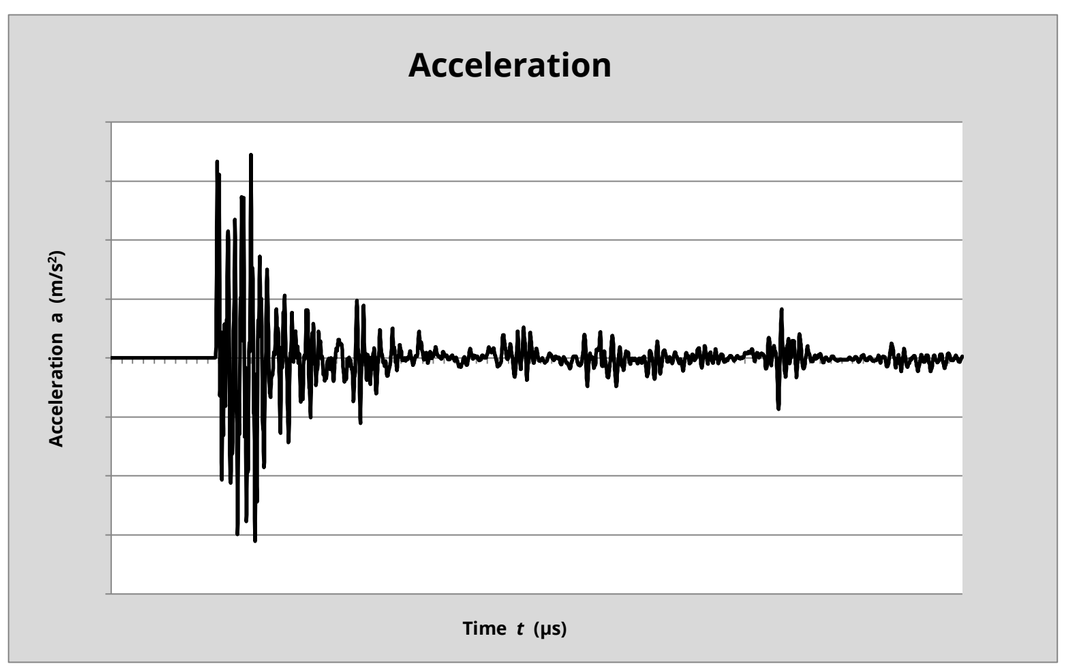
DATE OF TEST	VALID UNTIL	HAMMER ID
09/01/2019	09/01/2020	RD02

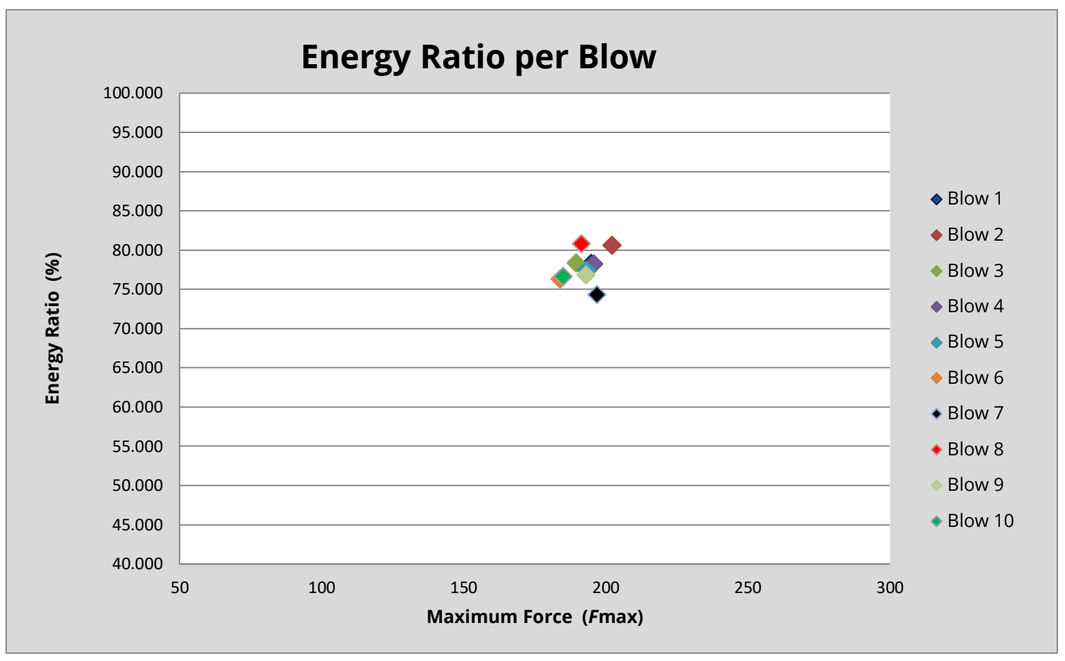
Observations:
1.

E_{meas} =	**0.367** kN-m
E_{theor} =	**0.473** kN-m









Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$

77.52%

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Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
AF	18/01/2019	18/01/2019	**18/01/2019**

© Copyright 2019 **Equipe Group**, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	TH70
Test Date:	18/10/2019
Report Date:	18/10/2019
File Name:	TH70.spt
Test Operator:	JL

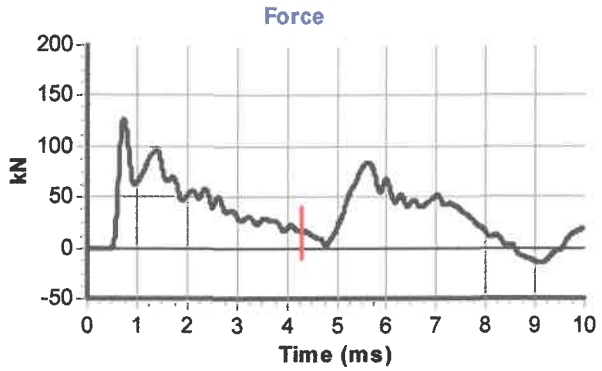
Instrumented Rod Data

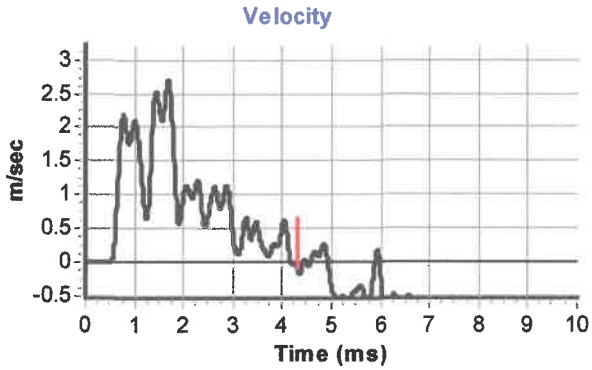
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.2
Assumed Modulus E_a (GPa):	210
Accelerometer No.1:	7080
Accelerometer No.2:	11609

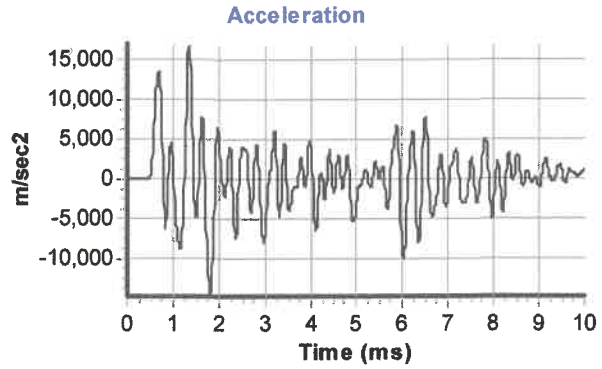
SPT Hammer Information

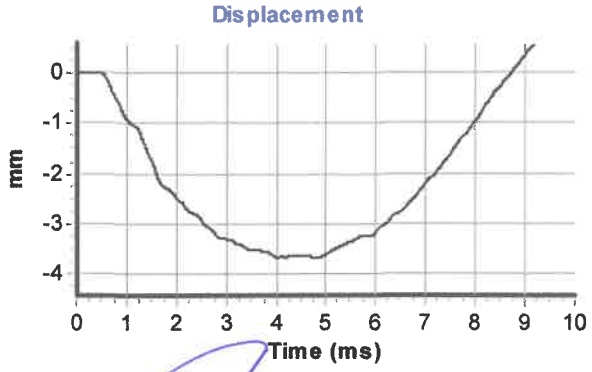
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	931
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	302

Energy Ratio E_r (%): **64**

Signed: S. HOWARTH

Title: FITTER

The recommended calibration interval is 12 months

SPTMAN ver.1.93 All rights reserved, Testconsult ©2010

Borehole Log

SOCOTEC

Drilled	AR	**Start**	09/12/2019
Logged	RP/FC	**End**	10/12/2019
Checked	MS		
Approved	TC		

Equipment, Methods and Remarks

Dando 2000./
Cable percussion boring.
SPT Hammer ID: JD02, Rod type: Whitworth.
Vibrating wire piezometers installed at 7.00m and 11.00m on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	12.00	150	1.70

Ground Level	25.73 mOD
Coordinates (m)	E 471199.06
National Grid	N 109325.94

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.05 - 0.10	LB 1	0.00-1.20 Hand excavated inspection pit.		
0.05 - 0.10	LB 2			
0.10 - 0.30	B 4			
0.30	D 3			
0.50 - 1.00	B 5			
1.00	UT 6	11 blows 80% rec		Dry
1.50	UT 8	20 blows 100% rec	1.50	Dry
1.50	D 7			
2.00	UT 10	21 blows 100% rec	1.70	Dry
2.00	D 9			
2.50	UT 12	25 blows No Recovery	1.70	Dry
2.50	D 11			
2.50 - 3.00	B 13			
3.00	UT 14	28 blows No Recovery	1.70	Dry
3.00 - 3.50	B 15			
3.50	UT 16	28 blows 100% rec	1.70	Dry
4.10	UT 18	28 blows 100% rec	1.70	Dry
4.10	D 17			
4.70	UT 20	100% rec	1.70	Dry
4.70	D 19			
			09/12/19	1630
			1.70	Dry
5.30	UT 22	29 blows 75% rec		
5.30	D 21		10/12/19	0715
			1.70	Dry
5.90	UT 24	30 blows 90% rec	1.70	Dry
5.90	D 23			
6.50	UT 26	30 blows 90% rec	1.70	Dry
6.50	D 25			
7.00	UT 27	33 blows 100% rec	1.70	Dry
7.60	UT 29	35 blows 100% rec	1.70	Dry
7.60	D 28			
8.20	D 30			
8.30	UT 31	35 blows 100% rec	1.70	Dry
8.80	UT 33	38 blows 100% rec	1.70	Dry
8.80	D 32			
9.40	UT 34	40 blows	1.70	Dry

Strata Description

Main	Detail	Depth, Level (Thickness)
TOPSOIL.		0.10 (0.10) +25.63
Soft brownish grey, mottled orange and brown, slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse of flint.		(0.40)
Soft to firm brownish grey, mottled orangish brown, slightly sandy slightly gravelly silty CLAY.		0.50 +25.23 (0.50)
Soft to firm greyish brown, mottled orangish brown and bluish grey, slightly sandy CLAY. Sand is fine to coarse. Rare roots (up to 5mm) and occasional rootlets (20x20mm). Rare pockets of selenite crystals (up to 10mm).	1.00-1.20 fine to coarse gravel of mudstone 1.42-1.45 dark orangish brown slightly sandy gravelly clay lens. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of sandstone	1.00 +24.73 (1.33)
Stiff, locally fissured brown, mottled dark grey and bluish grey, slightly sandy CLAY. Rare plant/ organic material. Rare selenite crystals. Rare shell fragments (20x5mm). Fissures are randomly orientated, extremely closely spaced, planar, smooth.	1.50 firm to stiff 1.54-1.95 rare pockets (up to 60x2mm) 2.03-2.09 firm 2.09-2.33 very soft, frequent rootlets 2.19 1 no. pocket (50x10mm) of dark brown rootlets	2.33 +23.40 (1.77)
Firm to stiff friable, locally fissured, orangish grey and brown, mottled bluish grey, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of ironstone and siltstone. Fissures are horizontal to 5 degree and 85 to 90 degree, extremely closely spaced, planar, smooth.		4.10 +21.63 (0.77)
Stiff to very stiff, locally fissured, dark brownish grey silty slightly micaceous CLAY. Rare shell fragments (up to 2x5mm). Fissures are horizontal to 5 degree and randomly orientated, extremely closely spaced, planar, smooth.	4.93 local pockets (up to 20mm) of dark grey , mottled orangish brown, silt 5.50 very stiff 5.90 rare pockets (up to 20x5mm) of light grey silt, locally indistinctly laminated 6.21 1 no. pocket (up to 20mm) of light grey fine sand/ silt 6.29 frequent shell fragments (up to 20mm) 6.75 1 no. pocket (up to 25mm) of dark grey silt and fine sand 6.89-6.92 1 no. pocket (up to 20mm) of dark grey silt and fine sand	4.87 +20.86 (6.73)

Legend / Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:47:07

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-BH-01

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	25.73 mOD
Logged	RP/FC	09/12/2019	Dando 2000./	1.20	12.00	150	1.70	**Coordinates (m)**	E 471199.06
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109325.94
Approved	TC	10/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Vibrating wire piezometers installed at 7.00m and 11.00m on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 10.00	UT 36 D 35	41 blows 100% rec	1.70	Dry	Stiff to very stiff, locally fissured, dark brownish grey silty slightly micaceous CLAY. Rare shell fragments (up to 2x5mm). Fissures are horizontal to 5 degree and randomly orientated, extremely closely spaced, planar, smooth.	10.00 local pockets (up to 50x10mm) of fine sand and silt			
10.50	UT 37	43 blows 100% rec	1.70	Dry					
11.00	UT 38	45 blows	1.70	Dry					
11.60 11.60	UT 40 D 39	47 blows 89% rec	1.70 10/12/19 1.70	Dry 1630 Dry	Very stiff, locally indistinctly laminated, dark grey slightly sandy silty CLAY. Sand is fine to medium.		11.60 +14.13 (0.40)		
12.00	D 41				END OF EXPLORATORY HOLE		12.00 +13.73		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:47:07

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-BH-01

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	21.45 mOD
Logged	FC	12/12/2019	Dando 2000. Cable percussion boring.	1.20	9.20	150	4.50	**Coordinates (m)**	E 471397.98
Checked	MS	**End**	SPT Hammer ID: JD02, Rod type: Whitworth.					**National Grid**	N 109170.99
Approved	TC	16/12/2019	Vibrating wire piezometer installed at 4.00 m on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			TOPSOIL.		0.10 (0.10) +21.35		
					Dark brown sandy CLAY. Frequent rootlets.		0.20 (0.10) +21.25		
0.30 - 0.50	B 2				Firm greyish brown and orangish brown slightly sandy CLAY.				
0.50 - 0.80	B 3								
0.80 - 1.20	B 4						(1.00)		
1.20	UT 5	10 blows 75% rec	1.20	Dry			1.20 +20.25		
					Firm orangish brown, mottled grey, slightly sandy CLAY. Frequent plant material (up to 40mm).				
						1.52 rare subangular to rounded gravel of mudstone and sandstone (up to 20mm)	(0.60)		
1.80	UT 7	22 blows 85% rec	1.70	Dry			1.80 +19.65		
1.80	D 6				Firm orangish brown, mottled light grey, slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of quartzite, chert and mudstone. Rare rootlets (up to 40mm) and plant material.	1.92-1.99 brown and grey slightly sand clayey subangular to subrounded fine to coarse gravel of mudstone, siltstone and chert	(0.63)		
2.30	UT 8	24 blows 100% rec	1.70	Dry			2.43 +19.02		
					Firm to stiff greyish brown, mottled orangish brown, slightly sandy CLAY. Rare pockets (up to 20mm) of white sand/silt.				
2.80	UT 9	30 blows 80% rec	1.70	Dry		1.99-2.04 orangish brown fine to coarse sand	(0.97)		
3.40	UT 11	30 blows 100% rec	3.00	Damp		2.80-3.40 rare subangular fine to coarse gravel of chert and mudstone	3.40 +18.05		
3.40	D 10				Stiff, locally fissured, brown, mottled bluish grey, silty CLAY. Fissures are horizontal to 5 degree, randomly orientated, extremely closely spaced, planar, smooth.	3.12 1 no. pocket of orangish brown slightly sandy slightly gravelly clay. Gravel is subangular fine to coarse of mudstone and sandstone			
4.00	UT 13	50 blows No Recovery	3.00	Damp			(1.70)		
4.00	D 12								
4.00 - 4.60	B 14								
4.60 - 5.05	SPTS	N=6 (1,1/1,2,1,2)	4.50	Dry		3.44-3.47 rare subangular coarse gravel of chert			
4.60	D 15								
4.60 - 5.10	B 16								
			12/12/19	1330					
			4.50	Dry					
5.10	UT 17	28 blows 70% rec	16/12/19	0745		3.70 orangish brown lenses (up to 10mm) of fine to medium sand	5.10 +16.35		
			4.50	Dry	Very stiff, locally fissured, grey slightly sandy silty slightly micaceous CLAY with occasional pockets/ lenses (up to 35mm) of dark grey fine sand and silt. Fissures are horizontal to 5 degree, extremely closely spaced, planar, smooth.	3.78 1 no. pocket (up to 20mm) of grey fine sand/silt			
5.70	UT 19	32 blows 70% rec	4.50	Dry		4.00 grey, locally mottled brown			
5.70	D 18								
6.20	UT 21	35 blows 70% rec	4.50	Dry		6.20 locally indistinctly laminated			
6.20	D 20					6.38 1 no. fossil fragment (35x20mm)			
6.80	UT 23	36 blows 100% rec	4.50	Dry					
6.80	D 22						(4.10)		
7.40	UT 25	38 blows	4.50	Dry					
7.40	D 24								
8.00	UT 27	40 blows	4.50	Dry					
8.00	D 26								
8.50	D 28								
8.60	UT 29	43 blows	4.50	Dry					
			16/12/19	1530					
			4.50	Dry					
9.20	D 30				END OF EXPLORATORY HOLE		9.20 +12.25		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	0.40	Seepage.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
4.00 - 4.20	30	Chisel

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.

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Scale 1:50

09/04/2020 20:47:08

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-BH-02

Sheet 1 of 1

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.45 mOD
Logged	RT	07/11/2019	Dando 2000.	1.20	30.00	250	6.50	**Coordinates (m)**	E 470921.01
Checked	MS	**End**	Cable percussion boring.	30.00	30.30	150	30.00	**National Grid**	N 109351.98
Approved	TC	12/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to hard strata. Standpipe piezometer installed on completion.					**Inclination**	

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.		
0.30 - 0.50	B 2			
0.50	D 3			
0.50 - 0.80	B 4			
0.80 - 1.20	B 5			
1.00	D 6			
1.20 - 1.65	SPTS	N=7 (1,1/1,2,2,2)		Damp
1.20 - 1.65	D 7			
1.20 - 1.70	B 8			
1.70 - 2.00	B 9			
2.00 - 3.00	Falling Head	k=1.4E-6 m/s	2.00	Dry
2.00	UT 11	11 blows 100% rec		
2.00	D 10			
2.50	EW 2			
2.50	EW 3			
2.50	D 12			
2.50 - 3.00	B 13			
3.00 - 3.45	SPTS	N=7 (1,1/1,1,3,2)	3.00	Dry
3.00	EW 1			
3.00	D 14			
3.00	D 15			
3.00 - 3.50	B 16			
3.40 - 4.00	Rising Head	k=2.8E-9 m/s		
3.50 - 4.00	B 17			
4.00	UT 19	17 blows 100% rec	4.00	Dry
4.00	D 18			
			07/11/19 4.00	1750
4.50	D 20			
4.50 - 5.00	B 21		11/11/19 4.00	0730 6.20
5.00 - 5.45	SPTS	N=15 (1,2/3,4,4,4)	5.00	Damp
5.00 - 5.45	D 22			
5.00 - 5.50	B 23			
5.50 - 6.00	B 24			
6.00	UT 26	22 blows 100% rec	6.00	Dry
6.00	D 25			
6.50	D 27			
6.50 - 7.00	B 28			
6.80	W 55			
7.00 - 7.45	SPTS	N=14 (1,2/3,3,4,4)	6.50	Dry
7.00	D 29			
7.00	D 30			
7.00 - 7.50	B 31			
7.50 - 8.00	B 32			
8.00	UT 34	25 blows 100% rec	6.50	Dry
8.00	D 33			
8.50	D 35			
8.50 - 9.00	B 36			
9.00 - 9.45	SPTS	N=23 (2,3/5,6,6,6)	6.50	Dry
9.00	D 37			
9.00	D 38			
9.00 - 9.50	B 39			
9.50 - 10.00	B 40			

Strata Description

Main	Detail	Depth, Level (Thickness)
Soft brown slightly sandy CLAY with frequent rootlets. (TOPSOIL)		0.05 (0.05) +37.40
Soft orangish brown slightly sandy CLAY with frequent pockets (up to 5mm) of orange fine silt.		(0.45)
Soft to firm orangish brown, mottled light brown, slightly sandy CLAY with frequent pockets (up to 5mm) of orange fine silt. Rare fine gravel.		0.50 +36.95 (0.70)
Firm orangish brown, mottled light brown, slightly sandy silty CLAY. Frequent pockets (up to 5mm) of orange silt and fine sand.		1.20 +36.25 (0.80)
Firm to stiff light brown, mottled orangish brown and light grey, slightly sandy silty CLAY. Frequent pockets of orange silt and fine sand. Occasional pockets (up to 5mm) of black silt. Occasional partings (up to 1mm) of orange and light brown fine sand. Slightly pyritic.		2.00 +35.45 (2.00)
Stiff to very stiff dark grey, occasionally mottled light grey, slightly sandy CLAY. Occasional light grey lenses/layers (up to 5mm) of fine sand. Pyritic.	4.50-5.00 becoming stiff with occasional shell fragments present 5.00-6.00 stiff to very stiff 6.00-6.50 becoming very stiff	4.00 +33.45 (2.50)
Stiff dark grey with occasional light grey mottling slightly sandy silty CLAY. Occasional light grey lenses/layers (up to 60mm) of silty fine Sand. Pyritic. Occasional shell fragments present.	7.00-8.00 no shell fragments observed 8.00-11.50 occasional shell fragments present	6.50 +30.95 (5.50)

Legend

Backfill

1

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	0.90	Seepage	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:05

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-01

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.45 mOD
Logged	RT	07/11/2019	Dando 2000.	1.20	30.00	250	6.50	**Coordinates (m)**	E 470921.01
Checked	MS	**End**	Cable percussion boring.	30.00	30.30	150	30.00	**National Grid**	N 109351.98
Approved	TC	12/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to hard strata. Standpipe piezometer installed on completion.					**Inclination**	

Samples and Tests / Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 10.00	UT 42 D 41	26 blows 100% rec	6.50	Dry	Stiff dark grey with occasional light grey mottling slightly sandy silty CLAY. Occasional light grey lenses/layers (up to 60mm) of silty fine Sand. Pyritic. Occasional shell fragments present.				
10.50 10.50 - 11.00	D 43 B 44								
11.00 11.00 - 11.50	D 45 B 46								
11.50 - 11.95 11.50 11.50 - 12.00	SPTS D 47 B 48	N=20 (3,3/4,5,5,6)	6.50	Dry		11.50-12.00 stiff			
12.00 12.00 - 12.50	D 49 B 50				Stiff to very stiff dark grey, occasionally mottled grey, silty CLAY. Occasional grey lenses/layers (up to 60mm) of silt.		12.00 +25.45		
12.50 - 13.00	B 51								
13.00 13.00	UT 53 D 52	26 blows 100% rec	6.50	Dry					
13.50 13.50 - 14.00	D 54 B 56								
14.00 14.00 - 14.50	D 57 B 58								
14.50 - 14.95 14.50 14.50 - 15.00	SPTS D 59 B 60	N=24 (3,4/5,6,6,7)	6.50	Dry			(5.00)		
15.00 15.00 - 15.50	D 61 B 62								
15.50 - 16.00	B 63								
16.00 16.00	UT 65 D 64	31 blows	6.50	Dry					
16.50 16.50 - 17.00	D 66 B 67								
17.00 17.00 - 17.50	D 68 B 69				Stiff to very stiff thinly laminated dark grey, mottled grey, silty CLAY. Pyritic.		17.00 +20.45		
17.50 - 17.95 17.50 - 17.95 17.50 - 18.00	SPTS D 70 B 71	N=24 (3,4/5,6,6,7)	6.50	Dry		17.50-18.00 occasional lenses/ layers of grey silt			
18.00 18.00 - 18.50	D 72 B 73					18.00-24.50 fissures present (randomly orientated and extremely closely spaced), occasional fissure faces have silt dusting locally slightly polished			
18.50 - 19.00	B 74								
19.00 19.00	UT 76 D 75	33 blows	6.50	Dry		18.50-19.00 occasional light grey to grey lenses/ layers of silt			
19.50 19.50 - 20.00	D 77 B 78								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:05

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-01

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.45 mOD
Logged	RT	07/11/2019	Dando 2000.	1.20	30.00	250	6.50	**Coordinates (m)**	E 470921.01
Checked	MS	**End**	Cable percussion boring.	30.00	30.30	150	30.00	**National Grid**	N 109351.98
Approved	TC	12/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to hard strata. Standpipe piezometer installed on completion.					**Inclination**	

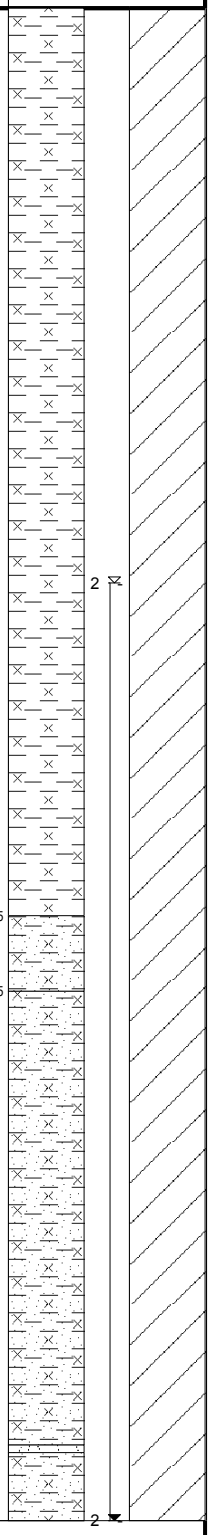
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
20.00	D 79			
20.00 - 20.50	B 80			
20.50 - 20.95	SPTS	N=26 (4,6/6,6,7,7)	6.50	Dry
20.50	D 81			
20.50 - 21.00	B 82			
21.00	D 83			
21.00 - 21.50	B 84			
21.50 - 22.00	B 85			
22.00	UT 87	36 blows 100% rec	6.50	Dry
22.00	D 86			
22.50	D 88			
22.50 - 23.00	B 89			
23.00	D 90			
23.00 - 23.50	B 91			
23.50 - 23.95	SPTS	N=34 (5,7/8,8,9,9)	6.50	Dry
23.50	D 92			
23.50 - 24.00	B 93			
24.00	D 94			
24.00 - 24.50	B 95			
24.50 - 25.00	B 96			
25.00	UT 98	38 blows 100% rec	6.50	Dry
25.00	D 97			
			11/11/19	1730
			6.50	Dry
25.50	D 99			
25.50 - 26.00	B 100		12/11/19	0730
			6.50	21.50
26.00	D 101			
26.00 - 26.50	B 102			
26.50 - 26.95	SPTS	N=36 (5,7/8,9,9,10)	6.50	Dry
26.50	D 109			
26.50	B 103			
26.50 - 27.00	B 104			
27.00	D 105			
27.00 - 27.50	B 106			
27.50 - 28.00	B 107			
28.00	UT 108	39 blows 100% rec	6.50	Dry
28.50 - 29.00	B 110			
29.00	D 111			
29.00 - 29.50	B 112			
29.50 - 29.95	SPTS	N=33 (6,7/8,8,8,9)	6.50	Dry
29.50	D 113			
29.50 - 30.00	B 114			

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend
Stiff to very stiff thinly laminated dark grey, mottled grey, silty CLAY. Pyritic.		(9.00)	
	23.50 becoming very stiff		
Very stiff fissured dark grey sandy silty CLAY. Sand is fine. Pyritic. Fissures are randomly orientated, extremely closely spaced, occasional silty sand dustings. Rare slightly polished faces. Occasional shell fragments present.		26.00 +11.45 (0.50)	
Very stiff fissured dark grey, occasionally mottled light grey, sandy silty CLAY. Sand is fine. Occasional light grey lenses/layers (up to 5mm) of silty sand. Pyritic. Fissures are randomly orientated, extremely closely spaced, occasional silty sand dustings on surfaces. Rare slightly polished faces. Rare shell fragments (up to 60mm).		26.50 +10.95 (3.00)	
	28.50 possible burrow structure		
Dark grey clayey fine SAND. Occasional shell fragments present. Pyritic.		29.50 +7.95 (0.05) 29.55 +7.90	
Firm to stiff dark grey sandy silty CLAY. Sand is fine. Pyritic. Occasional shell fragments.		(0.75)	

Backfill



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
2	30.00	Rose to 23.80 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:05

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-01

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.45 mOD
Logged	RT	07/11/2019	Dando 2000.	1.20	30.00	250	6.50	**Coordinates (m)**	E 470921.01
Checked	MS	**End**	Cable percussion boring.	30.00	30.30	150	30.00	**National Grid**	N 109351.98
Approved	TC	12/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to hard strata. Standpipe piezometer installed on completion.					**Inclination**	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			12/11/19	1730	Firm to stiff dark grey sandy silty CLAY. Sand is fine. Pyritic. Occasional shell fragments.	30.20-30.30 driller notes cemented shells			
			30.00	23.80					
					END OF EXPLORATORY HOLE		30.30 +7.15		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
30.20 - 30.20	30	Chisel

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.

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Scale 1:50

09/04/2020 20:49:05

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-01

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	30.03 mOD
Logged	PC	08/11/2019	Dando 2500.	1.20	30.00	200	30.00	**Coordinates (m)**	E 471172.00
Checked	MS	**End**	Cable percussion boring.	30.00	34.45	150	32.50	**National Grid**	N 109034.97
Approved	TC	14/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.					**Inclination**	
			Standpipe piezometer installed on completion.						

Samples and Tests / Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		0.00-1.20 Hand excavated inspection pit.			Brown gravelly slightly clayey fine to medium SAND. Gravel is subrounded to subangular fine to coarse of Flint.		(0.40)		
0.20	D 1				(TOPSOIL)		0.40 +29.63		
0.40	D 2				Orangish brown, mottled dark brown and brown, gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to coarse of flint.				
0.40 - 1.00	B 3						(0.80)		
1.20 - 1.65	SPTS	N=20 (2,2/2,4,7,7)		Dry	Medium dense orangish brown, mottled light grey and reddish brown, slightly gravelly clayey fine to medium SAND. Gravel is subrounded fine to coarse of cemented sands.		1.20 +28.83		
1.20 - 1.45	D 4								
1.20 - 1.70	B 5								
1.70 - 2.00	D 6		08/11/19	1400		1.70-2.50 Orangish brown and reddish brown mottled.			
			2.00	Dry					
2.00 - 2.45	SPTS	2.00-5.00 Water added.							
2.00 - 2.45	D 7	N=12 (2,2/3,3,3,3)	11/11/19	0730			(1.80)		
			2.00	2.50					
2.50 - 3.00	D 9					2.50-3.00 Orangish brown with light grey and reddish brown mottling.			
2.50 - 3.00	B 8								
3.00 - 3.45	SPTS	N=9 (1,2/2,1,2,4)	3.00	0.50	Loose orangish brown, mottled reddish brown and light greyish brown, clayey fine to medium SAND.		3.00 +27.03		
3.00 - 3.45	D 10								
3.00 - 3.50	B 11						(0.50)		
3.50 - 4.00	D 12				Soft orangish brown, mottled greyish brown, sandy CLAY. Sand is fine to medium.		3.50 +26.53		
4.00 - 4.45	SPTS	N=7 (1,1/2,1,2,2)	4.00	0.50		4.00-4.50 Occasional reddish brown mottling.			
4.00 - 4.45	D 13								
4.00 - 4.50	B 14						(1.50)		
4.50 - 5.00	D 15								
5.00 - 5.45	SPTS	N=6 (2,1/1,2,1,2)	5.00	0.50	Soft to firm dark grey slightly sandy to sandy CLAY. Sand is fine. Pyritic.		5.00 +25.03		
5.00 - 5.45	D 16								
5.00 - 5.50	B 17								
5.50 - 6.00	D 18								
6.00 - 6.45	SPTS	N=4 (1,1/1,1,1,1)	6.00	Dry		6.00-6.50 Occasional black pockets (up to 60mm) of silt.			
6.00 - 6.45	D 19								
6.00 - 6.50	B 20						(2.45)		
6.50 - 7.00	Falling Head	k=1.5E-6 m/s							
6.50 - 7.00	D 21								
7.00 - 7.45	UT 22	41 blows 100% rec	7.00	Dry					
7.45	D 23				Firm to stiff dark grey sandy CLAY. Sand is fine. Possible fissures present. Pyritic.		7.45 +22.58		
7.50 - 8.00	B 24								
			11/11/19	1730					
			8.00	Dry					
8.00 - 8.45	SPTS	N=14 (1,2/2,3,4,5)				8.00-9.00 Possible thin laminations. Occasional shell fragments (up to 60mm). 8.50-9.00 Occasional pockets (up to 60mm) of black silt.			
8.00 - 8.45	D 25		12/11/19	0730			(1.55)		
8.00 - 8.50	B 26		8.00	7.50					
8.50 - 9.00	D 27								
8.50 - 9.00	B 28								
9.00 - 9.45	UT 29	55 blows 100% rec	9.00	8.50	Stiff to very stiff dark grey, mottled grey to greyish brown, slightly sandy silty CLAY. Sand is fine. Occasional grey to greyish brown lenses/layers (up to 60mm) of silty pyritic sand.		9.00 +21.03		
9.45	D 30					9.45-10.50 Occasional shell fragments.			
9.50 - 10.00	B 31								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:06

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-02

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	30.03 mOD
Logged	PC	08/11/2019	Dando 2500.	1.20	30.00	200	30.00	**Coordinates (m)**	E 471172.00
Checked	MS	**End**	Cable percussion boring.	30.00	34.45	150	32.50	**National Grid**	N 109034.97
Approved	TC	14/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.					**Inclination**	
			Standpipe piezometer installed on completion.						

Samples and Tests / Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.45	SPTS	N=20 (3,3/3,5,6,6)	10.00	9.00	Stiff to very stiff dark grey, mottled grey to greyish brown, slightly sandy silty CLAY. Sand is fine. Occasional grey to greyish brown lenses/layers (up to 60mm) of silty pyritic sand.				
10.00 - 10.45	D 32								
10.00 - 10.50	B 33								
10.50 - 11.00	D 35					10.50-12.00 Fissures are randomly orientated and extremely closely spaced.	(3.00)		
10.50 - 11.00	B 34								
11.00 - 11.50	B 36								
11.50 - 11.95	UT 37	81 blows 100% rec	11.50	10.80					
11.95	D 38								
12.00 - 12.50	B 39				Stiff to very stiff fissured dark grey with occasional light grey to greyish brown sandy silty CLAY. Sand is fine grained. Occasional light grey to greyish brown lenses/layers of silt. Pyritic. Fissures are randomly orientated, extremely closely spaced, occasional faces have silty sandy dustings.	12.00-12.50 Occasional shell fragments.	12.00 +18.03		
12.50 - 13.00	D 41								
12.50 - 13.00	B 40								
13.00 - 13.45	SPTS	N=22 (3,4/4,5,5,8)	13.50	Dry					
13.00 - 13.45	D 42								
13.00 - 13.50	B 43								
13.50 - 14.00	D 45					13.50-14.00 Indistinctly thinly laminated			
13.50 - 14.00	B 44								
14.00 - 14.50	B 46					14.00-22.45 Rare to occasional shell fragments (up to 60mm).			
14.50 - 14.95	UT 47	56 blows 100% rec	14.00	Dry					
14.95	D 48								
15.00 - 15.50	B 49								
15.50 - 16.00	D 51								
15.50 - 16.00	B 50								
16.00 - 16.45	SPTS	N=25 (4,5/5,6,7,7)	14.00	Dry					
16.00 - 16.45	D 52								
16.00 - 16.50	B 53								
16.50 - 17.00	D 55								
16.50 - 17.00	B 54								
17.00 - 17.50	B 56								
17.50 - 17.95	UT 57	64 blows 100% rec	14.00	Dry					
17.95	D 58								
18.00 - 18.50	B 59								
18.50 - 19.00	D 61						(13.00)		
18.50 - 19.00	B 60								
19.00 - 19.45	SPTS	N=27 (3,6/5,7,8,7)	14.00	Dry		19.00-19.50 Possible subhorizontal lamination.			
19.00 - 19.45	D 62								
19.00 - 19.50	B 63								
19.50 - 20.00	D 65								
19.50 - 20.00	B 64								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:06

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-02

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	30.03 mOD
Logged	PC	08/11/2019	Dando 2500.	1.20	30.00	200	30.00	**Coordinates (m)**	E 471172.00
Checked	MS	**End**	Cable percussion boring.	30.00	34.45	150	32.50	**National Grid**	N 109034.97
Approved	TC	14/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.					**Inclination**	
			Standpipe piezometer installed on completion.						

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
20.00 - 20.50	B 66			
20.50 - 20.95	UT 67	98 blows 100% rec	14.00	Dry
20.95	D 68			
21.00 - 21.50	B 69			
21.50 - 22.00	D 71			
21.50 - 22.00	B 70			
			12/11/19	1730
			14.00	Dry
22.00 - 22.45	SPTS	N=32 (2,7/8,7,8,9)		
22.00 - 22.45	D 72		13/11/19	0730
22.00 - 22.50	B 73		14.00	17.50
22.50 - 23.00	D 75			
22.50 - 23.00	B 74			
23.00 - 23.50	B 76			
23.50 - 23.95	UT 77	90 blows 100% rec	14.00	Dry
23.95	D 78			
24.00 - 24.50	B 79			
24.50 - 25.00	D 81			
24.50 - 25.00	B 80			
25.00 - 25.45	SPTS	N=50 (5,6/9,11,14,16)	14.00	Dry
25.00 - 25.45	D 82			
25.00 - 25.50	B 83			
25.50 - 26.00	D 85			
25.50 - 26.00	B 84			
26.00 - 26.50	B 86			
26.50 - 26.90	UT 87	100 blows 89% rec	14.00	Dry
26.90	D 88			
27.00 - 27.50	B 89			
27.50 - 28.00	D 91			
27.50 - 28.00	B 90			
28.00 - 28.45	SPTS	N=42 (5,6/8,8,11,15)	14.00	Dry
28.00 - 28.45	D 92			
28.00 - 28.50	B 93			
28.50 - 29.00	D 95			
28.50 - 29.00	B 94			
29.00 - 29.50	B 96			
29.50 - 29.95	UT 97	84 blows 100% rec	14.00	Dry
			13/11/19	1730
29.95	D 98		14.00	Dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Stiff to very stiff fissured dark grey with occasional light grey to greyish brown sandy silty CLAY. Sand is fine grained. Occasional light grey to greyish brown lenses/layers of silt. Pyritic. Fissures are randomly orientated, extremely closely spaced, occasional faces have silty sandy dustings.	24.50-25.00 Slightly pyritic. Silt is grey to dark grey. Rare shell fragments present.			
Very stiff fissured indistinctly thinly laminated dark grey with occasional grey to brownish grey and light grey silty CLAY. Pyritic. Fissures are randomly orientated, extremely closely spaced, slightly polished with occasional silt dustings. Occasional light grey lenses/layers of silt.	25.00-25.44 Distinctly subhorizontal laminations.	25.00 +5.03		
	26.90-29.00 Rare shell fragments present	(4.00)		
	28.00-28.45 Distinctly thinly laminated.			
	28.50-29.50 stiff to very stiff.			
Very stiff dark grey fissured indistinctly to distinctly thinly laminated silty CLAY. Pyritic. Fissures are randomly orientated and extremely closely spaced.		29.00 +1.03		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
29.50 - 33.50	Slow drilling - 4 hours.

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:06

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-02

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	30.03 mOD
Logged	PC	08/11/2019	Dando 2500.	1.20	30.00	200	30.00	**Coordinates (m)**	E 471172.00
Checked	MS	**End**	Cable percussion boring.	30.00	34.45	150	32.50	**National Grid**	N 109034.97
Approved	TC	14/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.					**Inclination**	
			Standpipe piezometer installed on completion.						

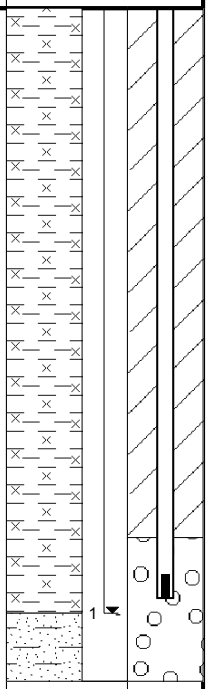
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
30.00 - 30.50	B 99		14/11/19	0730
			14.00	28.00
30.50 - 31.00	D 101			
30.50 - 31.00	B 100			
31.00 - 31.38	SPTS	>49 (7,12/17,16,16 for 75mm)	31.00	27.00
31.00 - 31.35	D 102			
31.00 - 31.50	B 103			
31.50 - 32.00	D 105			
31.50 - 32.00	B 104			
32.00 - 32.50	B 106			
32.50 - 32.70	UT 107	100 blows 44% rec	32.50	28.00
32.70	D 108			
33.00 - 33.50	B 109			
33.50 - 34.00	Rising Head	k=3.2E-7 m/s		
33.50 - 34.00	D 110			
34.00 - 34.45	SPTS	N=14 (2,2/1,2,4,7)	32.50	15.10
34.00 - 34.45	D 111			
			14/11/19	1730
			32.50	15.10

Strata Description

Main	Detail	Depth, Level (Thickness)
Very stiff dark grey fissured indistinctly to distinctly thinly laminated silty CLAY. Pyritic. Fissures are randomly orientated and extremely closely spaced.	31.00-31.50 Occasional partings (2mm thick) of light grey fine sand.	(5.00)
	32.70 Rare shell fragments (<5mm) and rare infilled burrows (2mm x 5mm)	
	33.50-34.00 Slightly sandy. Occasional lenses (10mm x 10mm) of light grey fine sand.	
Medium dense dark grey clayey fine SAND.		34.00 -3.97 (0.45)
END OF EXPLORATORY HOLE		34.45 -4.42

Legend / **Backfill**



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	34.00	Rose to 15.10 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:06

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-02

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	22.72 mOD
Logged	RP	05/12/2019	Dando 2000. Cable percussion boring. SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to possible artesian groundwater in deeper strata.	1.20	9.00	150	1.70	**Coordinates (m)**	E 471272.01
Checked	MS	**End**						**National Grid**	N 109271.03
Approved	TC	06/12/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			Red and greyish brown slightly sandy CLAY with frequent rootlets. (TOPSOIL)		0.10 (0.10) +22.62		
0.30 - 0.50	B 2				Soft orangish brown, mottled grey, slightly sandy silty CLAY with frequent rootlets and occasional pockets of fine orangish brown sand.		(0.40)		
0.50	D 3						0.50 +22.22		
0.50 - 0.80	B 4				Soft to firm yellowish brown/grey mottled sandy silty CLAY. Sand is yellowish brown and orangish fine to coarse with rare subangular fine to coarse gravel of chert.		(0.70)		
0.80 - 1.20	B 5								
1.20	UT 7	12 blows		Dry			1.20 +21.52		
1.20	D 6				Firm orangish brown sandy CLAY. Sand is fine to coarse.		(0.50)		
			05/12/19	1630 Dry					
1.70	D 8						1.70 +21.02		
1.70 - 2.00	B 9		06/12/19	0745 Dry	Firm to stiff grey and brown, mottled yellowish brown and brown, slightly sandy CLAY. Sand is fine to coarse. Rare white crystals of gypsum/ selenite. Roots and rootlets.				
2.00 - 2.45	SPTS	N=9 (1,1/2,2,2,3)	1.70	Dry					
2.00	D 10								
2.00	D 11								
2.00 - 2.50	B 12								
2.50 - 3.00	B 13						(1.80)		
3.00 - 3.45	UT 15	21 blows 84% rec	1.70	Dry		3.00-3.50 stiff			
3.00	D 14								
3.50 - 4.00	B 16				Firm to stiff brown, occasionally mottled grey, CLAY.		3.50 +19.22		
4.00 - 4.45	SPTS	N=12 (1,2/3,3,3,3)	1.70	Dry			(1.00)		
4.00	D 17								
4.00	D 18								
4.00 - 4.50	B 19								
4.50 - 5.00	B 20				Stiff dark grey silty CLAY. Rare pyrite flecks.		4.50 +18.22		
5.00 - 5.45	UT 22	25 blows 100% rec	1.70	Dry					
5.00	D 21								
5.50	D 23								
5.50 - 6.00	B 24								
6.00 - 6.45	SPTS	N=15 (2,3/3,4,4,4)	1.70	Dry		6.00-6.50 firm			
6.00	D 25								
6.00	D 26						(3.50)		
6.00 - 6.50	B 27								
6.50 - 7.00	B 28					6.50-7.00 firm to stiff			
7.00 - 7.45	UT 30	25 blows 89% rec	1.70	Dry					
7.00	D 29								
7.50	D 31					7.45 stiff to very stiff			
7.50 - 8.00	B 32								
8.00 - 8.45	SPTS	N=18 (3,3/4,4,5,5)	1.70	Dry	Stiff to very stiff dark grey slightly sandy CLAY. Sand is fine. Occasional pyrite flecks.		8.00 +14.72		
8.00	D 33								
8.00	D 34								
8.00 - 8.50	B 35								
8.50 - 9.00	B 36						(1.00)		
			06/12/19	1630					
			1.70	Dry					
9.00	D 37				END OF EXPLORATORY HOLE	9.00 stiff dark grey sandy clay. Sand is fine	9.00 +13.72		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:07

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-03

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	24.90 mOD
Logged	RP	15/11/2019	Dando 2000. Cable percussion boring.	1.20	11.50	200	6.50	**Coordinates (m)**	E 471400.99
Checked	MS	**End**	SPT Hammer ID: JD02, Rod type: Whitworth.	11.50	12.20	150	6.50	**National Grid**	N 109385.98
Approved	TC	18/11/2019	Terminated due to hard strata. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			Soft to firm brown, mottled light grey and orangish brown and brown, occasionally mottled reddish brown, sandy CLAY. Sand is fine to coarse. Occasional degraded gravel size wood fragments. Rare roots and rootlets (up to 10mm). (TOPSOIL)		(0.50)		
0.30 - 0.50	B 2						0.50 +24.40		
0.50	HV	p 72kPa, r 37kPa			Firm light greyish, mottled orangish brown, CLAY. Occasional gravel size wood fragments. Roots and rootlets.		(0.70)		
0.50	D 3								
0.50 - 0.80	B 4								
0.80 - 1.20	B 6								
1.00	D 5						1.20 +23.70		
1.20 - 1.65	SPTS	N=3 (1,0/0,1,1,1)		Damp	Firm to stiff brown, mottled orangish brown, slightly sandy CLAY. Slightly pyritic. Sand is fine to medium.		(0.50)		
1.20	D 7								
1.20 - 1.70	B 8								
1.70 - 2.00	B 9				Stiff brown, mottled light grey and orangish brown, CLAY.		1.70 +23.20		
2.00	UT 11	11 blows 67% rec	1.70	Dry		2.00-2.50 possible gypsum present indistinctly to distinctly thinly laminated	(0.80)		
2.00	D 10								
2.50	D 12						2.50 +22.40		
2.50 - 3.00	B 13				Stiff fissured brown, mottled light grey, occasionally mottled orangish brown and reddish brown, slightly sandy CLAY with white gypsum crystals. Sand is fine to medium. Fissures are subvertical to randomly orientated, extremely closely spaced. Slightly polished faces. Slightly pyritic.		(0.50)		
3.00 - 3.45	SPTS	N=12 (2,1/2,3,4,3)	3.00	Dry			3.00 +21.90		
3.00	D 14								
3.00	D 15								
3.00 - 3.50	B 16								
3.50 - 4.00	B 17				Stiff brown, mottled grey and orangish brown, occasionally mottled black, slightly sandy silty CLAY. Sand is fine to medium. Occasional black layers/pockets (up to 5mm) of silt and degraded wood. Occasional white gypsum. Pyritic.	3.50 indistinctly thinly laminated fissured	(1.00)		
4.00	UT 19	19 blows 100% rec	3.00	Dry	Stiff fissured dark grey slightly sandy slightly gravelly CLAY. Pyritic. Fissures are randomly orientated, extremely closely spaced and rough.		4.00 +20.90		
4.00	D 18								
4.50 - 5.00	B 20								
			15/11/19	1730					
			4.50	Dry					
5.00 - 5.45	SPTS	N=17 (2,3/4,4,4,5)					(2.00)		
5.00	D 21		18/11/19	0730					
5.00	D 22		4.50	Dry					
5.00 - 5.50	B 23								
5.50 - 6.00	B 24								
6.00	UT 26	23 blows 100% rec	4.50	Dry	Stiff to very stiff dark grey sandy silty CLAY. Sand is fine to medium. Pyritic.		6.00 +18.90		
6.00	D 25						(0.50)		
6.50	D 27				Stiff to very stiff fissured dark grey, mottled grey and light grey, slightly sandy silty CLAY. Sand is fine to medium. Rare light grey pockets (up to 60mm) of silty sand. Pyritic. Fissures are randomly orientated, extremely closely to very closely spaced with occasional silt dustings. Locally slightly polished.		6.50 +18.40		
6.50 - 7.00	B 28								
7.00 - 7.45	SPTS	N=21 (3,4/4,5,6,6)	4.50	Dry		7.00 dark grey slightly silty clay			
7.00	D 29								
7.00	D 30								
7.00 - 7.50	B 31								
7.50 - 8.00	B 32						(2.50)		
8.00	UT 34	25 blows 100% rec	6.50	Dry		8.00 occasional pockets of silty fine sand			
8.00	D 33								
8.50	D 35					8.50 rare shell fragments			
8.50 - 9.00	B 36								
9.00 - 9.45	SPTS	N=20 (3,3/4,5,5,6)	6.50	Dry	Stiff to very stiff fissured dark grey, occasionally mottled light grey, slightly sandy silty CLAY. Sand is fine. Occasional light grey lenses/layers (up to 5mm) of silt and occasional silty sand. Pyritic. Fissures are randomly orientated, extremely closely spaced with occasional silty sand dustings. Locally slightly polished.		9.00 +15.90		
9.00	D 37								
9.00	D 38								
9.00 - 9.50	B 39								
9.50 - 10.00	B 40						(1.00)		
							10.00 +14.90		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:07

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-04

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	24.90 mOD
Logged	RP	15/11/2019	Dando 2000.	1.20	11.50	200	6.50	**Coordinates (m)**	E 471400.99
Checked	MS	**End**	Cable percussion boring.	11.50	12.20	150	6.50	**National Grid**	N 109385.98
Approved	TC	18/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Terminated due to hard strata. Standpipe piezometer installed on completion.						

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
10.00 10.00	UT 42 D 41	27 blows 67% rec	6.50	Dry
10.50 10.50 - 11.00	D 43 B 44			
11.00 - 12.20 11.00 11.00 - 11.50	Rising Head D 45 B 46	k=1.2E-6 m/s		
11.50 - 11.80 11.50 11.50 - 12.00	SPTS D 47 B 48	>50 (3,5/31,19 for 75mm)	6.50	Dry
12.00	D 49		18/11/19 6.50	1730 1.20
12.20 12.20	D 50 W 51			

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Stiff to very stiff fissured dark grey, mottled light grey, sandy silty CLAY. Sand is fine. Pyritic. Fissures are randomly orientated, extremely closely spaced with locally polished faces. Rare shell fragments. Occasional light grey lenses/ layers (up to 5mm) of silt grading to silty sand.	10.50 occasional grey silty lenses/ layers. Rare shell fragments	(1.00)		
Stiff to very stiff dark grey, mottled grey, slightly gravelly sandy CLAY. Sand is fine. Gravel is rounded fine to coarse of flint. Pyritic.		11.00 +13.90 (0.50)		
Stiff dark grey, occasionally mottled black, sandy gravelly CLAY. Sand is fine. Gravel is angular to subangular fine to coarse of fossiliferous limestone.		11.50 +13.40 (0.50)		
Strong massive dark grey and grey fine to medium grained fossiliferous LIMESTONE. Recovered as subangular coarse gravel and cobbles.		12.00 +12.90 (0.20)		
END OF EXPLORATORY HOLE		12.20 +12.70		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	11.50	Rose to 1.20 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
12.20 - 12.20	75	Chisel

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.

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Scale 1:50

09/04/2020 20:49:07

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-04

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	27.91 mOD
Logged	RP	19/11/2019	Dando 2000.	1.20	9.50	200	9.50	**Coordinates (m)**	E 471706.01
Checked	MS	**End**	Cable percussion boring.	9.50	20.00	150	13.00	**National Grid**	N 109490.01
Approved	TC	22/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			Dark brown slightly sandy CLAY. (TOPSOIL)		0.10 (0.10) +27.81		
0.30 - 0.50	B 2				Firm fissured light grey, mottled orangish brown, slightly sandy, locally organic, CLAY. Frequent rootlets. Fissures are randomly orientated.		(1.10)		
0.50	D 3								
0.50 - 0.80	B 4								
0.80 - 1.20	B 6								
1.00	D 5		19/11/19	1730 Dry					
1.20 - 1.65	SPTS	N=5 (1,0/1,1,1,2)					1.20 +26.71		
1.20	D 7		20/11/19	0745 Dry	Firm orangish brown to brown, mottled light grey, CLAY with occasional roots and rootlets (up to 10mm).				
1.20 - 1.70	B 8						(0.80)		
1.70 - 2.00	B 9					1.70-2.00 brown mottled orangish brown and light grey			
2.00	UT 11	16 blows 89% rec	1.70	Dry			2.00 +25.91		
2.00	D 10				Firm brown, mottled orangish brown and light grey, slightly sandy CLAY. Sand is fine to coarse. Pyrite flecks.		(0.50)		
2.20	EW 2								
2.50	D 12						2.50 +25.41		
2.50 - 3.00	B 13				Stiff brown and dark grey, mottled brownish grey and orangish brown, slightly sandy CLAY. Sand is fine to medium. Pyrite flecks (up to 5mm). Occasional gypsum crystals.				
3.00 - 3.45	SPTS	N=10 (1,2/2,3,2,3)	3.00	Dry		3.00 indistinctly thinly laminated			
3.00	D 14						(1.50)		
3.00	D 15								
3.00 - 3.50	B 16								
3.50 - 4.00	B 17								
4.00	UT 19	23 blows 100% rec	3.00	Dry	Stiff dark grey very sandy silty CLAY. Sand is fine to medium. Pyrite flecks.		4.00 +23.91		
4.00	D 18						(0.50)		
4.50	EW 3				Stiff to very stiff dark grey slightly gravelly sandy CLAY. Sand is fine to medium. Rare to occasional black subrounded fine to coarse gravel of flint. Pyrite flecks.		4.50 +23.41		
4.50 - 5.00	B 20								
5.00 - 5.45	SPTS	N=18 (2,3/4,4,5,5)	3.00	Dry		5.00 stiff to very stiff clay layer			
5.00	D 21								
5.00	D 22								
5.00 - 5.50	B 23								
5.50 - 6.00	B 24					5.50-6.00 slightly sandy	(1.95)		1
6.00	EW 1		3.00	Dry					
6.00	UT 26	26 blows 100% rec							
6.00	D 25								
6.50	D 27				Stiff to very stiff dark grey slightly sandy silty CLAY. Sand is fine to medium. Pyrite flecks.	6.50 rare light grey pockets of silty fine sand	6.45 +21.46		
6.50 - 7.00	B 28								
7.00 - 7.45	SPTS	N=22 (3,3/4,5,6,7)	3.00	Dry					
7.00	D 29						(1.55)		
7.00	D 30								
7.00 - 7.50	B 31								
7.50 - 8.00	B 32								
8.00	UT 34	26 blows	3.00	Dry	Stiff dark grey silty CLAY. Pyrite flecks.		8.00 +19.91		
8.00	D 33								
8.50 - 9.00	B 35					8.50 very stiff	(1.00)		
9.00 - 9.45	SPTC	N=38 (4,7/8,8,10,12)	3.00	Dry	Stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is black rounded fine to coarse of flint. Occasional shell fragments.		9.00 +18.91		
9.00	D 36								
9.00	B 37						(1.00)		1
9.00 - 9.50	B 38								
							10.00 +17.91		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	9.50	Rose to 5.60 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
9.90 - 10.00	30	Chisel

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.

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Scale 1:50

09/04/2020 20:49:09

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-05

Borehole Log

SOCOTEC

Drilled	AR	**Start**	19/11/2019
Logged	RP		
Checked	MS	**End**	
Approved	TC		22/11/2019

Equipment, Methods and Remarks

Dando 2000.
Cable percussion boring.
SPT Hammer ID: JD02, Rod type: Whitworth.
Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	9.50	200	9.50
9.50	20.00	150	13.00

Ground Level	27.91 mOD
Coordinates (m)	E 471706.01
National Grid	N 109490.01

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.17	SPTC	>52 (25 for 20mm/29,23 for 75mm)	10.00	7.00	Recovered as soft dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is dark grey and black rounded to subangular fine to coarse of flint and limestone.	10.00 medium strong dark grey fine to medium limestone cobble			
10.00 - 11.00	Rising Head	k=1.1E-6 m/s				10.00-10.17 SPT may be affected by cobble.	(1.00)		
10.00	D 39								
10.00	B 40								
10.00 - 10.50	B 41								
10.50 - 11.00	B 42								
			20/11/19	1730					
			10.00	7.00					
11.00	D 43						11.00 +16.91		
			21/11/19	0745	Firm dark grey sandy silty CLAY. Sand is fine. Rare shell fragments. Pyritic flecks.		(0.20)		
11.20 - 11.50	B 44		10.00				11.20 +16.71		
					Very stiff reddish brown and light grey mottled slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is grey subangular to subrounded fine to coarse of cemented sandstone.				
11.50	UT 45	31 blows 78% rec	11.50	Damp					
12.00	D 46					12.00 purple, mottled yellowish brown and orangish brown			
12.00 - 12.50	B 47								
12.50 - 13.00	B 48					12.50 red and purple mottled			
13.00 - 13.45	SPTS	N=26 (5,6/6,7,7,6)	13.00	Damp					
13.00	D 49						(3.80)		
13.00	D 50								
13.00 - 13.50	B 51								
13.50 - 14.00	B 52					13.50 stiff to very stiff			
14.00	D 53								
14.00 - 14.50	B 54								
14.50	UT 55	40 blows 64% rec	13.00	10.00					
15.00	D 56						15.00 +12.91		
15.00 - 15.50	B 57				Very stiff red, light purple, pink, and light grey mottled with occasional yellowish brown mottling, slightly sandy CLAY. Sand is fine to medium.		(0.50)		
15.50 - 16.00	B 58						15.50 +12.41		
					Stiff to very stiff reddish brown, light red, pink and light grey mottled with occasional yellowish brown mottling CLAY.				
16.00 - 16.38	SPTS	>50 (5,7/11,17,22 for 75mm)	13.00	10.00		16.00 very stiff			
16.00	D 59								
16.00	D 60								
16.00 - 16.50	B 61								
16.50 - 17.00	B 62								
17.00	D 63								
17.00 - 17.50	B 64								
17.50	UT 65	46 blows 56% rec	13.00	10.00					
							(4.50)		
17.90	D 66								
18.00 - 18.50	B 67								
						18.20 recovered as firm to stiff			
18.50 - 19.00	B 68								
19.00 - 19.35	SPTS	>50 (7,10/15,19,16 for 50mm)	13.00	10.50					
19.00	D 69								
19.00	D 70								
19.00 - 19.50	B 71								
19.50 - 20.00	B 72								
			21/11/19	1730					
			13.00	Damp					
					END OF EXPLORATORY HOLE		20.00 +7.91		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
13.00	Water added.

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:09

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-CP-05

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	34.73 mOD
Logged	RP	04/12/2019	Dando 250.	1.20	14.80	200	4.50	**Coordinates (m)**	E 472454.54
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109746.65
Approved	TC	05/12/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10	PID	0.00-1.20 Hand excavated			Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint. Occasional roots and rootlets (up to 10mm). (TOPSOIL)		(0.30)		
0.10	ES 2	inspection pit.					0.30 +34.43		
0.10	B 1	0.2 ppmv					(0.20)		
0.30	PID						0.50 +34.23		
0.30	ES 4								
0.30	B 3	0.1 ppmv			Soft brown and light grey, mottled orangish brown, slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint.				
0.50	PID								
0.50	ES 6								
0.50	B 5	0.2 ppmv							
0.81 - 3.50	Rising Head								
1.00	PID								
1.00	ES 8	k=2.4E-7 m/s		Dry	Firm light grey, mottled orangish brown and brown, slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse of flint. Cobbles are subrounded of flint.		(1.50)		
1.00	EW 1	0.4 ppmv							
1.00	EW 2					1.50-2.00 stiff			
1.00	EW 3								
1.00	B 7								
1.20 - 1.65	SPTS								
1.20 - 1.65	D 9								
1.50 - 2.00	Falling Head	N=12 (4,5/4,3,2,3)	2.00	1.80					
1.50 - 2.00	D 11				Medium dense brown, mottled orangish brown, fine to medium SAND.		2.00 +32.73		
1.50 - 2.00	B 10	k=4.8E-7 m/s					(0.50)		
2.00 - 2.45	SPTS								
2.00 - 2.45	D 12								
2.50	PID	N=25 (2,3/4,5,7,9)			Firm to stiff dark grey, occasionally mottled brown, sandy silty CLAY. Sand is fine.		2.50 +32.23		
2.50	ES 14								
2.50 - 3.00	B 13	0.0 ppmv							
3.00 - 3.45	SPTS	N=16 (8,8/4,3,4,5)	3.00	0.50			(1.00)		
3.00 - 3.45	D 15								
3.00 - 3.50	B 16								
3.50 - 4.00	D 18				Stiff to very stiff light, mottled grey and red, slightly sandy CLAY. Sand is fine to coarse. Occasional angular fine to coarse gravel size clasts of mudstone.		3.50 +31.23		
3.50 - 4.00	B 17								
4.00	PID	0.1 ppmv	4.00	0.50			(0.95)		
4.00	ES 19								
4.00 - 4.45	UT 20	42 blows 100% rec							
4.45	D 21				Stiff to very stiff, mottled grey and red, CLAY.		4.45 +30.28		
4.50 - 5.00	B 22						(0.55)		
5.00 - 5.45	SPTS	N=20 (2,2/4,4,5,7)	4.50	Dry	Very stiff light grey, mottled red, occasionally mottled yellowish brown, CLAY.		5.00 +29.73		
5.00 - 5.45	D 23								
5.00 - 5.50	B 24								
5.50 - 6.00	D 26								
5.50 - 6.00	B 25								
6.00 - 6.45	UT 27	48 blows 100% rec	4.50	Dry		6.00-7.00 occasional subangular ironstone and mudstone gravel size fragments	(2.00)		
6.45	D 28								
6.50 - 7.00	B 29								
7.00 - 7.45	SPTS	N=26 (3,4/4,7,6,9)	4.50	Dry	Stiff to very stiff grey red, mottled pink and occasional yellowish brown mottling, slightly sandy CLAY. Sand is fine.		7.00 +27.73		
7.00 - 7.45	D 30								
7.00 - 7.50	B 31		04/12/19	1630					
			4.50	Dry					
7.50 - 8.00	D 33		05/12/19	0730					
7.50 - 8.00	B 32		4.50	5.10			(1.45)		
8.00 - 8.45	UT 34	63 blows 100% rec	4.50	Dry					
8.45	D 35				Very stiff light grey and red with occasional yellowish brown, pink and brown mottling, slightly sandy CLAY. Sand is fine.		8.45 +26.28		
8.50 - 9.00	B 36						(0.55)		
9.00 - 9.45	SPTS	N=30 (3,5/5,6,8,11)	4.50	Dry	Very stiff red and light grey with occasional yellowish brown and pink mottling, slightly sandy silty CLAY. Sand is fine to coarse.		9.00 +25.73		
9.00 - 9.45	D 37								
9.00 - 9.50	B 38								
9.50 - 10.00	D 40								
9.50 - 10.00	B 39								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.00	Rose to 1.80 m after 20 minutes.	3.50

Depth Related Remarks

Depths (m)	Remarks
2.00 - 3.50	Water added.

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:09

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-06

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	34.73 mOD
Logged	RP	04/12/2019	Dando 250. Cable percussion boring. SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe installed on completion.	1.20	14.80	200	4.50	**Coordinates (m)**	E 472454.54
Checked	MS	**End**						**National Grid**	N 109746.65
Approved	TC	05/12/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.45	UT 41	84 blows 100% rec	4.50	Dry	Very stiff red and light grey with occasional yellowish brown and pink mottling, slightly sandy silty CLAY. Sand is fine to coarse.		(2.50)		
10.45	D 42					10.50-11.50 sand is fine			
10.50 - 11.00	B 43								
11.00 - 11.50	B 44								
11.50 - 11.95	SPTS	N=46 (6,6/8,11,12,15)	4.50	Dry			11.50 +23.23		
11.50 - 11.95	D 45				Very stiff red, mottled occasionally light grey and yellowish brown and brown, silty CLAY.				
11.50 - 12.00	B 46						(0.50)		
12.00 - 12.50	D 48						12.00 +22.73		
12.00 - 12.50	B 47				Very stiff light grey, yellowish brown and brown, mottled red and pink sandy CLAY. Sand is fine.				
12.50 - 13.00	D 50								
12.50 - 13.00	B 49								
13.00 - 13.40	UT 51	100 blows 89% rec	4.50	Dry					
13.40	D 52						(2.74)		
13.50 - 14.00	B 53								
14.00 - 14.50	D 55								
14.00 - 14.50	B 54								
14.50 - 14.80	SPTS	>50 (4,8/27,23 for 75mm)	4.50	Dry					
14.50 - 14.80	D 56		05/12/19	1630					
			4.50	Dry			14.74 +19.99		
					Light grey fine to medium SAND.		(0.06)		
					END OF EXPLORATORY HOLE		14.80 +19.93		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-06

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	38.75 mOD
Logged	JF	25/11/2019	Dando 2500.	1.20	2.70	200	2.50	**Coordinates (m)**	E 471027.00
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110233.00
Approved	TC	26/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Borehole terminated due to hard strata, relocated and designated ATK-CP-07A.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Time Casing / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		0.00-1.20 Hand excavated inspection pit.		TOPSOIL.		(0.20) 0.20 +38.55		
0.20	B 1			Soft brown CLAY with abundant rootlets.		(0.30) 0.50 +38.25		
0.50	B 2			Soft to firm brown, locally mottled grey, sandy CLAY with frequent rootlets. Sand is fine to coarse.				
1.00	B 3							
1.20 - 1.65	SPTS	N=9 (1,2/1,2,3,3)	Dry			(1.50)		
1.20 - 1.65	D 4							
1.50 - 2.00	D 6							
1.50 - 2.00	B 5				1.65-2.00 sand is orangish brown with occasional subangular to subrounded gravel of flint (<2mm)			
2.00 - 2.45	UT 7	46 blows 100% rec	2.00 Dry	Firm brown, locally mottled grey, sandy gravelly CLAY. Gravel is subrounded fine to coarse of flint. Sand is fine to coarse.		2.00 +36.75 (0.45)		
2.45	D 8		26/11/19 1330	Brown sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of chert, flint and limestone. Sand is fine.		2.45 +36.30 (0.25)		
2.50 - 2.70	B 9		2.50 1.90	END OF EXPLORATORY HOLE		2.70 +36.05		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.50	Rose to 1.90 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks
2.70	Borehole terminated due to hard strata.

Hard Boring

Depths (m)	Duration (mins)	Tools used
2.50 - 2.70	60	Chisel

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.

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09/04/2020 20:49:10

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-07

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	38.66 mOD
Logged	JF	26/11/2019	Dando 2500.	1.20	10.35	200	4.50	**Coordinates (m)**	E 471031.54
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110231.31
Approved	TC	28/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		0.00-1.20 Hand excavated inspection pit.			TOPSOIL.		(0.20) 0.20 +38.46		
0.20 - 0.50	B 1				Firm orangish brown, mottled grey, slightly sandy CLAY with frequent rootlets. Sand is fine to coarse.				
0.50 - 1.00	B 2								
						1.00 becoming stiff 1.00-2.45 sand is orangish brown fine to medium			
1.20 - 1.65	SPTS	N=10 (1,1/2,2,3,3)	1.20	Dry			(2.25)		
1.20 - 1.65	D 3								
1.50 - 2.00	D 5								
1.50 - 2.00	B 4								
2.00 - 2.45	SPTS	N=44 (2,2/7,19,11,7)	2.00	Dry					
2.00 - 2.45	D 6								
			26/11/19	1700					
			2.00	Dry					
2.50 - 3.00	D 8		28/11/19	0800	Yellowish brown sandy clayey angular to subangular fine to coarse GRAVEL of flint, limestone and sandstone with low cobble content. Cobbles are subrounded of sandstone.	2.45-2.50 yellowish brown clayey fine to coarse sand	2.45 +36.21		
2.50 - 3.00	B 7		2.00	Dry			(0.55)		
3.00 - 3.45	SPTS	N=12 (1,2/3,3,3,3)	3.00	Dry	Stiff to very stiff yellowish brown sandy CLAY. Sand is fine to coarse. Occasional lenses (<1mm) of grey silty fine sand.	3.00-3.50 soft to firm	3.00 +35.66		
3.00 - 3.45	D 9								
3.00 - 3.50	B 10								
3.50 - 4.00	D 12					3.50-4.00 rare subangular gravel (<10mm) of sandstone			
3.50 - 4.00	B 11								
4.00 - 4.45	UT 13	84 blows 100% rec	4.00	Dry		3.50-4.45 firm to stiff reddish brown mottled greyish brown			
4.45	D 14					4.45-5.00 stiff			
4.50 - 5.00	D 16								
4.50 - 5.00	B 15								
5.00 - 5.45	SPTS	N=36 (4,3/6,7,10,13)	4.50	Dry		5.00-8.00 very stiff			
5.00 - 5.45	D 17								
5.00 - 5.50	B 18								
5.50 - 6.00	D 20								
5.50 - 6.00	B 19								
6.00 - 6.40	UT 21	100 blows 88% rec	4.50	Dry					
6.40	D 22								
6.50 - 7.00	B 23						(7.35)		
7.00 - 7.45	SPTS	N=37 (2,5/7,8,10,12)	4.50	Dry		7.00-10.35 slightly sandy			
7.00 - 7.45	D 24								
7.00 - 7.50	B 25								
7.50 - 8.00	D 27								
7.50 - 8.00	B 26								
8.00 - 8.35	UT 28	100 blows 84% rec	4.50	Dry					
8.38	D 29								
8.50 - 9.00	B 30								
9.00 - 9.45	SPTS	N=44 (5,6/8,8,13,15)	4.50	Dry					
9.00 - 9.45	D 31								
9.00 - 9.50	B 32								
9.50 - 10.00	D 34								
9.50 - 10.00	B 33								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
2.50 - 3.00	90	Chisel

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.

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09/04/2020 20:49:10

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-07A

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	38.66 mOD
Logged	JF	26/11/2019	Dando 2500.	1.20	10.35	200	4.50	**Coordinates (m)**	E 471031.54
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110231.31
Approved	TC	28/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.35	UT 35	100 blows 77% rec	4.50	Dry	Stiff to very stiff yellowish brown sandy CLAY. Sand is fine to coarse. Occasional lenses (<1mm) of grey silty fine sand.				
			28/11/19	1530					
			4.50	Dry					
10.35	D 36						10.35 +28.31		
					END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:10

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-07A

Borehole Log

SOCOTEC

Drilled	PD	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	38.47 mOD
Logged	RP	26/11/2019	Dando 175. Cable percussion boring. SPT Hammer ID: TH70, Rod type: 54mm Whitworth.	1.20	10.44	200	3.20	**Coordinates (m)**	E 471756.98
Checked	MS	**End**						**National Grid**	N 110144.07
Approved	TC	27/11/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		0.00-1.20 Hand excavated inspection pit.			TOPSOIL		(0.20) 0.20 +38.27		
0.20	D 1				Soft brown and orangish brown mottled light grey and greyish brown, slightly sandy CLAY. Sand is fine to coarse.				
0.20 - 0.50	B 2						(0.30) 0.50 +37.97		
0.50	D 3				Brown, orangish brown, mottled greyish brown, clayey fine to medium SAND.				
0.50 - 1.00	B 4						(0.70)		
1.00	D 5								
1.20 - 1.65	SPTS	N=3 (1,0/1,0,1,1)	1.20	Damp	Soft to firm brown and orangish brown mottled sandy CLAY. Sand is fine to medium.		1.20 +37.27		
1.20	D 6								
1.20 - 1.65	B 7								
1.65 - 2.20	B 8					1.65-2.20 rare orangish brown medium to coarse gravel size fragments of cemented sand	(1.45)		
2.20 - 2.65	UT 9	71 blows 100% rec	2.20	Damp					
2.65	D 10				Stiff to very stiff red and light grey mottled slightly sandy CLAY. Sand is fine to coarse.		2.65 +35.82		
2.65 - 3.20	B 11								
3.20 - 3.65	SPTS	N=14 (1,1/2,4,4,4)	3.20	Dry					
3.20	D 12								
3.20 - 3.65	B 13								
3.65 - 4.20	B 14								
4.20 - 4.65	UT 15	100 blows 67% rec	3.20	Dry			(3.00)		
4.65	D 16								
4.65 - 5.20	B 17								
5.20 - 5.65	SPTS	N=18 (2,2/3,4,4,7)	3.20	Dry		5.20 grey with red and pink mottling			
5.20	D 18								
5.20 - 5.65	B 19								
5.65 - 6.20	B 20				Very stiff red and grey, occasionally mottled yellowish brown and orangish brown, slightly sandy CLAY.		5.65 +32.82		
6.20 - 6.50	UT 21	100 blows 22% rec	3.20	Dry					
6.50 - 6.95	SPTS	N=27 (3,4/6,6,7,8)	3.20	Dry		6.50 light grey with red and pink mottling			
6.50	D 22								
6.50	D 23								
6.50 - 7.20	B 24								
7.20 - 7.65	UT 25	100 blows 78% rec	3.20 26/11/19 3.20	Dry 1800 Dry					
7.65	D 26		27/11/19	0800					
7.65 - 8.20	B 27		3.20	Dry			(4.79)		
8.20 - 8.65	SPTS	N=45 (2,6/7,10,13,15)	3.20	Dry					
8.20	D 28								
8.20 - 8.65	B 29								
8.65 - 9.20	B 30								
9.20 - 9.65	UT 31	100 blows 50% rec	3.20	Dry					
9.65	D 32								
9.65 - 10.00	B 33								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:11

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-08

Borehole Log

SOCOTEC

Drilled	PD	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	38.47 mOD
Logged	RP	26/11/2019	Dando 175.	1.20	10.44	200	3.20	**Coordinates (m)**	E 471756.98
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110144.07
Approved	TC	27/11/2019	SPT Hammer ID: TH70, Rod type: 54mm Whitworth.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.44 10.00	SPTS D 34	>50 (4,7/11,15,15,9 for 60mm)	3.20 27/11/19 3.20	Dry 1600 Dry	Very stiff red and grey, occasionally mottled yellowish brown and orangish brown, slightly sandy CLAY.				
					END OF EXPLORATORY HOLE		10.44 +28.03		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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AGS

Scale 1:50

09/04/2020 20:49:11

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-08

Borehole Log

SOCOTEC

Drilled	PD	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.17 mOD
Logged	RP	27/11/2019	Dando 175.	1.20	10.10	200	3.20	**Coordinates (m)**	E 472187.70
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110054.34
Approved	TC	28/11/2019	SPT Hammer ID: TH70, Rod type: 54mm Whitworth.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		0.00-1.20 Hand excavated inspection pit.			Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint. TOPSOIL.		(0.20) 0.20 +38.97		
0.20	D 1								
0.30 - 0.50	B 2								
0.50	D 3				Soft to firm brown and grey, mottled orangish brown, sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint.		(0.60)		
0.80	D 4						0.80 +38.37		
0.80 - 1.20	B 5		27/11/19	1800 Damp					
					Orangish brown, mottled light grey, slightly gravelly clayey fine to medium SAND. Gravel is subangular to subrounded fine to coarse of flint.		(0.40)		
1.20 - 1.65	SPTS	N=29 (4,4/5,7,8,9)					1.20 +37.97		
1.20	D 6		28/11/19	0800					
1.20 - 1.65	B 7			Damp	Medium dense brown, mottled orangish brown and light grey, slightly gravelly clayey fine to coarse SAND.				
1.65 - 2.20	B 8						(1.00)		
2.20 - 2.65	SPTS	N=4 (2,2/1,1,1,1)	2.20	Damp			2.20 +36.97		
2.20	D 9				Soft to firm dark grey sandy CLAY. Sand is fine to medium. Pyrite flecks present.				
2.20 - 2.65	B 10								
2.65 - 3.20	B 11						(1.00)		
3.20 - 3.50	UT NR	100 blows No Recovery	3.20	Dry			3.20 +35.97		
3.20 - 3.50	B 13				Stiff to very stiff light grey, mottled red and pink, occasionally mottled yellowish brown, CLAY. Rare gravel size clasts (up to 60mm) of medium strong mudstone.		(0.30)		
3.50 - 3.95	SPTS	N=17 (1,2/4,4,4,5)	3.20	Dry			3.50 +35.67		
3.50	D 14								
3.50 - 4.20	B 15				Stiff to very stiff light grey, mottled red and pink, occasionally mottled yellowish brown, slightly sandy CLAY.				
4.20 - 4.65	UT 16	100 blows 100% rec	3.20	Dry					
4.65	D 17								
4.65 - 5.20	B 18								
5.20 - 5.65	SPTS	N=19 (1,2/4,4,5,6)	3.20	Dry		5.20-5.65 light grey, mottled red, occasionally mottled yellowish brown			
5.20	D 19								
5.20 - 5.65	B 20								
5.65 - 6.20	B 21								
6.20 - 6.65	UT NR	100 blows No Recovery	3.20	Dry					
6.50 - 6.95	SPTS	N=32 (2,5/5,8,9,10)	3.20	Dry		6.50 occasionally mottled brown			
6.50	D 23								
6.50 - 6.95	B 24						(6.60)		
6.95 - 7.20	B 25								
7.20 - 7.65	UT 26	100 blows 67% rec	3.20	Dry					
7.65	D 27								
7.65 - 8.20	B 28								
8.20 - 8.65	SPTS	N=20 (2,3/4,5,5,6)	3.20	Dry					
8.20	D 29								
8.20 - 8.65	B 30								
8.65 - 9.20	B 31					8.65-9.20 red and pink, mottled light grey, occasionally mottled yellowish brown and brown			
9.20 - 9.65	UT 32	100 blows 100% rec	3.20	Dry					
9.65 - 10.10	SPTS	N=38 (3,3/6,10,11,11)	3.20	Dry					
9.65	D 33								
9.65	D 34		28/11/19	1800					
			3.20	Dry					

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:11

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-09

Borehole Log

SOCOTEC

Drilled	PD	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.17 mOD
Logged	RP	27/11/2019	Dando 175. Cable percussion boring. SPT Hammer ID: TH70, Rod type: 54mm Whitworth.	1.20	10.10	200	3.20	**Coordinates (m)**	E 472187.70
Checked	MS	**End**						**National Grid**	N 110054.34
Approved	TC	28/11/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Time Casing / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				Stiff to very stiff light grey, mottled red and pink, occasionally mottled yellowish brown, slightly sandy CLAY.		10.10 +29.07		
				END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:11

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-09

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	36.10 mOD
Logged	PC/RP	21/11/2019	Dando 2500.	1.20	11.50	200	11.50	**Coordinates (m)**	E 470923.96
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109944.04
Approved	TC	22/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Terminated due to hard strata.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10	D 1	0.00-1.20 Hand excavated inspection pit.			Very soft brown sandy CLAY with abundant rootlets. (TOPSOIL)		0.10 (0.10) +36.00		
0.10 - 0.50	B 2				Firm, mottled orangish brown and grey, slightly sandy CLAY.				
0.50	HV	p 63kPa, r 32kPa					(1.10)		
0.50 - 1.00	B 3					1.00 becoming stiff			
1.20 - 1.65	UT 5	16 blows 100% rec		Dry	Firm to stiff light brown and light grey, mottled orangish brown, CLAY.		1.20 +34.90		
1.20	D 4						(0.45)		
1.65	D 6				Stiff mottled brown and grey with some orangish brown mottling, slightly sandy silty CLAY. Sand is fine. Pyrite flecks.		1.65 +34.45		
1.65 - 2.00	B 7								
2.00 - 2.45	SPTS	N=12 (2,3/2,4,3,3)	2.00	Dry			(1.35)		
2.00 - 2.45	D 8								
2.00 - 2.50	B 9								
2.50 - 3.00	D 11					2.50-3.00 occasional grey mottling			
2.50 - 3.00	B 10								
3.00 - 3.45	UT 12	50 blows 100% rec	3.00	Dry	Stiff brown, mottled orangish brown, CLAY. Rare gypsum crystals.		3.00 +33.10		
3.45	D 13						(1.00)		
3.50 - 4.00	B 14					3.50-4.00 slightly sandy, sand is fine			
4.00 - 4.45	SPTS	N=26 (3,3/4,7,7,8)	4.00	Dry	Very stiff brownish grey and brown, mottled orangish brown slightly sandy silty CLAY. Sand is fine. Occasional orangish brown lenses/pockets (up to 60mm) of silty sand. Pyrite flecks.		4.00 +32.10		
4.00 - 4.45	D 15								
4.00 - 4.50	B 16								
4.50 - 5.00	D 18						(1.00)		
4.50 - 5.00	B 17								
5.00 - 5.45	UT 19	53 blows 100% rec	5.00	Dry	Stiff to very stiff dark grey silty CLAY. Rare to occasional selenite crystals (up to 20mm).		5.00 +31.10		
5.45	D 20								
5.50 - 6.00	B 21					5.50-6.00 pyrite pieces	(1.00)		
6.00 - 6.45	SPTS	N=19 (2,3/4,5,4,6)	6.00	Dry	Stiff to very stiff dark grey slightly sandy silty CLAY. Sand is fine. Rare selenite crystals (up to 2mm). Pyrite flecks.		6.00 +30.10		
6.00 - 6.45	D 22								
6.00 - 6.50	B 23								
6.50 - 7.00	D 25						(1.45)		
6.50 - 7.00	B 24								
7.00 - 7.45	UT 26	81 blows 100% rec	7.00	Dry		7.00 rare pockets of yellow silt			
7.45	D 27				Stiff to very stiff dark grey sandy silty CLAY. Sand is fine. Pyrite flecks.		7.45 +28.65		
7.50 - 8.00	B 28						(0.55)		
8.00 - 8.45	SPTS	N=35 (6,7/7,8,10,10)	8.00	Dry	Stiff to very stiff dark grey sandy to very sandy silty CLAY. Sand is fine.		8.00 +28.10		
8.00 - 8.45	D 29								
8.00 - 8.50	B 30								
8.50 - 9.00	D 32					8.50-9.00 grey slightly sandy, sand is fine	(1.00)		
8.50 - 9.00	B 31								
9.00 - 9.45	UT 33	89 blows 100% rec	9.00	Dry	Very stiff dark grey CLAY.		9.00 +27.10		
9.45	D 34						(0.50)		
9.50 - 10.00	B 35				Stiff to very stiff dark grey silty CLAY. Rare light grey pockets (up to 60mm) of silt.		9.50 +26.60		
							(0.50)		
							10.00 +26.10		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:11

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-10

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	36.10 mOD
Logged	PC/RP	21/11/2019	Dando 2500.	1.20	11.50	200	11.50	**Coordinates (m)**	E 470923.96
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109944.04
Approved	TC	22/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Terminated due to hard strata.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.38 10.00 - 10.35 10.00 - 10.50	SPTS D 36 B 37	>50 (7,7/12,13,25 for 75mm)	10.00	Dry	Stiff to very stiff dark grey sandy silty CLAY. Sand is fine. Rare gypsum crystals. Pyrite pieces.				
10.50 - 11.00	B 38						(1.00)		
			21/11/19 10.50	1730 Dry					
11.00 - 11.50 11.00 - 11.50	D 41 B 40		22/11/19 10.50 22/11/19 11.50	1000 4.40 1300 Dry	Medium strong dark grey fine to medium grained fossiliferous LIMESTONE. Recovered as slightly sandy gravelly clay with medium cobble content. Sand is fine to medium. Gravel is rounded to angular fine to coarse of flint and fossiliferous limestone. Cobbles are angular of fossiliferous limestone.		11.00 +25.10 (0.50)		1
11.50 - 11.50	SPTS	>50 (25 for 0mm/50 for 0mm			END OF EXPLORATORY HOLE		11.50 +24.60		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	11.00		

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
11.00 - 11.50	120	Chisel

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-10

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.15 mOD
Logged	FC	17/12/2019	Dando 2000.	1.20	11.26	150	1.70	**Coordinates (m)**	E 471174.97
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109519.93
Approved	TC	17/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Vibrating Wire Piezometer installed at 11.20 m on completion.						

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.		
0.30 - 0.50	B 2			
0.50	D 3			
0.50 - 0.80	B 4			
0.80 - 1.20	B 5			
1.20 - 1.65	SPTS	N=4 (1,0/1,1,1,1)		Dry
1.20	D 6			
1.20	D 7			
1.20 - 1.70	B 8			
1.70 - 2.00	B 9			
2.00	UT 11	16 blows	1.70	Dry
2.00	D 10			
2.60	D 12			
2.60 - 3.00	B 13			
3.00 - 3.45	SPTS	N=9 (1,2/2,2,2,3)	1.70	Dry
3.00	D 14			
3.00	D 15			
3.00 - 3.50	B 16			
3.50 - 4.00	B 17			
4.00	UT 19	25 blows	1.70	Dry
4.00	D 18			
4.60	D 20			
4.60 - 5.00	B 21			
5.00 - 5.45	SPTS	N=14 (2,2/3,3,4,4)	1.70	Dry
5.00	D 22			
5.00	D 23			
5.00 - 5.50	B 24			
5.50 - 6.00	B 25			
6.00	UT 27	30 blows	1.70	Dry
6.00	D 26			
6.60	D 28			
6.60 - 7.00	B 29			
7.00 - 7.45	SPTS	N=14 (2,1/3,3,4,4)	1.70	Dry
7.00	D 30			
7.00	D 31			
7.00 - 7.50	B 32			
7.50 - 8.00	B 33			
8.00	UT 35	33 blows	1.70	Dry
8.00	D 34			
8.60	D 36			
8.60	B 37			
9.00 - 9.45	SPTS	N=17 (2,3/4,4,4,5)	1.70	Dry
9.00	D 38			
9.00	D 39			
9.00 - 9.50	B 40			
9.50 - 10.00	B 41			

Strata Description

Main	Detail	Depth, Level (Thickness)
Soft to firm light brown slightly sandy CLAY with frequent rootlets.		0.10 (0.10) +26.05
Firm greyish brown, mottled orangish brown, CLAY with rare organic material and rootlets.		(1.10)
Firm to stiff bluish grey, mottled brown and orangish brown, slightly sandy CLAY.		1.20 +24.95
	2.00 local pockets (up to 30x30mm) of orangish brown fine to medium sand	(1.40)
Stiff bluish grey, locally mottled white and orangish brown, silty CLAY. Pockets (up to 20x10mm) of selinite crystals. and fine to medium sand (up to 30x10mm). Rare organic material.		2.60 +23.55
		(0.90)
Stiff to very stiff dark grey silty CLAY.		3.50 +22.65
		(1.50)
	4.60 very stiff local pockets (up to 20x20mm) of fine to medium sand and silt	
Stiff dark grey slightly sandy silty CLAY.		5.00 +21.15
	5.50 locally sandy	
		(2.00)
	6.60 indistinctly laminated	
Very stiff dark grey slightly sandy silty CLAY.	7.00-7.50 local pockets (up to 20x20mm) of fine to medium sand	7.00 +19.15
		(1.60)
Stiff to very stiff dark grey sandy silty CLAY.		8.60 +17.55
		(2.00)
	10.00 very stiff dark grey silty clay	

Backfill

1

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:12

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-11

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.15 mOD
Logged	FC	17/12/2019	Dando 2000.	1.20	11.26	150	1.70	**Coordinates (m)**	E 471174.97
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109519.93
Approved	TC	17/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Vibrating Wire Piezometer installed at 11.20 m on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 10.00	UT 43 D 42	50 blows	1.70	Dry	Stiff to very stiff dark grey sandy silty CLAY.				
10.60 10.60 - 11.00	D 44 B 45				Dark grey clayey fine to medium SAND.		10.60 +15.55 (0.66)		
11.00 - 11.26 11.00	SPTS D 46	>50 (15,10 for 35mm/26,24 for 75mm)	1.70 17/12/19 1.70	1630 2.50	END OF EXPLORATORY HOLE		11.26 +14.89		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	11.10	Rose to 2.50 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-11

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.90 mOD
Logged	RP	18/11/2019	Dando 2500.	1.20	10.45	200	6.00	**Coordinates (m)**	E 471174.96
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109782.99
Approved	TC	20/11/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 - 0.30	D 2	0.00-1.20 Hand excavated inspection pit.			Soft to firm, mottled orangish brown and light grey sandy CLAY. Sand is fine to coarse. Rare roots and rootlets (<5mm).		(0.30)		
0.00 - 0.30	B 1						0.30 +26.60		
0.30 - 0.90	D 4				Firm to stiff grey, mottled orangish brown and brown, slightly sandy CLAY. Sand is fine to medium. Rare roots and rootlets (<5mm).		(0.60)		
0.30 - 0.90	B 3								
0.50	HV	p 41kPa, r 11kPa							
0.90 - 1.20	D 4B				Stiff grey, mottled orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of flint.		0.90 +26.00		
0.90 - 1.20	B 4A		18/11/19	1730			(0.30)		
1.00	EW 1						1.20 +25.70		
1.20 - 1.65	SPTS	N=6 (1,1/1,2,1,2)							
1.20 - 1.65	D 5		19/11/19	0730	Firm orangish brown, mottled light grey slightly sandy CLAY. Sand is fine to medium. Pyritic flecks.				
1.20 - 1.70	B 6			Dry					
1.70 - 2.00	D 7						(1.30)		
1.90	EW 2								
2.00 - 2.45	UT 8	23 blows 100% rec	2.00	Dry					
2.50	EW 3				Stiff dark grey, mottled brown, CLAY. Pyrite flecks.		2.50 +24.40		
2.50 - 3.00	D 10						(0.50)		
2.50 - 3.00	B 9								
3.00 - 3.45	SPTS	N=16 (1,1/3,3,5,5)	3.00	Dry	Stiff dark grey slightly gravelly sandy CLAY. Sand is fine. Gravel is dark grey and black rounded of flint. Pyrite flecks.		3.00 +23.90		
3.00 - 3.45	D 11								
3.00 - 3.50	B 12								
3.50 - 4.00	D 14					3.50 rare shell fragments (up to 60mm)	(1.00)		
3.50 - 4.00	B 13								
4.00 - 4.45	SPTS	N=21 (3,3/5,5,5,6)	4.00	2.90	Medium dense dark grey very clayey fine SAND. Pyrite flecks.		4.00 +22.90		
4.00 - 5.00	Rising Head	k=1.1E-6 m/s					(0.50)		
4.00 - 4.45	D 15								
4.00 - 4.50	B 16								
4.50 - 5.00	D 18				Soft to firm dark grey sandy CLAY. Sand is fine. Pyrite flecks.		4.50 +22.40		
4.50 - 5.00	B 17								
5.00 - 5.45	UT 19	89 blows 100% rec	5.00	Dry			(0.95)		
5.50	D 20				Stiff to very stiff red and light grey mottled with purple mottling slightly sandy CLAY.	5.50-6.00 slightly sandy, sand is fine to coarse	5.45 +21.45		
5.50 - 6.00	D 22								
5.50 - 6.00	B 21								
6.00 - 6.45	SPTS	N=32 (3,5/6,5,10,11)	6.00	Dry		6.00-6.45 occasional orangish brown and yellowish brown mottling			
6.00 - 6.45	D 23						(1.55)		
6.00 - 6.50	B 24								
6.50 - 7.00	D 26								
6.50 - 7.00	B 25								
7.00 - 7.45	UT 27	89 blows 100% rec	7.00	Dry	Stiff to very stiff red to reddish brown and light grey mottled, occasional brown and yellowish brown, CLAY.		7.00 +19.90		
			19/11/19	1730					
			6.00	Dry					
7.50 - 8.00	D 29		20/11/19	0730		7.50-8.00 occasional yellowish brown and orangish brown pockets of fine to medium sand			
7.50 - 8.00	B 28		6.00	6.40					
8.00 - 8.45	SPTS	N=50 (5,8/9,13,17,11)	6.00	Dry			(2.00)		
8.00 - 8.40	D 30								
8.00 - 8.50	B 31								
8.50 - 9.00	D 33								
8.50 - 9.00	B 32								
9.00 - 9.45	UT 34	79 blows 100% rec	6.00	Dry	Very stiff red and light grey, mottled yellowish brown and orangish brown, CLAY.		9.00 +17.90		
9.45	D 35								
9.50 - 10.00	D 37								
9.50 - 10.00	B 36						(1.45)		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	0.50	Rose to 0.20 m after 20 minutes.	
2	3.50	Rose to 2.90 m after 20 minutes.	5.00

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-12

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.90 mOD
Logged	RP	18/11/2019	Dando 2500. Cable percussion boring. SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe piezometer installed on completion.	1.20	10.45	200	6.00	**Coordinates (m)**	E 471174.96
Checked	MS	**End**						**National Grid**	N 109782.99
Approved	TC	20/11/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.45 10.00 - 10.45	SPTS D 38	N=39 (4,5/6,8,10,15)	6.00 20/11/19 6.00	Dry 1730 Dry	Very stiff red and light grey, mottled yellowish brown and orangish brown, CLAY.				
					END OF EXPLORATORY HOLE		10.45 +16.45		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-12

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	29.91 mOD
Logged	PC	22/11/2019	Dando 2000.	1.20	2.50	200	2.00	**Coordinates (m)**	E 471446.02
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109822.97
Approved	TC	22/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth.						
			Borehole terminated due to obstruction, relocated and designated ATK-CP-13A.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Time Casing	Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.40	B 1	0.00-1.20 Hand excavated inspection pit.			Brown sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of flint. Frequent rootlets. (TOPSOIL)		0.10 (0.10) +29.81		
0.40 - 0.60	B 2						(0.50)		
0.50	D 3				Firm orangish brown and grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of flint and sandstone.	0.60-0.80 occasional rootlets	0.60 +29.31		
0.60	D 5								
0.60 - 1.00	B 4				Firm, mottled orange brown and grey, CLAY. Rare rounded coarse gravel of flint.				
1.20	UT 7	12 blows	1.20	0.70					
1.20	D 6						(1.90)		
1.70	D 8								
1.70 - 2.00	B 9								
2.00 - 2.45	SPTC	N=25 (2,4/5,6,6,8)	2.00	0.70					
2.00	D 10								
2.00	B 11								
2.00 - 2.50	B 12		22/11/19	1400					
			2.00	0.70					
					END OF EXPLORATORY HOLE		2.50 +27.41		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	0.50	Seepage.	
2	1.00	Rose to 0.70 m after 20 minutes.	
3	1.20	Rose to 0.75 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks
2.50	Borehole terminated due to obstruction.

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:13

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-13

Sheet 1 of 1

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	29.75 mOD
Logged	JA	25/11/2019	Dando 2000.	1.20	10.50	200	4.50	**Coordinates (m)**	E 471447.76
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109812.48
Approved	TC	25/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			TOPSOIL.		0.10 (0.10) +29.65		
0.30 - 0.50	B 2				Soft to firm yellowish brown gravelly CLAY. Gravel is angular to subangular fine to coarse of chert and flint.		(0.40)		
0.50	D 3						0.50 +29.25		
0.50 - 0.80	B 4				Soft to firm orangish brown and grey slightly sandy CLAY. Frequent rootlets.				
0.80 - 1.00	B 5								
1.20	UT 7	12 blows	1.20	Damp			(1.50)		
1.20	D 6								
1.70	D 8								
1.70 - 2.00	B 9								
2.00 - 2.45	SPTC	N=16 (2,3/3,4,4,5)	1.70	Damp					
2.00	D 10				Firm orangish brown, mottled grey, slightly sandy to sandy CLAY.	2.00-2.50 occasional subrounded fine to coarse gravel of flint	2.00 +27.75		
2.00	D 11								
2.00 - 2.50	B 12								
2.50 - 3.00	B 13								
3.00 - 3.45	SPTS	N=11 (1,2/2,3,3,3)	3.00	1.40		3.00-4.00 firm to stiff with pockets of fine to medium orange brown sand (up to 25mm)	(2.00)		
3.00	D 14								
3.00	D 15								
3.00 - 3.50	B 16								
3.50 - 4.50	Rising Head	k=5.2E-8 m/s							
3.50 - 4.00	B 17								
4.00	UT 19	21 blows	4.00	Dry	Firm greyish brown sandy CLAY.		4.00 +25.75		
4.00	D 18						(0.50)		
4.50	D 20						4.50 +25.25		
4.50 - 5.00	B 21				Firm to stiff, mottled red and grey, slightly sandy CLAY.				
5.00 - 5.45	SPTS	N=18 (2,4/4,4,5,5)	4.50	Dry					
5.00	D 22								
5.00	D 23								
5.00 - 5.50	B 24								
5.50 - 6.00	B 25								
6.00	UT 27	30 blows	4.50	Dry					
6.00	D 26								
6.30	D 28								
6.50 - 7.00	B 29								
7.00 - 7.45	SPTS	N=25 (3,4/5,6,7,7)	4.50	Dry					
7.00	D 30								
7.00	D 31								
7.00 - 7.50	B 32								
7.50 - 8.00	B 33						(6.00)		
8.00	UT 35	38 blows	4.50	Dry		8.00 very stiff			
8.00	D 34								
8.50	D 36								
8.50 - 9.00	B 37					8.50-9.00 occasional angular to subangular fine to coarse gravel of mudstone			
9.00 - 9.45	SPTS	N=22 (2,3/3,6,6,7)	4.50	Dry					
9.00	D 38								
9.00	D 39								
9.00 - 9.50	B 40								
9.50 - 10.00	B 41								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.50	Rose to 1.40 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:13

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-13A

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	29.75 mOD
Logged	JA	25/11/2019	Dando 2000.	1.20	10.50	200	4.50	**Coordinates (m)**	E 471447.76
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 109812.48
Approved	TC	25/11/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00	UT 43	39 blows	4.50	Dry	Firm to stiff, mottled red and grey, slightly sandy CLAY.				
10.00	D 42		25/11/19	1630					
			4.50	Dry					
10.50	D 44				END OF EXPLORATORY HOLE		10.50 +19.25		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-13A

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	33.61 mOD
Logged	PC/FC	11/12/2019	Dando 2500. Cable percussion boring.	1.20	5.00	200	4.50	**Coordinates (m)**	E 472014.00
Checked	MS	**End**	SPT Hammer ID: JD04, Rod type: Whitworth.					**National Grid**	N 109691.03
Approved	TC	11/12/2019	Borehole terminated due to hard strata / slow progress. Attempted to relocate but unable to erect rig safely due to soft ground conditions, location cancelled.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10	D 1	0.00-1.20 Hand excavated inspection pit.			Very soft slightly gravelly sandy CLAY. Gravel is subangular fine to coarse of flint. Frequent rootlets. (TOPSOIL)		0.10 (0.10) +33.51		
0.10 - 0.50	B 2								
0.50	HV	p 56kPa, r 20kPa			Firm to stiff, mottled orange and brown, locally grey, slightly sandy silty CLAY with occasional rootlets.				
0.50 - 1.00	B 3								
1.20 - 1.65	SPTS	N=9 (1,1/1,2,3,3)	1.20	Dry		1.20-1.65 local pockets (up to 10x10mm) of dark grey organic material			
1.20 - 1.65	D 4								
1.50 - 2.00	D 6								
1.50 - 2.00	B 5								
2.00 - 2.45	UT 7	11 blows 100% rec	2.00	Dry			(3.60)		
2.45	D 8								
2.50 - 3.00	B 9								
3.00 - 3.45	SPTS	N=8 (1,1/1,2,2,3)	3.00	Dry		3.00-3.45 locally mottled dark orangish brown pockets (up to 20x20mm) of fine to medium sand			
3.00 - 3.45	D 10								
3.00 - 3.50	B 11								
3.70 - 4.00	D 12				Firm to stiff dark grey slightly sandy silty CLAY. Sand is fine to medium.		3.70 +29.91		
3.70 - 4.00	B 13								
4.00 - 4.45	UT 14	39 blows 100% rec	4.00	Dry			(0.75)		
4.45	D 15				Stiff dark grey silty CLAY. Local pockets (up to 20x10mm) of light grey fine sand and silt.		4.45 +29.16		
4.50 - 5.00	B 16						(0.55)		
5.00 - 5.40	SPTS	>50 (3,7/9,12,14,15 for 30mm)	4.50	Dry	Stiff dark grey silty CLAY. Local pockets (up to 20x10mm) of light grey fine sand and silt. Rare sand and gravel of flint.		5.00 +28.61		
5.00 - 5.40	D 17		11/12/19	1630			(0.40)		
			4.50	Dry			5.40 +28.21		
					END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	1.00	Seepage.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
5.30 - 5.50	90	Chisel

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-14

Sheet 1 of 1

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	33.45 mOD
Logged	FC	28/11/2019	Dando 2000.	1.20	16.00	200	16.00	**Coordinates (m)**	E 470810.97
Checked	MS	**End**	Cable percussion boring.	16.00	30.28	150	30.00	**National Grid**	N 109674.00
Approved	TC	05/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			TOPSOIL.		0.10 (0.10) +33.35		
0.30 - 0.50	B 2				Soft to firm grey and brown, mottled orangish brown, silty CLAY with abundant rootlets.				
0.50	D 3					0.50-1.20 slightly sandy			
0.50 - 0.80	B 4						(1.10)		
0.80 - 1.00	B 5								1
1.20	UT 7	8 blows 67% rec		Damp	Soft, becoming firm, yellowish brown, mottled grey, slightly sandy CLAY. Sand is fine to medium.		1.20 +32.25		
1.20	D 6								
1.50 - 2.00	B 8					1.50 bluish grey and firm clay			
2.00 - 2.45	SPTS	N=4 (1,0/0,1,1,2)	1.70	Dry		2.00 Stiff brownish grey mottled grey clay with occasional fine gravel of white selenite and fine lenticular light brown sand. 2.50 Sand is orangish brown fine to medium.			
2.00	D 10								
2.00	D 9								
2.00 - 2.50	B 11						(2.30)		
2.50 - 3.00	B 12								
3.00	UT 14	19 blows 67% rec	3.00	Dry					
3.00	D 13								
3.50 - 4.00	B 15				Stiff light brown, mottled orangish brown and grey, sandy CLAY with occasional lenses (up to 60mm) of fine sand.		3.50 +29.95		
4.00 - 4.45	SPTS	N=12 (1,2/2,3,3,4)	3.00	Dry			(1.00)		
4.00	D 16								
4.00	D 17								
4.00 - 4.50	B 18								
4.50 - 5.00	B 19				Stiff to very stiff orangish brown mottled grey CLAY with partings (up to 1mm) of fine orangish brown sand.		4.50 +28.95		
			28/11/19	0745					
			4.50	Dry					
5.00	UT 21	24 blows					(1.00)		
5.00	D 20		29/11/19	0745					
			4.50	Dry					
5.50	D 22				Stiff grey, locally silty, CLAY. Occasional silt horizontal lenses of light grey silt.		5.50 +27.95		
5.50 - 6.00	B 23								
6.00 - 6.45	SPTS	N=37 (1,1/2,3,21,11)	4.50	Dry		6.00 Very stiff dark grey clay and slightly silty.			
6.00	D 24								
6.00	D 25								
6.00 - 6.50	B 26								
6.50 - 7.00	B 27								
7.00	UT 29	30 blows	6.00	Dry					
7.00	D 28								
7.50	D 30					7.50-8.00 Slightly pyritic.			
7.50 - 8.00	B 31								
8.00 - 8.45	SPTS	N=16 (2,3/3,4,4,5)	6.00	Dry		8.00 Dark grey mottled brown.			
8.00	D 32								
8.00	D 33								
8.00 - 8.50	B 34						(5.70)		
8.50 - 9.00	B 35								
9.00	UT 37	34 blows	6.00	Dry		9.00 Slightly sandy. (Fine light brown sand).			
9.00	D 36								
9.50	D 38					9.50-10.00 Slightly pyritic and sandy.			
9.50 - 10.00	B 39								

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	0.80	Seepage	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:49:14

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-15

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	33.45 mOD
Logged	FC	28/11/2019	Dando 2000.	1.20	16.00	200	16.00	**Coordinates (m)**	E 470810.97
Checked	MS	**End**	Cable percussion boring.	16.00	30.28	150	30.00	**National Grid**	N 109674.00
Approved	TC	05/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 10.00 - 10.50	D 40 B 41				Stiff grey, locally silty, CLAY. Occasional silt horizontal lenses of light grey silt.				
10.50 - 10.95 10.50 10.50 - 11.00	SPTS D 42 B 43	N=19 (2,3/4,4,5,6)	6.00	Dry					
11.00 11.00 - 11.50	D 44 B 45		29/11/19 6.00	1630 Dry					
					Stiff dark grey, occasionally mottled light grey, sandy silty CLAY. Sand is fine to medium.		11.20 +22.25		
11.50 - 12.00	B 46		02/12/19 6.00	0745 Dry					
12.00 12.00	UT 48 D 47	34 blows	6.00	Dry		12.00 Thinly laminated.			
12.50 12.50 - 13.00	D 49 B 50					12.50 Stiff to very stiff dark grey brownish silty clay.	(2.80)		
13.00 13.00 - 13.50	D 51 B 52								
13.50 - 13.95 13.50 13.50 - 14.00	SPTS D 53 B 54	N=20 (3,4/4,5,5,6)	6.00	Dry		13.50 Slightly sandy. Sand is fine light grey.			
14.00 14.00 - 14.50	D 55 B 56				Stiff grey brown silty CLAY, becoming sandy. Sand is fine light grey and brown.		14.00 +19.45		
14.50 - 15.00	B 57								
15.00 15.00	UT 59 D 58	37 blows	6.00	Dry			(2.00)		
15.50 15.50 - 16.00	D 60 B 61					15.50-16.00 Very stiff.			
16.00 16.00 - 16.50	D 62 B 63				Dense dark grey slightly silty angular to subangular fine to coarse GRAVEL of mudstone.	16.00-16.50 Recovered as firm grey silty clay occasional mottling.	16.00 +17.45		
16.50 - 16.82 16.50 16.50 - 16.80	SPTC B 64 B 65	>50 (6,9/17,21,12 for 20mm)	16.50 02/12/19 16.50	5.00 1630 5.00					
17.00	D 66		03/12/19 16.50	0745			(2.00)		
17.50 - 18.50 17.50 - 18.00	Rising Head B 67	k=5.5E-9 m/s				17.40-18.00 Soft to firm silty clay.			
18.00 - 18.45 18.00 18.00 18.00 - 18.50	SPTS D 68 D 69 B 70	N=23 (3,4/5,6,6,6)	18.00	Dry	Firm to stiff, mottled red, brown and grey slightly sandy CLAY. Sand is yellowish brown fine and lenticular (up to 1mm thickness).		18.00 +15.45		
18.50 - 19.00	B 71						(1.00)		
19.00 19.00 - 19.50	D 72 B 73				Stiff grey brown silty CLAY, becoming sandy. Sand is fine light grey and brown.		19.00 +14.45		
19.50 - 19.95 19.50 19.50 - 20.00	SPTS D 74 B 75	N=33 (5,6/7,8,8,10)	19.50	Dry					

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
16.00	Water added.

Hard Boring

Depths (m)	Duration (mins)	Tools used
16.50 - 16.80	75	Chisel
16.80 - 17.40	105	Chisel

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.

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09/04/2020 20:49:14

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-15

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	33.45 mOD
Logged	FC	28/11/2019	Dando 2000.	1.20	16.00	200	16.00	**Coordinates (m)**	E 470810.97
Checked	MS	**End**	Cable percussion boring.	16.00	30.28	150	30.00	**National Grid**	N 109674.00
Approved	TC	05/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth.						
			Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
20.00	D 76				Stiff grey brown silty CLAY, becoming sandy. Sand is fine light grey and brown.	20.00 Firm.			
20.00 - 20.50	B 77								
20.50 - 21.00	B 78					20.50-21.00 Recovered as soft to firm.			
21.00	UT 80	43 blows	21.00	7.70					
21.00	D 79								
21.30	D 81								
21.30 - 21.80	B 82								
			03/12/19	1630					
			21.00	8.00					
21.80 - 22.02	SPTS	>50 (15,10 for 20mm/26,24 for 50mm)				21.80 Slightly silty.			
21.80	D 83		04/12/19	0745					
21.80 - 22.50	B 84		21.00						
22.50	UT 85	50 blows No Recovery	22.50	7.00					
22.50 - 23.00	B 86						(7.50)		
23.00	D 87								
23.00 - 23.50	B 88								
23.50 - 24.00	B 89								
24.00 - 24.32	SPTS	>50 (8,12/15,15,20 for 24mm)	24.00	8.00					
24.00	D 90								
24.00	D 91								
24.00 - 24.50	B 92								
24.50 - 25.00	B 93								
25.00	D 94								
25.00 - 25.50	B 95								
25.50 - 25.95	SPTS	N=50 (8,9/10,12,13,15)	25.50	8.00		25.50-26.50 Recovered as dense to very dense reddish brown clayey fine to coarse sand.			
25.50	D 96								
25.50 - 26.00	B 97								
26.00 - 26.50	B 98								
26.50 - 27.00	B 99				Very stiff reddish brown slightly sandy CLAY. Sand is fine to medium.		26.50 +6.95		
							(0.50)		
27.00 - 27.39	SPTS	>50 (10,14/15,15,19,1 for 18mm)	27.00	8.00	Very stiff grey reddish brown very sandy CLAY. Sand is fine to coarse and light grey.		27.00 +6.45		
27.00	D 100								
27.00	D 101								
27.00 - 27.50	B 102								
27.50 - 28.00	B 103								
28.00 - 28.50	B 104						(2.50)		
28.50 - 28.80	SPTS	>50 (15,10 for 35mm/19,27,4 for 28.5mm)	28.00	8.00					
28.50	D 105								
28.50 - 29.00	B 106								
29.00 - 29.50	B 107								
					Firm light grey very sandy CLAY. Sand is fine to coarse.		29.50 +3.95		
							(0.78)		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
2	21.20	Rose to 13.00 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks
21.80 - 22.30	Slow progress (60mins).
24.00 - 24.60	Slow progress (60mins).

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-CP-15

Borehole Log

SOCOTEC

Drilled	AR	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	33.45 mOD
Logged	FC	28/11/2019	Dando 2000.	1.20	16.00	200	16.00	**Coordinates (m)**	E 470810.97
Checked	MS	**End**	Cable percussion boring.	16.00	30.28	150	30.00	**National Grid**	N 109674.00
Approved	TC	05/12/2019	SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
30.00 - 30.28 30.00	SPTS D 108	>50 (16,9 for 30mm/19,24,7 for 20mm)	30.00 04/12/19 30.00	8.50 1630 8.50	Firm light grey very sandy CLAY. Sand is fine to coarse. END OF EXPLORATORY HOLE		30.28 +3.17		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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AGS

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-15

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.70 mOD
Logged	FC	17/12/2019	Dando 2500. Cable percussion boring.	1.20	10.45	200	3.00	**Coordinates (m)**	E 471309.51
Checked	MS	**End**	SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe installed on completion.					**National Grid**	N 110205.64
Approved	TC	18/12/2019	Panel of experts additional hole.						

Samples and Tests

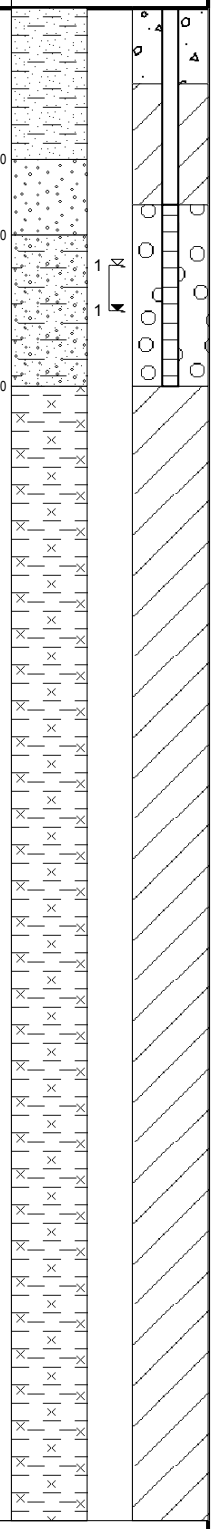
Depth	Type & No.	Records	Date Casing	Time Water
		0.00-1.20 Hand excavated inspection pit.		
0.50 - 1.00	B 1			
1.00 - 1.20	B 2			
1.30 - 2.50	Rising Head	k=2.8E-6 m/s		
1.50 - 2.00	D 3			
1.70 - 2.00	B 3a	1.70-2.50 Water added.		
2.00 - 2.45	SPTS	N=1 (1,0/0,1,0,0)	2.00	1.70
2.50	ES 4a			
2.50 - 3.00	D 5			
2.50 - 3.00	B 4			
3.00 - 3.45	UT 6	21 blows 100% rec	3.00	1.00
3.00	D 7			
3.50	ES 8a			
3.50 - 4.00	D 9			
3.50 - 4.00	B 8			
4.00 - 4.45	SPTS	N=16 (1,2/2,3,5,6)	3.00	1.00
4.00	D 10			
4.00 - 4.50	B 11			
4.50	ES 12a			
4.50 - 5.00	D 13			
4.50 - 5.00	B 12			
5.00 - 5.45	UT 14	53 blows 100% rec	3.00	1.00
			17/12/19	1630
			3.00	1.00
5.45	D 15			
5.50 - 6.00	B 16		18/12/19	0730
			3.00	
6.00 - 6.45	SPTS	N=21 (2,2/4,4,7,6)	3.00	
6.00 - 6.45	D 17			
6.00 - 6.50	B 18			
6.50 - 7.00	B 19			
7.00 - 7.45	UT 21	82 blows 100% rec	3.00	
7.00	D 20			
7.45	D 22			
7.50 - 8.00	B 23			
8.00 - 8.45	SPTS	N=40 (3,3/7,8,10,15)	3.00	
8.00 - 8.45	D 24			
8.00 - 8.50	B 25			
8.50 - 9.00	D 27			
8.50 - 9.00	B 26			
9.00 - 9.45	UT 28	100 blows 89% rec	3.00	
9.50	D 29			
9.50 - 10.00	B 30			

Strata Description

Main	Detail	Depth, Level (Thickness)
Very soft to soft orangish brown sandy to very sandy CLAY with frequent rootlets.		(1.00)
Dark grey angular to subangular coarse GRAVEL of weak Limestone.		1.00 +36.70 (0.50)
Very loose orangish brown very sandy clayey angular to subangular fine to coarse GRAVEL of limestone with medium cobble content. Cobbles are subangular of limestone.		1.50 +36.20 (1.00)
Firm to stiff, red, mottled grey and bluish grey, silty CLAY.	3.50-4.00 soft to firm 5.45 very stiff 5.50-6.00 mottled purple and dark reddish brown	2.50 +35.20 (7.95)

Legend

Backfill



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.00	Rose to 1.70 m after 20 minutes.	2.50

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used
1.00 - 1.70	120	Chisel

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.

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Scale 1:50

09/04/2020 20:49:15

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-16

Borehole Log

SOCOTEC

Drilled	DS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.70 mOD
Logged	FC	17/12/2019	Dando 2500.	1.20	10.45	200	3.00	**Coordinates (m)**	E 471309.51
Checked	MS	**End**	Cable percussion boring.					**National Grid**	N 110205.64
Approved	TC	18/12/2019	SPT Hammer ID: JD04, Rod type: Whitworth. Standpipe installed on completion. Panel of experts additional hole.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 10.45 10.00 - 10.45	SPTS D 31	N=48 (3,9/10,12,13,13)	3.00 18/12/19 3.00	1630	Firm to stiff, red, mottled grey and bluish grey, silty CLAY.				
					END OF EXPLORATORY HOLE		10.45 +27.25		

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:49:15

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-CP-16

Borehole Log

SOCOTEC

Drilled	KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	40.53 mOD
Logged	RP	03/12/2019	Comacchio 205.	1.20	3.50	117	3.00	**Coordinates (m)**	E 471206.01
Checked	MS	**End**	Dynamic sampling to 4.50 m. Rotary core drilling (GBS size) using air mist flush.	3.50	4.50	102	4.50	**National Grid**	N 110331.98
Approved	TC	10/12/2019	Client instructed no samples to be taken below 21.00m. 37.34 to 37.71m, drill damaged core.	4.50	38.50	146	6.00		
			Standpipe piezometer installed on completion.						

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			0.00-1.20 Hand excavated inspection pit.			Brown slightly gravelly sandy CLAY. Gravel is subangular to rounded fine to coarse of flint and chert. Frequent rootlets. (TOPSOIL)		(0.40)		
0.20	D 1							0.40 +40.13		
0.40	D 2					Soft to firm orangish brown very sandy CLAY.	0.60-0.80 frequent rounded medium to coarse gravel of black flint			
0.40 - 0.80	B 3							(0.80)		1
0.80 - 1.20	B 4									
1.20 - 2.50	L		100% rec, diameter 117mm			Firm brown, mottled grey and orangish brown sandy CLAY. Sand is fine.		1.20 +39.33		
1.70 - 1.80	D 5							(1.12)		
2.30 - 2.40	D 6							2.32 +38.21		
2.50 - 2.60	D 7					Firm to stiff brown, mottled grey and orangish brown, slightly sandy CLAY. Sand is fine.		2.42 (0.10) +38.11		
2.50 - 3.50	L		100% rec, diameter 117mm			Orangish brown, mottled reddish brown and dark brown/purple, clayey fine to coarse SAND.		2.50 (0.08) +38.03		
						Stiff red, mottled brown and purple, sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of ironstone.		2.60 (0.10) +37.93		
3.10 - 3.20	D 8					Firm to stiff red and grey, occasionally mottled yellowish brown and brown, silty CLAY.				
3.50 - 4.50	L		100% rec, diameter 102mm					(1.90)		
4.00 - 4.10	D 9									
4.40 - 4.50	D 10			03/12/19 3.00	1630 0.80					
				04/12/19 3.00	0800 0.00	Stiff red and grey, occasionally mottled yellowish brown and brown, slightly sandy CLAY. Sand is fine to coarse. Rare fine to coarse gravel size clasts of ironstone/mudstone.		4.50 +36.03		
4.70 - 4.80			D 11					(0.60)		
4.50 - 6.00	100 NA					Firm red and grey, occasionally mottled yellowish brown and brown, slightly sandy CLAY. Sand is fine to coarse. Rare fine to coarse gravel size clasts of ironstone/mudstone.		5.10 +35.43		
5.40 - 5.50	NA		D 12					(0.20)		
						Stiff red and grey, occasionally mottled, yellowish brown, slightly sandy CLAY. Sand is fine to coarse.		5.30 +35.23		
5.90 - 6.00			D 13					(0.35)		
6.20 - 6.30			D 13A			Very stiff red and grey, occasionally mottled, yellowish brown, slightly sandy CLAY. Sand is fine to coarse.		5.65 +34.88		
6.40 - 6.80			CS 14							
6.00 - 7.50	89 NA NA							(1.85)		
7.10 - 7.20		- NA -	D 15							
						Stiff to very stiff red, grey and pink, occasionally mottled yellowish brown and brown, slightly sandy CLAY. Sand is fine to coarse.		7.50 +33.03		
7.70 - 7.80			D 16					(0.60)		
8.20 - 8.30	100 NA					Very stiff red and grey, mottled pink and yellowish brown, CLAY.		8.10 +32.43		
7.50 - 9.00	NA		D 17							
8.80 - 8.90			D 18							
9.00 - 9.40			CS 19							
9.00 - 10.50	100 NA NA							(2.40)		
9.90 - 10.00			D 20							

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	0.80	Remained at 0.80 m after 20 minutes. Seepage.	

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:20

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-01

Borehole Log

SOCOTEC

Drilled	KW	**Start**	03/12/2019
Logged	RP	**End**	10/12/2019
Checked	MS		
Approved	TC		

Equipment, Methods and Remarks

Comacchio 205.
Dynamic sampling to 4.50 m. Rotary core drilling (GBS size) using air mist flush.
Client instructed no samples to be taken below 21.00m. 37.34 to 37.71m, drill damaged core.
Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	3.50	117	3.00
3.50	4.50	102	4.50
4.50	38.50	146	6.00

Ground Level	40.53 mOD
Coordinates (m)	E 471206.01
National Grid	N 110331.98

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Very stiff red and grey, mottled pink and yellowish brown, CLAY.				
10.30 - 10.40			D 21					10.50 +30.03		
						Stiff to very stiff red and grey, occasionally mottled yellowish brown and brown, slightly sandy CLAY. Sand is fine to medium. Occasional gravel size pockets of yellowish brown and red sand.				
10.90 - 11.00			D 22				11.00 very stiff red and grey, mottled brown			
10.50 - 12.00	100 NA							(1.50)		
11.40 - 11.50	NA		D 23							
11.90 - 12.00			D 24					12.00 +28.53		
						Firm to stiff brown, mottled grey, very sandy to sandy CLAY. Sand is fine to medium.				
12.50 - 12.60			D 25							
12.00 - 13.50	97 NA							(1.30)		
12.90 - 13.30	NA		CS 26							
13.30 - 13.40			D 27					13.30 +27.23		
						Brown, mottled light grey, clayey fine to medium SAND.		(0.20)		
13.50 - 13.60			D 28				13.50-13.70 red and grey, mottled yellowish brown	13.50 +27.03		
						Stiff to very stiff brown, mottled grey, sandy CLAY. Sand is fine to medium.		(0.34)		
						Brown, mottled grey, fine to medium SAND.		13.84 +26.69		
14.10 - 14.20			D 29					(0.51)		
13.50 - 15.00	91 NA									
	NA							14.35 +26.18		
						Stiff to very stiff brown, mottled grey, slightly sandy CLAY. Sand is fine to medium.				
14.70 - 14.80			D 30							
		-					14.86-15.00 AZCL			
15.00 - 15.10		NA -	D 31					(1.21)		
15.55 - 15.65			D 32					15.56 +24.97		
						Very stiff grey and red, mottled brown and yellowish brown, CLAY.	15.60 possible 20 degree rough polished fissure	(0.33)		
15.00 - 16.50	59 NA							15.89 +24.64		
	NA					Assessed Zone of Core Loss. Driller notes clay with sand.				
								(0.61)		
				04/12/19 6.00	1630					
16.60 - 16.70			D 33	05/12/19 6.00	0800 4.70	Very stiff grey and red, mottled brown and yellowish brown, CLAY.		16.50 +24.03		
	100									
16.50 - 17.25	NA		CS 34							
16.90 - 17.25	NA									
17.50 - 17.60	84		D 35							
17.25 - 18.00	NA									
	NA							(2.90)		
18.30 - 18.40			D 36							
	100									
18.00 - 19.50	NA		D 37							
18.80 - 18.90	NA									
19.30 - 19.40			D 38							
19.50 - 19.60			D 39					19.40 +21.13		
						Very stiff red and grey, mottled pink, yellowish brown and brown, slightly sandy CLAY. Sand is fine to medium.				
								(1.00)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:20

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-RC-01

Borehole Log

SOCOTEC

Drilled	KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	40.53 mOD
Logged	RP	03/12/2019	Comacchio 205. Dynamic sampling to 4.50 m. Rotary core drilling (GBS size) using air mist flush. Client instructed no samples to be taken below 21.00m. 37.34 to 37.71m, drill damaged core. Standpipe piezometer installed on completion.	1.20	3.50	117	3.00	**Coordinates (m)**	E 471206.01
Checked	MS	**End**		3.50	4.50	102	4.50	**National Grid**	N 110331.98
Approved	TC	10/12/2019		4.50	38.50	146	6.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
20.00 - 20.40			CS 40			Very stiff red and grey, mottled pink, yellowish brown and brown, slightly sandy CLAY. Sand is fine to medium.				
19.50 - 21.00	100 NA NA					Very stiff red and grey, mottled yellowish brown and brown, sandy CLAY. Sand is fine to medium.		20.40 +20.13		
20.70 - 20.80			D 41					(1.30)		
21.00 - 22.50	100 NA NA		Flush: 4.50 - 38.50 Air/mist 100%			Brown, mottled grey, clayey fine to medium SAND.		21.70 +18.83		
								(0.64)		
						Very stiff grey, mottled brown, sandy CLAY. Sand is fine to medium.		22.34 +18.19 (0.08) 22.42 +18.11		
						Brown, mottled grey, slightly clayey fine to medium SAND.		(0.18) 22.60 +17.93		
22.50 - 24.00	100 NA NA					Very stiff brown and grey, mottled red and pink, slightly sandy to sandy CLAY. Sand is fine to medium.		(1.00)		
							23.40-23.60 sandy to very sandy			
						Grey, mottled brown, slightly clayey fine to medium SAND. Rare pockets (up to 5mm) of black silt.		23.60 +16.93		
								(0.45)		
						Very stiff brown, mottled grey, slightly sandy CLAY. Sand is fine to medium.		24.05 +16.48 (0.11) 24.16 +16.37		
24.00 - 25.50	100 NA NA	- NA -				Very stiff grey, mottled brown, sandy to very sandy CLAY. Sand is fine to medium with occasional horizontal to 10 degree grey and brown layers of fine to medium sand.		(0.84)		
						Very stiff grey and red, mottled yellowish brown, slightly sandy CLAY. Sand is fine to medium. Rare gravel size subrounded clasts of weak ironstone.		25.00 +15.53		
								(0.50)		
							25.30 possible up to 30 degree very closely spaced polished fissures	25.50 +15.03 (0.20) 25.70 +14.83		
						Very stiff grey, mottled yellowish brown, slightly sandy CLAY. Sand is fine.	25.50-25.60 30, 70 and 50 degree very closely spaced polished to slightly polished fissures			
						Very stiff yellowish brown and reddish pink, mottled grey, slightly sandy CLAY. Sand is fine.				
25.50 - 27.00	100 NA NA									
								(2.70)		
27.00 - 28.50	100 NA NA						27.80 grey, mottled red and yellowish brown			
				05/12/19 6.00	1630					
						Very stiff grey, mottled red and yellowish brown, very sandy CLAY. Sand is fine to medium.		28.40 +12.13 (0.10) 28.50 +12.03 (0.12) 28.62 +11.91		
				06/12/19 6.00	0800 4.75	Red slightly clayey fine to medium SAND.				
						Grey fine to medium SAND.	28.73-28.75 dark grey slightly clayey sand band	(0.28) 28.90 +11.63		
28.50 - 30.00	93 NA NA					Very stiff grey and red, mottled pink and brown, slightly sandy to sandy CLAY. Sand is fine to medium.				
							29.30-29.41 AZCL	(0.90)		
						Very stiff dark grey, mottled red, CLAY.		29.80 +10.73		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:20

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-01

Borehole Log

SOCOTEC

Drilled	KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	40.53 mOD
Logged	RP	03/12/2019	Comacchio 205. Dynamic sampling to 4.50 m. Rotary core drilling (GBS size) using air mist flush.	1.20	3.50	117	3.00	**Coordinates (m)**	E 471206.01
Checked	MS	**End**	Client instructed no samples to be taken below 21.00m. 37.34 to 37.71m, drill damaged core.	3.50	4.50	102	4.50	**National Grid**	N 110331.98
Approved	TC	10/12/2019	Standpipe piezometer installed on completion.	4.50	38.50	146	6.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
30.00 - 31.50	86 NA NA	- NA -				Very stiff dark grey, mottled red, CLAY.	30.07 30 degree slightly polished planar fissure 30.23 5 degree planar slightly polished fissure 30.46 40 degree undulating slightly polished fissure 30.95 20 degree undulating slightly polished fissure 31.07 40 degree undulating slightly polished fissure	(1.70) 31.50 +9.03		
31.50 - 33.00	87 NA NA					Very stiff friable dark grey and black, mottled red and yellow, CLAY.	31.62-31.76 extremely closely spaced rough slightly polished to polished fissure/ jointing dips of 20, 60 and 30 degree 32.02 70 degree planar undulating slightly polished fissure	(1.10) 32.60 +7.93		
				06/12/19 6.00	1230	Very stiff grey, mottled red, CLAY.	32.28 50 degree planar slightly polished fissure	(0.40) 33.00 +7.53		
				09/12/19 6.00	0800 4.80	Very stiff grey and red, mottled yellowish brown, CLAY.	32.80-33.00 AZCL	(0.44) 33.44 +7.09		
33.00 - 34.50	100 NA NA					Very stiff grey and yellowish brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of flint.	33.44 45 degree planar rough joint	(0.35) 33.79 +6.74		
						Very stiff bluish grey, mottled yellowish brown, very sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of flint. Glauconitic.		(0.20) 33.99 +6.54		
						Medium strong medium density white CHALK.		(0.10) 34.09 +6.44		
34.50 - 35.00	100 NA NA					Very stiff friable light brown slightly sandy CLAY with low cobble content. Sand is fine to coarse. Cobbles are angular to subangular of chalk.	34.45 black subangular cobble of flint with white rind	(0.23) 34.32 +6.21		
						Very stiff bluish grey, mottled yellowish brown, slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular fine to coarse of chalk.	34.54 subangular cobble of flint/large flint nodule	(0.11) 34.43 +6.10		
35.00 - 35.50	100 100 58	NI 250 600	Falling Head k=4.0E-8 m/s					(0.17) 34.60 +5.93		
35.50 - 36.50						Stiff dark grey and brown, mottled red, slightly sandy CLAY.	35.33 0 degree undulating rough joint open up to 5mm clayey infill	(0.40) 35.00 +5.53		
						Very stiff greenish grey, mottled pink, red and yellowish brown, sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to angular fine to coarse of flint.				
35.50 - 37.00	100 93 86					Medium strong high density white CHALK with rare black flint cobbles. Fractures are horizontal, widely spaced, undulating, rough, faint black speckling on surfaces, locally orangish brown staining.	35.99-36.02 black fractured flint band with light grey marl infill 36.20-36.30 black flint band or shattered cobble 36.62 0 degree undulating rough joint with faint black speckled staining open up to 5mm (possible drilling induced) 37.24-37.34 black flint band or fracture nodule 37.71-37.78 black flint cobble 37.81-37.85 band of black flint or fractured flint nodule 38.15 0 degree planar to undulating	(3.50)		
37.00 - 38.50	90 46 46			09/12/19 6.00	1630					
						END OF EXPLORATORY HOLE	rough joint clean and tight 38.35-38.50 AZCL	38.50 +2.03		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:20

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-01

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL./Beretta T41. Cable percussion boring to 6.50 m./Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.30	B 1	0.00-1.20 Hand excavated inspection pit.			Brown gravelly clayey fine to medium SAND. Gravel is subrounded to subangular fine to coarse of Flint. Occasional roots and rootlets.		(0.50)		
0.30 - 0.50	B 2						0.50 +39.37		
0.50	D 3				Orangish brown, mottled brown, slightly clayey silty fine to medium SAND. Rare roots and rootlets.	0.50-0.80 occasional light grey mottling			
0.50 - 0.80	B 4						(0.70)		
0.80 - 1.50	B 5								
1.00	D 6						1.20 +38.67		
1.20 - 1.65	SPTS	N=21 (2,3/5,5,5,6)		Dry	Medium dense orangish brown clayey fine SAND. Slightly pyritic.				
1.20 - 1.70	B 8						(0.80)		
1.50	D 7								
1.70 - 2.00	B 9					1.70-2.00 slightly gravelly	2.00 +37.87		
2.00 - 2.45	SPTS	2.00-5.00 Water added.	2.00	Dry	Medium dense orangish brown clayey fine to medium SAND.				
2.00	D 10	N=14 (1,3/3,3,4,4)					(1.50)		
2.00	D 11								
2.00 - 2.50	B 12								
2.50 - 3.00	B 13								
3.00 - 3.45	SPTS	N=17 (1,3/3,4,4,6)	3.00	1.50					
3.00	D 14								
3.00	D 15								
3.00 - 3.50	B 16								
3.50 - 4.00	B 17				Soft orangish brown sandy CLAY. Sand is fine.		3.50 +36.37		
							(0.50)		
4.00 - 4.45	SPTS	N=15 (2,3/3,3,4,5)	4.00	2.50	Medium dense orangish brown clayey to very clayey fine SAND. Pyritic.		4.00 +35.87		
4.00	D 18								
4.00	D 19								
4.00 - 4.50	B 20								
4.50 - 5.00	B 21					4.50-5.00 light brown mottling	(1.00)		
5.00 - 5.45	SPTS	N=17 (2,3/4,4,4,5)	5.00	Dry	Firm brown, mottled orangish brown, sandy CLAY. Sand is fine. Pyritic.		5.00 +34.87		
5.00	D 22								
5.00	D 23								
5.00 - 5.50	B 24								
5.50 - 6.00	B 25						(1.00)		
6.00 - 6.45	UT 27	19 blows 100% rec	6.00	Dry	Firm to stiff dark grey sandy CLAY. Sand is fine. Pyritic. Rare gravel size shell fragments.		6.00 +33.87		
6.00	D 26						(0.50)		
			13/11/19 6.00	1730 Dry					
6.50		D 28	18/11/19 6.00	0800 Dry	NO RECOVERY. Driller notes clay.		6.50 +33.37		
6.50 - 7.00	0 NA NA								
7.00 - 7.50	0 NA NA						(2.00)		
7.50 - 8.50	0 NA NA	- NA -							
8.50 - 8.70		D 28A			Minimal recovery. Recovered core comprises dark grey silty CLAY with 3 no. cobbles of dark grey claystone.		8.50 +31.37		
8.50 - 10.00	24 NA NA								
		Flush: 6.50 - 13.00 Air/mist 100%							

Depth	TCR SCR RQD	If	Records	Date Casing	Time Water

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:21

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	
Logged	JF/RP		13/11/2019
Checked	MS	**End**	
Approved	TC		12/12/2019

Equipment, Methods and Remarks

Dando 2000/Fraste XL. Beretta T41.
Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m.
SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	6.50	200	6.00
6.50	72.20	146	58.00

Ground Level	39.87 mOD
Coordinates (m)	E 470984.99
National Grid	N 109166.01

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.00 - 11.50	0 NA NA					Minimal recovery. Recovered core comprises dark grey silty CLAY with 3 no. cobbles of dark grey claystone.				
11.50 - 11.70			D 29							
11.50 - 12.00	48 NA NA							(6.50)		
12.00 - 13.00	29 NA NA									
12.80 - 13.00			D 30	18/11/19 6.00	1730 Dry					
13.00 - 13.50	100 NA NA		D 31	20/11/19 6.00	0800					
13.30 - 13.50										
13.50 - 15.00	33 NA NA									
14.50 - 14.70			B 32							
14.70			B 33							
15.00 - 15.20		- NA -	D 34			Stiff to very stiff dark brownish grey silty CLAY with occasional partings and lenses (<3mm) of light brown silt and fine sand.		15.00 +24.87		
15.00 - 16.50	97 NA NA		D 35				16.20-16.50 pyritised claystone nodule (40x40x25mm) and occasional shells (bivalves) 16.50-18.00 no recovery driller notes clay			
15.76 - 16.20										
16.50 - 18.00	0 NA NA		Flush: 13.00 - 20.50 Air/ mist 40%					(5.50)		
				20/11/19 6.00	1730					
18.00 - 18.20			D 36							
18.00 - 18.75	20 NA NA			21/11/19 6.00	0800					
18.75 - 19.50	13 NA NA									
				21/11/19 18.00	1730					
				26/11/19 18.00	0800 Dry					

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL. Beretta T41. Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.50 - 20.60			D 37		
20.50 - 21.60	100 NA NA		Flush: 20.50 - 21.60 Air/ mist 90%		
21.10 - 21.20			D 38		
21.62 - 21.78			CS 39		
21.80 - 21.90			D 40		
21.60 - 23.10	100 NA NA		Flush: 21.60 - 23.10 Air/ mist 75%		
22.40 - 22.50			D 41		
22.59 - 23.00			CS 42		
23.00 - 23.10			D 43	26/11/19 19.50	1630 Dry
23.10 - 24.20			D 44	27/11/19 19.50	0800 10.10
23.10 - 24.60	13 NA NA		Flush: 23.10 - 24.60 Air/ mist 85%		
24.66 - 24.94			CS 45		
24.60 - 25.35	100 NA NA	- NA -	Flush: 24.60 - 25.35 Air/ mist 90%		
25.00 - 25.10			D 46		
25.60 - 25.70	100 NA NA		D 47		
25.35 - 26.10			Flush: 25.35 - 26.10 Air/ mist 70%		
26.20 - 26.30			D 48		
26.74 - 27.00	93 NA NA		CS 49		
26.10 - 27.60			Flush: 26.10 - 27.60 Air/ mist 75%		
27.50 - 27.60			D 50		
28.10 - 28.20			D 51		
27.60 - 29.10	67 NA NA		Flush: 27.60 - 29.10 Air/ mist 90%		
28.70 - 28.80			D 52		
29.60 - 29.70	83 NA NA		D 53		
29.70 - 29.90			CS 54		
29.10 - 30.60			Flush: 29.10 - 30.60 Air/ mist 60%		

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Stiff to very stiff dark brownish grey silty CLAY with occasional partings and lenses (<3mm) of light brown silt and fine sand.				
Stiff dark grey silty CLAY with occasional subangular coarse gravel of siltstone and claystone. Recovered as dark grey silty clay.	20.90-21.60 lenses/ horizon (<2mm silty sand)	20.50 +19.37		
	21.30-21.60 yellowish brown lenses of fine sand			
	21.30-21.90 rare shell (bivalve) (<30mm)	(2.60)		
	21.35-21.60 thinly laminated, rare polish surfaces			
	21.80-22.00 randomly orientated laminations			
	23.00-23.10 rare shell (<10mm) fan shaped alluvial flow	23.10 +16.77		
Stiff to very stiff grey silty CLAY with occasional partings and lenses (<2mm) of silty sand. Sand is light grey/brown and fine.	23.10-24.10 slight fissuring			
	25.00-25.10 indistinctly laminated			
	25.35-25.70 indistinctly laminated	(4.50)		
	26.10-26.20 slightly laminated			
	26.50-26.70 whitish/ light brown lens (<1mm) of fine sand			
	27.20 cobble of mudstone			
	27.60-28.80 (<3mm) cross cut wave structures	27.60 +12.27		
Stiff to very stiff dark grey CLAY with occasional horizontal partings (<2mm) of light silt.		(1.50)		
		29.10 +10.77		
Stiff indistinctly laminated dark grey silty CLAY. Laminae are horizontal of light grey silt.	29.50-29.80 rare shells (bivalves)			
		(1.27)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL. Beretta T41. Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
30.20 - 30.30			D 55	27/11/19 19.50	1640 21.10	Stiff indistinctly laminated dark grey silty CLAY. Laminae are horizontal of light grey silt.				
				28/11/19 19.50	0830 9.80	Stiff to very stiff dark grey silty CLAY with occasional faint laminations of rare fibrous lignite.	30.37-30.60 AZCL	30.37 +9.50		
30.80 - 30.90			D 56				30.60-30.80 finely laminated			
	100						31.00 rare fibrous lignite	(1.73)		
30.60 - 32.10	NA		D 57				31.40-32.10 stiff			
31.40 - 31.50	NA									
32.00 - 32.10			D 58							
						Stiff to very stiff dark grey CLAY with occasional faint laminations.		32.10 +7.77		
32.50 - 32.60			D 59				32.46-32.50 angular to subangular fine gravel of mudstone (8x4mm) (<1mm thickness)			
32.60 - 32.75			CS 60					(1.50)		
	93						32.60-32.70 cross cut laminations (<10mm)			
32.10 - 33.60	NA									
	NA						32.98-33.02 fibrous lignite in a sandy micaceous silt			
33.10 - 33.20			D 61							
33.60 - 33.70			D 62				33.10-33.60 slightly sandy. Sand is light grey and fine	33.60 +6.27		
33.70 - 33.99			CS 63			Very stiff dark grey silty CLAY with occasional gravel size shells and lignite.	33.20-33.30 thinly laminated			
	93							(1.20)		
33.60 - 35.10	NA									
34.40 - 34.50	NA		D 64				34.50 rare shells (<7mm) bivalves			
							34.55 rare shells (<1mm) belemnites and black lignite (70x20x5mm)	34.80 +5.07 (0.20)		
		-				Dense grey and dark grey very clayey fine to coarse SAND.		35.00 +4.87		
35.10 - 35.20		NA -	D 65			Stiff dark grey very sandy CLAY. Sand is fine to medium, glauconitic.	34.60 very sandy clay. Sand is light brownish grey and fine to coarse, becoming clayey fine to medium sand			
35.42 - 35.65			CS 66							
35.70 - 35.80			D 67				35.00-35.10 AZCL			
	93						35.80 occasional shells	(1.60)		
35.10 - 36.60	NA									
	NA									
36.20 - 36.30			D 68							
							36.40 light grey sandy clay with rare subrounded gravel of flint pebbles (5 to 10mm)	36.60 +3.27		
						Assessed Zone of Core Loss. Driller notes dark grey SAND with black pebbles.				
	17							(1.30)		
36.60 - 38.10	NA									
	NA									
37.90 - 38.00			D 69	28/11/19 19.50	1600 23.10	Stiff brownish grey sandy CLAY with subrounded gravel of flint (<50x30x30mm). Sand is fine.	38.00 sand is fine and greyish brown	37.90 +1.97 (0.20) 38.10 +1.77		
				29/11/19 19.50	0815 7.90	Recovered as soft to firm dark grey sandy silty CLAY. Sand is fine to medium. Occasional subangular cobbles of mudstone.	38.10-39.40 driller reported green sand. Possible clayey sand? sand was consolidated			
38.50 - 38.60			D 70							
	40							(1.50)		
38.10 - 39.60	NA		Flush: 38.10 - 39.60 Air/ mist 65%							
	NA									
39.10 - 39.20			D 72				39.40 cobbles of mudstone (100x40mm) (80x60x30mm)			
39.73 - 39.94			CS 71			Stiff grey and reddish brown sandy silty CLAY. Sand is fine.		39.60 +0.27		
39.95 - 41.05			D 73							

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL. Beretta T41. Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
39.60 - 41.10	100 NA NA		Flush: 39.60 - 41.10 Air/ mist 90%	29/11/19 41.40	1200 23.70	Stiff grey and reddish brown sandy silty CLAY. Sand is fine.		(1.54)		
				03/12/19 41.40	0830 Dry	Firm to stiff grey slightly gravelly CLAY. Gravel is subrounded coarse of fossiliferous mudstone.		41.14 -1.27 (0.35)		
41.10 - 42.20	91 NA NA					Firm red, mottled pink and grey, CLAY. Rare selenite crystals (2-3mm).	41.67 stiff	41.49 -1.62 (0.28)		
						Very stiff pink, mottled red and grey and yellowish brown, CLAY.		41.77 -1.90 (0.43)		
42.20 - 43.70	97 NA NA					Very stiff brown, mottled grey, CLAY.		42.20 -2.33 (1.50)		
43.70 - 45.20	100 NA NA	- NA -				Very stiff brown, mottled grey, CLAY.		43.70 -3.83 (1.50)		
45.20 - 46.70	100 NA NA		Flush: 41.10 - 49.70 Air/ mist 100%	03/12/19 41.40	1630 46.00	Very stiff brown, mottled grey sandy silty CLAY. Sand is fine. Occasional pockets/lenses (up to 60mm) of grey silty fine sand.	46.20 60 degree planar rough tight fissure	45.20 -5.33 (1.67)		
				04/12/19 41.40	0800 9.10	Stiff brown CLAY.		46.87 -7.00 (0.27)		
46.70 - 48.20	100 NA NA					Very stiff brown slightly sandy to sandy CLAY. Sand is fine to medium.		47.14 -7.27 (1.06)		
						Brown clayey fine to medium SAND.		48.20 -8.33 (0.38)		
48.20 - 49.70	33 NA NA			04/12/19 46.50	1700 Dry	Weak grey, mottled brownish grey, fine to medium grained SANDSTONE. Recovered as subangular cobbles. Assessed Zone of Core Loss. Driller notes Lambeth Sands.		48.58 (0.12) 48.70 -8.71 -8.83		
				05/12/19 46.50	0800 10.20		49.70-51.20 no recovery	(2.50)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
52.70 - 54.20	Top 150mm is falling/spoil.

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL. Beretta T41. Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
49.70 - 51.20	0 NA NA				
51.20 - 52.70	100 NA NA		Flush: 49.70 - 52.70 Air/ mist 60%		
52.70 - 54.20	72 NA NA		Flush: 52.70 - 54.20 Air/ mist 25%		
54.20 - 55.70	0 NA NA	- NA -	Flush: 54.20 - 55.70 Air/ mist 20%		
55.70 - 57.20	0 NA NA		Flush: 55.70 - 57.20 Air/ mist 10%	05/12/19 49.20	1600 22.40
				06/12/19 49.20	0800 9.10
57.20 - 58.00	0 NA NA			06/12/19 58.00	1115 Dry
				09/12/19 58.00	0800 12.20
58.00 - 58.70	100 NA NA				
58.70 - 60.20	85 NA NA				
				09/12/19 58.00	1500 0.00

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Assessed Zone of Core Loss. Driller notes Lambeth Sands.				
Brown, mottled greyish brown, slightly gravelly clayey fine to medium SAND. Gravel is subangular fine to coarse of sandstone/cemented sand. Rare pockets (10-20mm) of grey clay.		51.20 -11.33 (0.85)		
Grey clayey fine to medium SAND. Rare to occasional thin black lenses (up to 1mm) of black clay/organics.	52.20-52.35 stiff to very stiff grey slightly sandy clay. Sand is fine to medium 52.70-52.90 stiff to very stiff grey slightly sandy CLAY. Sand is fine to medium. Occasional thin black lenses/ pockets (up to 2mm) of clay/organics	52.05 -12.18 (1.73)		
Assessed Zone of Core Loss. Driller notes sands.		53.78 -13.91 (0.42)		
NO RECOVERY. Driller notes sands.		54.20 -14.33 (3.80)		
Firm to stiff red, mottled grey, CLAY.		58.00 -18.13 (0.15)		
Very stiff red, mottled brown and grey, CLAY.	58.15 possible horizontal undulating clean tight fissure	58.15 -18.28 (1.65)		
Very stiff dark grey, mottled red, CLAY.		59.80 -19.93 (0.40)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.87 mOD
Logged	JF/RP	13/11/2019	Dando 2000/Fraste XL. Beretta T41. Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m. SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.	1.20	6.50	200	6.00	**Coordinates (m)**	E 470984.99
Checked	MS	**End**		6.50	72.20	146	58.00	**National Grid**	N 109166.01
Approved	TC	12/12/2019							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
60.20 - 61.70	100 NA NA			10/12/19 58.00	0800 10.10
61.70 - 63.20	67 NA NA				
63.20 - 64.70	100 NA NA	- NA -			
64.70 - 66.20	91 NA NA		Flush: 58.00 - 72.20 Air/ mist 100%	10/12/19 58.00	1645 16.90
				12/12/19 58.00	0800 0.00
66.20 - 67.70	100 NA NA				
67.70 - 69.20	100 NA NA				
69.20 - 70.70	100 100 73	10 130 250			

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Very stiff dark grey, mottled red, CLAY.	59.95 possible 0 to 10 degree undulating tight fissure/joint with polished face 59.97-60.00 AZCL	60.20 (0.80)	-20.33	
Very stiff friable dark grey, mottled red, yellow and yellowish brown, CLAY.		61.00 (1.70)	-21.13	
Very stiff slightly friable purple, mottled red, grey, yellow and yellowish brown, CLAY.	61.70-62.70 purple and grey, mottled red and yellowish brown	62.70 (0.85)	-22.83	
Assessed Zone of Core Loss. Driller notes clays with sand bands.		63.55 (0.65)	-23.68	
Very stiff red, mottled grey, pink and yellowish brown, slightly sandy CLAY. Sand is fine to medium.		64.20 (0.55)	-24.33	
Very stiff red and reddish brown, mottled grey and yellowish brown, slightly sandy CLAY. Sand is fine to medium.	64.55-64.65 grey mottled red and yellowish brown clayey fine to medium sand	64.75 (0.15)	-24.88	
Very stiff grey, mottled brown, slightly sandy CLAY. Sand is fine to medium.		64.90 (0.40)	-25.03	
Very stiff grey, mottled brown CLAY.		65.30 (0.67)	-25.43	
Very stiff grey, mottled brown and yellowish brown, CLAY.	65.75-65.94 extremely weak to very stiff grey clay	65.97 (0.23)	-26.10	
Dark grey and black, mottled yellow and yellowish brown LIGNITE.	65.94-65.97 extremely weak to very stiff black clay	66.20 (1.33)	-26.33	
Soft red and grey, mottled brown, CLAY.	66.12-66.20 no recovery	67.53 (0.13)	-27.66	
	67.20-67.53 mottled pink and purple	67.66 (0.40)	-27.79	
Weak indistinctly thinly laminated black lignified material LIGNITE. Organic odour.	67.61-67.66 pyrite rich section nodules (2-5mm) and thin lenses (up to 2mm)	68.06 (0.46)	-28.19	
Soft yellowish brown, mottled brown, dark brown and black, CLAY. Rare pocket clasts of black lignified material.	67.66-67.70 very stiff dark grey and brown mottled red clay	68.52 (0.18)	-28.65	
Very stiff grey, mottled red and yellowish brown, CLAY.	68.25-68.42 pale grey marl present on surface	68.70 (0.08)	-28.83	
Extremely weak grey, mottled yellowish brown, MUDSTONE. Recovered as slightly sandy clayey angular to subangular fine to coarse gravel. Sand is fine to coarse.	68.27 coarse gravel size angular flint or fracture flint band/ nodule present	68.78 (0.42)	-28.91	
Brown, dark grey and black angular to subangular fine to coarse GRAVEL of flint with medium cobble content. Cobbles are subangular of flint.	68.35 possible 30 degree planar fissure with slightly polished face 69.55-69.67 fragmented core zone possibly drilling induces	69.20 (1.40)	-29.33	
Very stiff greenish grey, mottled yellowish brown, sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of flint. Cobbles are angular to subangular				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole ATK-RC-02

Borehole Log

SOCOTEC

Drilled	AR/KW	**Start**	13/11/2019
Logged	JF/RP	**End**	12/12/2019
Checked	MS		
Approved	TC		

Equipment, Methods and Remarks

Dando 2000/Fraste XL. Beretta T41.
Cable percussion boring to 6.50 m. Rotary core drilling (GBS size) using air mist flush to 72.20m.
SPT Hammer ID: JD02, Rod type: Whitworth. Standpipe piezometer installed on completion. Relocated and designated ATK-RC-02A for improved core recovery.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	6.50	200	6.00
6.50	72.20	146	58.00

Ground Level	39.87 mOD
Coordinates (m)	E 470984.99
National Grid	N 109166.01

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Very stiff greenish grey, mottled yellowish brown, sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of flint. Cobbles are angular to subangular of flint.	69.69 horizontal stepped rough clean tight joint 70.03 horizontal irregular rough clay veneer open joint	70.60 (1.60) 72.20	-30.73 -32.33	
						Weak high density light grey CHALK with occasional coarse gravel size subangular to subrounded black flint.	70.44 horizontal undulating/irregular rough clean open joint 70.56 30 degree undulating rough clean tight joint			
70.70 - 72.20	100 36 27	60 180 300		12/12/19 58.00	1700	Weak high density white with some orange and yellowish orange staining CHALK. Occasional coarse gravel and subrounded cobbles of black flint with white rind some pitting on surfaces. Joints are: 1. horizontal, irregular, rough and tight with occasional brown staining. 2. 10 degree, planar, rough and clean. 3. 30 degree, undulating, rough, clean. 4. 80 degree, undulating, tight with orange staining.	70.70-70.79 fragmented zone drilling induced, some orange staining of surfaces 70.79-71.60 80 degree undulating tight joint with orange staining 70.98 10 degree planar rough clean tight joint 71.51 horizontal planar rough clean right joint 71.63 horizontal rough open joint with orange staining and brown clay veneer 71.77 horizontal irregular rough tight joint with some orange and brown staining 72.09 10 degree undulating rough clean tight joint			
						END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:22

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-RC-02

Borehole Log

SOCOTEC

Drilled	MM	**Start**	13/12/2019
Logged	RP		
Checked	MS	**End**	
Approved	TC	17/12/2019	

Equipment, Methods and Remarks

Beretta T41.
Rotary core drilling (GBS size) using air mist flush from 6.20 to 20.00m. Rotary open hole drilling from 1.20 to 6.20m, 8.10 to 9.10m and 20.00 to 40.00m.
Carried out to recover additional core.
Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	6.20	150	6.20
6.20	20.00	150	12.00
20.00	40.00	100	12.00

Ground Level	39.85 mOD
Coordinates (m)	E 470980.17
National Grid	N 109161.64

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			0.00-1.20 Hand excavated inspection pit.			SAND and GRAVEL. (Drillers description)				
			1.20-6.20 Rotary open hole drilling.					(6.30)		
6.30 - 6.60			50 NA NA	13/12/19 6.20	1600 Dry	Stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse of flint.	6.45-6.60 AZCL	6.30 +33.55 (0.30)		
				16/12/19 6.20	0830 Dry	Stiff brown and greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse of flint.		6.60 +33.25 (0.45)		
6.60 - 8.10	30 NA NA					Assessed Zone of Core Loss. Driller notes very sandy CLAY.		7.05 +32.80 (1.05)		
		- NA -	8.10-9.10 Rotary open hole drilling.			Very sandy CLAY. (Drillers description)		8.10 +31.75 (1.00)		
9.10 - 9.60	100 NA NA					Firm to stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Rare shell fragments.		9.10 +30.75 (0.30)		
						Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Occasional gravel size shell and shell fragments.	9.58 small pocket (10x2mm) of tubular shells	9.40 +30.45		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-RC-02A

Borehole Log

SOCOTEC

Drilled	MM	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	39.85 mOD
Logged	RP	13/12/2019	Beretta T41.	1.20	6.20	150	6.20	**Coordinates (m)**	E 470980.17
Checked	MS	**End**	Rotary core drilling (GBS size) using air mist flush from 6.20 to 20.00m. Rotary open hole drilling from 1.20 to 6.20m, 8.10 to 9.10m and 20.00 to 40.00m.	6.20	20.00	150	12.00	**National Grid**	N 109161.64
Approved	TC	17/12/2019	Carried out to recover additional core.	20.00	40.00	100	12.00		
			Standpipe piezometer installed on completion.						

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.60 - 11.10	73 NA NA				
11.10 - 12.60	100 NA NA				
12.60 - 14.10	100 NA NA		Flush: 6.20 - 20.00 Air/mist 100%		
14.10 - 15.60	100 NA NA	- NA -			
15.60 - 17.10	100 NA NA				
17.10 - 18.60	100 NA NA			16/12/19 9.00	1530 9.10
18.60 - 20.10	93 NA NA			17/12/19 9.00	0800 11.20
			20.00-40.00 Rotary open hole drilling.		

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Occasional gravel size shell and shell fragments.	10.70-11.10 AZCL	(1.70)		
Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Occasional gravel size shell and shelly material present. Rare thin pockets (up to 2mm) of dark grey silt.		11.10 +28.75 (3.00)		
Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Rare shell fragments. Occasional thin horizontal pocket (up to 2mm) of pale grey silt. Locally with horizontal indistinctly thin laminations.		14.10 +25.75 (3.00)		
Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Rare shell fragments. Rare to occasional thin pockets (up to 2mm) of pale grey silt.		17.10 +22.75 (3.00)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-02A

Borehole Log

SOCOTEC

Drilled	MM	**Start**	
Logged	RP		13/12/2019
Checked	MS	**End**	
Approved	TC		17/12/2019

Equipment, Methods and Remarks

Beretta T41.
Rotary core drilling (GBS size) using air mist flush from 6.20 to 20.00m. Rotary open hole drilling from 1.20 to 6.20m, 8.10 to 9.10m and 20.00 to 40.00m.
Carried out to recover additional core.
Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	6.20	150	6.20
6.20	20.00	150	12.00
20.00	40.00	100	12.00

Ground Level	39.85 mOD
Coordinates (m)	E 470980.17
National Grid	N 109161.64

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Very stiff dark grey, dark brown and grey silty CLAY. Pyrite flecks. Rare shell fragments. Rare to occasional thin pockets (up to 2mm) of pale grey silt. London CLAY. (Drillers description)		20.10 +19.75 (19.00)		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-02A

Borehole Log

SOCOTEC

Drilled	MM	**Start**	
Logged	RP		13/12/2019
Checked	MS	**End**	
Approved	TC		17/12/2019

Equipment, Methods and Remarks

Beretta T41.
Rotary core drilling (GBS size) using air mist flush from 6.20 to 20.00m. Rotary open hole drilling from 1.20 to 6.20m, 8.10 to 9.10m and 20.00 to 40.00m.
Carried out to recover additional core.
Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	6.20	150	6.20
6.20	20.00	150	12.00
20.00	40.00	100	12.00

Ground Level	39.85 mOD
Coordinates (m)	E 470980.17
National Grid	N 109161.64

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						London CLAY. (Drillers description)				
36.00 - 40.00			Rising Head k=6.1E-8 m/s							
						Woolwich and Reading CLAY. (Drillers description)		39.10 +0.75 (0.90)		
				17/12/19 12.00	1430 15.10					
						END OF EXPLORATORY HOLE		40.00 -0.15		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-02A

Borehole Log

SOCOTEC

Drilled	GW	**Start**	16/12/2019
Logged	RT		
Checked	MS	**End**	19/12/2019
Approved	TC		

Equipment, Methods and Remarks

Comacchio Geo 602 HT.
Dynamic sampling to 10.00m. Rotary open hole drilling from 10.00 to 45.00m. Rotary core drilling (GBS size) with water flush to 48.00m.

Standpipe piezometer installed on completion.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	4.00	200	4.00
4.00	10.00	150	10.00
10.00	45.00	143	10.00
45.00	48.00	146	10.00

Ground Level	31.52 mOD
Coordinates (m)	E 472339.94
National Grid	N 109596.99

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			0.00-1.20 Hand excavated inspection pit.			Very soft brownish TOPSOIL.		(0.30)		
0.20	ES 1							0.30 +31.22		
						Soft brown CLAY		(0.50)		
0.50	ES 2							0.80 +30.72		
						Firm brown CLAY.		(0.40)		
1.00	ES 3			16/12/19	1645 1.20			1.20 +30.32		
1.20 - 2.00	L		56% rec, diameter 117mm	17/12/19	0800 1.20	Firm to stiff brown, mottled orange and grey, slightly sandy CLAY. Sand is fine to coarse. Frequent pockets (<5mm) and partings (<2mm) of orange fine sand.		(0.80)		
2.00 - 3.00	L		100% rec, diameter 117mm			Stiff dark brown ,mottled grey, CLAY with occasional pockets (<5mm) of orangish fine sand. Rare pockets of poorly cemented sand. Rare nodules of hard brown claystone (fine to medium gravel sized from 2.7m).	2.70-3.00 Rare shell fragments (<2mm). 2.80-3.00 Slightly sandy. Sand is fine to medium.	2.00 +29.52		
								(1.00)		
3.00 - 4.00	L		90% rec, diameter 117mm			Stiff dark grey slightly sandy CLAY. Sand is fine to medium.		3.00 +28.52		
								(0.52)		
						Stiff dark grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is rounded medium to coarse of flint. Frequent lenses (<10mm) of dark grey fine to medium sand.		3.52 +28.00		
								(0.48)		
4.00 - 4.50	L		60% rec, diameter 117mm			Weak very thinly bedded (<6mm) dark grey fine to medium grained LIMESTONE.		4.00 +27.52		
								(0.60)		
4.50 - 6.00	L		6% rec, diameter 117mm			No recovery of fine material. Driller notes very dense fine grey SAND.	4.40-4.60 Grey fine to coarse sand. 4.60-5.90 1 no. 5mm bluish grey limestone cobble.	4.60 +26.92		
								(1.30)		
6.00 - 6.75	L		100% rec, diameter 117mm			Stiff to very stiff, locally fissured, bluish grey, mottled red, dark reddish brown and greenish brown CLAY. Fissures are subhorizontal and subvertical, smooth, undulating, slightly polished and occasionally filled with soft grey clay.		5.90 +25.62		
6.75 - 7.50	L		100% rec, diameter 117mm							
			Flush: 4.00 - 10.00 Water 90%							
7.50 - 9.00	L		90% rec, diameter 117mm							
								(4.10)		
9.00 - 10.00	L		90% rec, diameter 117mm				8.60-9.00 Dark reddish brown nodules of extremely weak claystone/poorly cemented clay.			
				17/12/19 10.00	1430 0.30			10.00 +21.52		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:24

Project	HAVANT THICKET WINTER STORAGE RESERVOIR
Project No.	A9031-19
Carried out for	Portsmouth Water

Borehole

ATK-RC-03

Borehole Log

SOCOTEC

Drilled	GW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	31.52 mOD
Logged	RT	16/12/2019	Comacchio Geo 602 HT. Dynamic sampling to 10.00m. Rotary open hole drilling from 10.00 to 45.00m. Rotary core drilling (GBS size) with water flush to 48.00m.	1.20	4.00	200	4.00	**Coordinates (m)**	E 472339.94
Checked	MS	**End**		4.00	10.00	150	10.00	**National Grid**	N 109596.99
Approved	TC	19/12/2019	Standpipe piezometer installed on completion.	10.00	45.00	143	10.00		
				45.00	48.00	146	10.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			10.00-45.00 Rotary open hole drilling.	18/12/19 10.00	0800 0.90	Very stiff red, mottled grey, CLAY. (Drillers description)				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-03

Borehole Log

SOCOTEC

Drilled	GW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	31.52 mOD
Logged	RT	16/12/2019	Comacchio Geo 602 HT.	1.20	4.00	200	4.00	**Coordinates (m)**	E 472339.94
Checked	MS	**End**	Dynamic sampling to 10.00m. Rotary open hole drilling from 10.00 to 45.00m. Rotary core drilling (GBS size) with water flush to 48.00m.	4.00	10.00	150	10.00	**National Grid**	N 109596.99
Approved	TC	19/12/2019	Standpipe piezometer installed on completion.	10.00	45.00	143	10.00		
				45.00	48.00	146	10.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Very stiff red, mottled grey, CLAY. (Drillers description)		(21.00)		
			Flush: 10.00 - 46.50 Water 100%							

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-03

Borehole Log

SOCOTEC

Drilled	GW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	31.52 mOD
Logged	RT	16/12/2019	Comacchio Geo 602 HT. Dynamic sampling to 10.00m. Rotary open hole drilling from 10.00 to 45.00m. Rotary core drilling (GBS size) with water flush to 48.00m.	1.20	4.00	200	4.00	**Coordinates (m)**	E 472339.94
Checked	MS	**End**		4.00	10.00	150	10.00	**National Grid**	N 109596.99
Approved	TC	19/12/2019	Standpipe piezometer installed on completion.	10.00	45.00	143	10.00		
				45.00	48.00	146	10.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Very stiff red, mottled grey, CLAY. (Drillers description)				
						Very stiff brownish CLAY. (Drillers description)		31.00 +0.52		
								(5.00)		
						Strong white CHALK. (Drillers description)		36.00 -4.48		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-03

Borehole Log

SOCOTEC

Drilled	GW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	31.52 mOD
Logged	RT	16/12/2019	Comacchio Geo 602 HT. Dynamic sampling to 10.00m. Rotary open hole drilling from 10.00 to 45.00m. Rotary core drilling (GBS size) with water flush to 48.00m.	1.20	4.00	200	4.00	**Coordinates (m)**	E 472339.94
Checked	MS	**End**		4.00	10.00	150	10.00	**National Grid**	N 109596.99
Approved	TC	19/12/2019	Standpipe piezometer installed on completion.	10.00	45.00	143	10.00		
				45.00	48.00	146	10.00		

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Strong white CHALK. (Drillers description)		(9.00)		
45.00 - 46.50	92 77 73	NI 250 600				Weak to medium strong high density white CHALK. Occasional subrounded gravel size fragments (up to 50mm) of rinded black flint. Fractures are horizontal, medium to widely spaced, planar, rough, locally with clay smearing. Rare light brown and light grey staining.	45.00-45.12 AZCL 45.12-45.32 very weak partially NI with frequent subangular cobble size fragments and rinded black flint	45.00 -13.48		
46.50 - 48.00	83 73 67		Flush: 46.50 - 48.00 Water 90%	18/12/19 10.00	1700 3.58		46.50-46.75 AZCL 47.37-47.54 partially NI with frequent subangular gravel size fragments of black flint 47.70-47.72 horizontal planar rough joint with up to 5mm light grey clay infill (marl band)	(3.00)		
						END OF EXPLORATORY HOLE		48.00 -16.48		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

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.

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Scale 1:50

09/04/2020 20:50:24

Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Borehole

ATK-RC-03

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 13/11/2019 **End** 13/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.10 m A / D / B / C 326 (Deg)	**Ground Level** 32.55 mOD **Coordinates (m)** E 470977.05 **National Grid** N 109834.00	

Samples and Tests

Depth	Type & No.	Records
0.20	ES1	
0.40	HV	p 71kPa, r 30kPa
0.40	D2	
0.50	ES3	
0.50 - 0.60	B4	
0.90	HV	p 52kPa, r 20kPa
1.00	ES6	
1.00	D7	
1.00 - 1.20	B8	
1.50	HV	p 83kPa, r 35kPa
1.60 - 1.80	B10	
1.70	D9	
2.80	D11	
2.80 - 2.90	B12	
3.00	D13	
3.00 - 3.10	B14	
3.10	ES15	
		13/11/19

Strata Description

Main	Detail	Depth, Level (Thickness)
Light brown slightly sandy CLAY. Frequent rootlets. (TOPSOIL)		(0.30) 0.30 +32.25
Firm, locally soft, dark greyish brown, mottled orangish brown, slightly sandy CLAY. Rare subrounded fine to coarse gravel of quartzite.	0.80-1.70 rare organic material 0.90 slip surface 20/320 degree planar smooth	(1.40) 1.70 +30.85
Firm to stiff friable dark greyish brown slightly sandy slightly gravelly CLAY with occasional pockets of very stiff clay up to 30mm by 30mm.		(1.20) 2.90 +29.65
Very stiff fissured dark greyish brown silty CLAY. Fissures are randomly orientated, closely spaced and planar		(0.80) 3.70 +28.85
END OF EXPLORATORY HOLE		

Legend: 1 (0.30 m), 2 (2.60 m)

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Seepage.
2	2.00	Seepage.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Sunny

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.

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09/04/2020 20:52:08

AGS

Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-01

Sheet 1 of 1

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 12/11/2019 **End** 12/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated. Terminated due to instability of long faces.	**Dimension and Orientation** Width 0.60 m Length 2.70 m A / B / C / D 145 (Deg)	**Ground Level** 26.62 mOD **Coordinates (m)** E 471177.03 **National Grid** N 109634.04	

Samples and Tests

Depth	Type & No.	Records
0.30	ES1	
0.50	HV	p 150kPa, r N/A
0.50	ES2	
0.50 - 0.70	B3	
1.00	HV	p 168kPa, r N/A
1.00	ES4	
1.20	D5	
1.30 - 1.40	B6	
2.20	D7	
2.20 - 2.40	B8	
		12/11/19

Strata Description

Main	Detail	Depth, Level (Thickness)
Light brown slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of chert and quartzite. Frequent rootlets. (TOPSOIL)		(0.40) 0.40 +26.22
Firm greyish brown, mottled orangish brown, slightly sandy CLAY. Occasional plant material. Rare rootlets below 1.00m. Rare subangular to rounded fine to coarse gravel of quartzite and chert.	1.20-2.50 stiff, indistinctly laminated	(2.10)
END OF EXPLORATORY HOLE		2.50 +24.12

Legend: 1

Backfill: ▽

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Rapid ingress.

Remarks

Depth (m)	Remarks
2.50	Pit terminated due to side wall collapse below 2.50m.

Stability Unstable below 2.50m

Shoring None

Weather Raining

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-02

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 14/11/2019 **End** 14/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.90 m A / D / B / C 145 (Deg)	**Ground Level** 25.37 mOD **Coordinates (m)** E 471340.97 **National Grid** N 109609.02	

Samples and Tests

Depth	Type & No.	Records
0.20	ES1	
0.40	HV	p 63kPa, r 24kPa
0.50	ES3	
0.50	D2	
0.50 - 0.60	B4	
0.90	HV	p 61kPa, r 27kPa
0.90	D5	
0.90 - 1.00	B6	
1.00	ES7	
1.20	HV	p 61kPa, r 26kPa
1.60	D8	
1.60 - 1.70	B9	
2.20	D10	
2.20 - 2.40	B11	
2.30	HV	p 102kPa, r 39kPa
3.10	D12	
3.10 - 3.20	B13	
3.40	ES14	
		14/11/19

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Light brownish grey sandy CLAY with rare subangular fine to coarse gravel of chert and quartzite. Frequent rootlets.		(0.25) 0.25 +25.12		
Firm light grey, mottled orangish brown, slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium of chert and quartzite.		(0.55) 0.80 +24.57		
Firm to stiff light grey, mottled orangish brown, slightly gravelly CLAY.	0.90 dark brown organic lens (up to 400mm) 1.20 slip surface 22/048 degree planar smooth	(1.40) 2.20 +23.17		
Stiff friable, locally indistinctly laminated, greyish brown slightly sandy slightly gravelly CLAY with occasional pockets of very stiff clay (up to 30x30mm)		(0.80) 3.00 +22.37		
Very stiff fissured dark greyish brown silty CLAY. Fissures are randomly orientated, extremely closely spaced and planar.		(0.80) 3.80 +21.57		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Seepage.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Foggy

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-03

Sheet 1 of 1

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 26/11/2019 **End** 26/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.70 m A / D / B / C 220 (Deg)	**Ground Level** 33.39 mOD **Coordinates (m)** E 471527.78 **National Grid** N 110022.73	

Samples and Tests

Depth	Type & No.	Records
0.10	ES1	
0.30 - 0.40	B3	
0.40	D2	
0.50	ES4	
1.00	ES6	
1.00 - 1.20	B5	
1.20	D7	
1.40	D9	
1.40 - 1.50	B8	
1.50	HV	p 80kPa, r 43kPa
1.80 - 2.00	B10	
2.00	HV	p 137kPa, r N/A
2.00	D11	
3.00	D13	
3.00 - 3.10	B12	
		26/11/19

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown slightly gravelly sandy CLAY. Gravel is rounded fine to coarse of flint and quartzite. (TOPSOIL)		(0.20) 0.20 +33.19
Soft light grey, mottled orangish brown, sandy silty CLAY.	1.00-1.30 firm to stiff	(1.10) 1.30 +32.09
Stiff dark brown and grey slightly sandy silty CLAY.		(0.50) 1.80 +31.59
Stiff grey, mottled orange, CLAY.		(1.60) 3.40 +29.99
END OF EXPLORATORY HOLE		

Legend: 1

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.40	

Remarks

Depth (m)	Remarks

Stability Unstable below 3.00m

Shoring None

Weather Raining

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Trial Pit

ATK-TP-04

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 26/11/2019 **End** 26/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.20 m A / D / B / C 246 (Deg)	**Ground Level** 32.57 mOD **Coordinates (m)** E 471734.36 **National Grid** N 109933.55	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.20	ES1		Dark grey slightly gravelly sandy CLAY. Gravel is subrounded to rounded fine to coarse of flint. (TOPSOIL)		(0.30)		
0.40 - 0.50	B3		Grey and light orangish brown silty fine to coarse SAND with occasional pockets (up to 400mm) of firm light grey sandy silty clay.	0.40-0.50 gravelly. Gravel is subrounded to rounded fine to coarse of flint	0.30 +32.27		
0.50 0.50	ES4 D2						
0.90 - 1.00	B6						
1.00 1.00	ES7 D5				(1.70)		
		26/11/19					
			END OF EXPLORATORY HOLE		2.00 +30.57		

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.10	Seepage.

Remarks

Depth (m)	Remarks

Stability Unstable below 2.00m

Shoring None

Weather Raining

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-05

Trial Pit Log

SOCOTEC

Logged PC **Checked** MS **Approved** TC	**Start** 05/12/2019 **End** 05/12/2019	**Equipment, Methods and Remarks** Hand excavated for infiltration test. Temporary monitoring pipe installed with diver data logger. Unable to undertake test due to ingress of groundwater.	**Dimension and Orientation** Width 0.50 m Length 0.50 m A / B / C / D 246 (Deg)	**Ground Level** 32.43 mOD **Coordinates (m)** E 471737.76 **National Grid** N 109937.78	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)
			Soft brown slightly gravelly very sandy CLAY. Gravel is angular fine to coarse of flint. (TOPSOIL)		(0.40)
			Firm, mottled orange and brown, locally grey, gravelly CLAY. Gravel is subrounded to rounded fine to coarse of black flint.		0.40 +32.03 (0.30)
			Orange and brown, locally grey, silty fine to coarse SAND.		0.70 +31.73 (0.80)
		05/12/19			
			END OF EXPLORATORY HOLE		1.50 +30.93

Legend: 1 (SPT)

Backfill: slotted pipe

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	1.40	Seepage.

Remarks

Depth (m)	Remarks

Stability Unstable below 1.30m

Shoring None

Weather Dry, cold

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Trial Pit

ATK-TP-05i

Trial Pit Log

SOCOTEC

Logged PC **Checked** MS **Approved** TC	**Start** 10/12/2019 **End** 10/12/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated. No hand vane after 2.00m due to nature of recovered material.	**Dimension and Orientation** Width 0.60 m Length 2.40 m A / B / C / D 352 (Deg)	**Ground Level** 32.07 mOD **Coordinates (m)** E 471915.96 **National Grid** N 109671.02	

Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 0.10	ES2 D1		Soft brown slightly gravelly sandy CLAY. Gravel is angular medium to coarse of flint. Frequent rootlets. (TOPSOIL)	0.10-0.40 frequent rootlets 0.20-0.40 rare subangular coarse gravel of flint	(0.10) 0.10 +31.97		
0.30 0.30 - 0.80	ES3 B4		Soft to firm greyish brown, mottled orange, sandy, locally very sandy, CLAY.				
0.50 0.50 0.50	HV ES6 D5	p 63kPa, r 28kPa			(0.80)		
0.90 0.90 - 1.20 1.00 1.00	D7 B8 HV ES9	p 68kPa, r 29kPa	Firm orangish brown, mottled grey, slightly sandy CLAY.	0.90 rare roots (up to 10mm diameter) 1.00 occasional pockets (up to 30mm) of fine to medium sand	0.90 +31.17		
					(1.10)		
1.90	HV	p 74kPa, r 32kPa					
2.00 2.00 - 2.40	D10 B11		Stiff brownish grey, locally mottled orange, slightly sandy silty CLAY.		2.00 +30.07		
					(1.30)		
3.00 3.00 - 3.50	D12 B13						
		10/12/19	Very stiff grey sandy CLAY. Occasional pockets of silty fine to medium sand (up to 30mm).		3.30 +28.77		
					(0.30)		
3.60	D14		END OF EXPLORATORY HOLE		3.60 +28.47		

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.00	Seepage from ground level.

Remarks

Depth (m)	Remarks

Stability Collapse of Face A below 1.80m

Shoring None

Weather Wet, cold and windy

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Trial Pit

ATK-TP-06

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 26/11/2019 **End** 26/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated. Terminated due to instability of long faces.	**Dimension and Orientation** Width 0.60 m Length 2.50 m A / D / B / C 349 (Deg)	**Ground Level** 34.55 mOD **Coordinates (m)** E 472068.72 **National Grid** N 109901.56	

Samples and Tests

Depth	Type & No.	Records
0.20	ES1	
0.40 - 0.50	B2	
0.50	HV	p 20kPa, r 12kPa
0.50	ES4	
0.50	D3	
0.85 - 0.90	B6	
0.90	D5	
1.00	ES7	
		26/11/19
1.60	D8	
1.60 - 1.70	B9	

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Dark brownish grey slightly gravelly sandy CLAY. Gravel is rounded fine to coarse of flint. (TOPSOIL)		(0.30) 0.30 +34.25		
Soft grey, mottled orangish brown, sandy gravelly CLAY with high cobble content. Gravel is rounded fine to coarse of flint. Cobbles are rounded of flint.		(0.60) 0.90 +33.65	1	
Grey and light orangish brown silty fine to coarse SAND with occasional pockets (up to 500mm) of firm light grey sandy silty clay.		(0.80) 1.70 +32.85		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	1.00	Seepage.

Remarks

Depth (m)	Remarks

Stability Unstable below 1.50m

Shoring None

Weather Raining

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-07

Trial Pit Log

SOCOTEC

Logged PC **Checked** MS **Approved** TC	**Start** 05/12/2019 **End** 05/12/2019	**Equipment, Methods and Remarks** Hand excavated for infiltration test. Temporary monitoring pipe installed with diver data logger. Unable to undertake test due to ingress of groundwater.	**Dimension and Orientation** Width 0.50 m Length 0.50 m A / B / C / D 348 (Deg)	**Ground Level** 34.52 mOD **Coordinates (m)** E 472064.69 **National Grid** N 109901.11	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Brown slightly gravelly sandy CLAY. Gravel is angular to rounded fine to coarse of flint. Frequent rootlets. (TOPSOIL)		(0.30) 0.30 +34.22		
			Soft brown and grey, mottled orangish brown, gravelly CLAY. Gravel is subrounded to rounded fine to coarse of black flint. 1no. rounded cobble of black flint.		(0.50) 0.80 +33.72	1	
		05/12/19	Orange and brown, locally grey, silty fine to medium SAND.		(0.70)	2	
			END OF EXPLORATORY HOLE		1.50 +33.02		

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Seepage.
2	1.20	Seepage.

Remarks

Depth (m)	Remarks

Stability Unstable below 0.80m

Shoring None

Weather Dry, cold

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Trial Pit

ATK-TP-07i

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 27/11/2019 **End** 27/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.70 m A / D / B / C 229 (Deg)	**Ground Level** 34.01 mOD **Coordinates (m)** E 472343.00 **National Grid** N 109778.00	

Samples and Tests

Depth	Type & No.	Records
0.10	ES1	
0.20 - 0.30	B4	
0.30	ES2	
0.30	D3	
0.50	ES5	
0.60	HV	p 71kPa, r 43kPa
0.90	ES6	
0.90	D7	
0.90 - 1.00	B8	
1.50	ES9	
1.50	D10	
1.50	B11	
		27/11/19

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown slightly sandy slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse of flint. (TOPSOIL)		(0.30) 0.30 +33.71
Firm light grey, mottled orangish brown, slightly sandy slightly gravelly CLAY. Gravel is rounded fine to coarse of flint.		(0.60) 0.90 +33.11
Firm light grey slightly sandy gravelly CLAY with high cobble content. Gravel is rounded fine to coarse of flint. Cobbles are rounded of flint.		(0.30) 1.20 +32.81
Light orangish brown very silty fine to medium SAND. Rare rounded fine to medium gravel of flint.		(1.10) 2.30 +31.71
Firm light orangish brown very sandy CLAY.		(0.20) 2.50 +31.51
END OF EXPLORATORY HOLE		

Legend: 1

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	2.00	Seepage.

Remarks

Depth (m)	Remarks

Stability Unstable below 2.50m

Shoring None

Weather Raining

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TP-08

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 02/12/2019 **End** 02/12/2019	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated.	**Dimension and Orientation** Width 0.40 m Length 2.80 m A / D / B / C 326 (Deg)	**Ground Level** 21.79 mOD **Coordinates (m)** E 471251.91 **National Grid** N 109067.03	

Samples and Tests

Depth	Type & No.	Records
0.20	ES1	
0.40 - 0.50	B2	
0.50	HV	p 76kPa, r 40kPa
0.50	ES4	
0.50	D3	
1.00	HV	p 95kPa, r 39kPa
1.00	ES5	
1.00	D7	
1.00 - 1.10	B6	
1.60	HV	p 92kPa, r 22kPa
1.60	D8	
1.60 - 1.70	B9	
2.70	D10	
2.70 - 2.80	B11	
3.00	HV	p 148kPa, r 29kPa
3.50	D12	02/12/19
3.50 - 3.60	B13	

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of flint. (TOPSOIL)		(0.30) 0.30 +21.49
Firm grey, mottled orangish brown, slightly sandy CLAY.	0.90-1.10 gravel lens. Gravel is subrounded to rounded fine to coarse of chert, flint and quartzite	(1.00)
Firm to stiff friable light bluish grey, locally mottled dark grey and brown, CLAY.	1.20 shear surface subhorizontal planar and undulating	1.30 +20.49
	1.60-1.70 slightly sandy	
	2.10 locally rounded cobbles of siltstone	(2.40)
END OF EXPLORATORY HOLE		3.70 +18.09

Legend: 1 (1.60), 2 (2.40)

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	1.50	Seepage.
2	2.50	Slight water ingress.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Sunny

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TPM-02

Sheet 1 of 1

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 30/11/2019 **End** 30/11/2019	**Equipment, Methods and Remarks** JCB 360. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.60 m A / D / B / C 160 (Deg)	**Ground Level** 23.36 mOD **Coordinates (m)** E 471256.07 **National Grid** N 109371.99	

Samples and Tests

Depth	Type & No.	Records
0.30	ES1	
0.40 - 0.50	B3A	
0.50	HV	p 50kPa, r 34kPa
0.50	ES3	
0.50	D2	
1.00	ES4	
1.20	HV	p 71kPa, r 37kPa
1.60	HV	p 39kPa, r 9kPa
1.60	D5	
1.60 - 1.70	B6	
2.50	D7	
2.50 - 2.60	B8	
2.80	D9	
2.80 - 2.90	D10	
3.60	D11	30/11/19 damp
3.60 - 3.70	B12	

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown slightly sandy CLAY. (TOPSOIL)		(0.35) 0.35 +23.01
Soft to firm grey, mottled orangish brown, locally slightly sandy CLAY.	0.80 possible shear surface 20/343 degree planar smooth 0.90-1.30 firm to stiff	(0.95) 1.30 +22.06
Soft light grey, mottled greyish brown, slightly sandy CLAY.		(1.10) 2.40 +20.96
Firm friable grey, mottled orangish brown, slightly sandy gravelly CLAY with low cobble content. Gravel is subrounded to rounded fine to coarse of flint. Cobbles are rounded of flint.		(0.30) 2.70 +20.66
Stiff grey, locally mottled orangish brown, CLAY.	3.50 light grey	(1.10) 3.80 +19.56
END OF EXPLORATORY HOLE		

Legend: 1

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	1.60	Slight water ingress.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Sunny

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.

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Scale 1:25

09/04/2020 20:52:10

AGS

Project: **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No.: **A9031-19**

Carried out for: **Portsmouth Water**

Trial Pit

ATK-TPM-03

Sheet 1 of 1

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 02/12/2019 **End** 02/12/2019	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated.	**Dimension and Orientation** Width 0.60 m Length 2.70 m A / D / B / C 191 (Deg)	**Ground Level** 23.04 mOD **Coordinates (m)** E 471433.05 **National Grid** N 109242.02	

Samples and Tests

Depth	Type & No.	Records
0.20	ES1	
0.50	HV	p 58kPa, r 30kPa
0.50	ES2	
0.50	D3	
0.50 - 0.60	B4	
1.00	HV	p 69kPa, r 30kPa
1.00	ES5	
1.50	D6	
1.50 - 1.60	B7	
2.40 - 2.50	B9	
2.50	D8	
3.60	D10	
3.60 - 3.70	B11	
		02/12/19 2.40

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown sandy slightly organic CLAY. Rare subangular to rounded fine to coarse gravel of flint. (TOPSOIL)		(0.30) 0.30 +22.74
Soft to firm light grey, mottled orangish brown, CLAY. Locally slightly sandy. Rare organic material (up to 40x20mm).		(2.00) 2.30 +20.74
Stiff friable bluish grey, locally mottled dark brown, CLAY.	3.40-3.50 gravel lens. Gravel is rounded fine to coarse of siltstone	(1.60) 3.90 +19.14
END OF EXPLORATORY HOLE		

Legend: 1

Backfill

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Slight ingress.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Sunny

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.

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Project HAVANT THICKET WINTER STORAGE RESERVOIR

Project No. A9031-19

Carried out for Portsmouth Water

Trial Pit

ATK-TPM-04

Trial Pit Log

SOCOTEC

Logged FC **Checked** MS **Approved** TC	**Start** 20/11/2019 **End** 20/11/2019	**Equipment, Methods and Remarks** Tracked 360 excavator. Machine excavated. TPM used to assess stability for man entry possibility.	**Dimension and Orientation** Width 0.60 m Length 8.00 m A / B / C / D 259 (Deg)	**Ground Level** 26.86 mOD **Coordinates (m)** E 471577.01 **National Grid** N 109532.98	

Samples and Tests

Depth	Type & No.	Records
0.10	ES1	
0.40 - 0.50	B2	
0.50	ES3	
0.70 - 1.00	B4	
1.00	ES6	
1.00	D5	
1.50	D7	
1.60 - 1.70	B8	
1.70	D9	
2.00 - 2.20	B10	
2.20	D10A	
2.90 - 3.00	B12	
3.00	D11	
3.30 - 3.40	B15	
3.40	ES13	
3.40	D14	
		20/11/19
4.40	D16	
4.40 - 4.50	B17	

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Dark brown slightly sandy CLAY with frequent roots (up to 5mm). (TOPSOIL)		(0.30)		
		0.30 +26.56		
Firm light grey, mottled orangish brown, slightly sandy CLAY. Rare organic material.	0.80 shear surface 20/240 degree planar smooth	(1.60)	1 2	
		1.90 +24.96		
Stiff, locally very stiff, friable dark grey, mottled dark brown, CLAY.	2.20 sandy	(1.00)		
		2.90 +23.96		
Very stiff fissured, locally indistinctly laminated, dark grey CLAY. Fissures are randomly orientated, very closely spaced, planar, smooth.		(0.40)		
		3.30 +23.56		
Very stiff indistinctly laminated dark grey silty CLAY.		(1.20)		
END OF EXPLORATORY HOLE		4.50 +22.36		

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Seepage.
2	1.00	Medium inflow.

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Cloudy, fair

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.

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Project **HAVANT THICKET WINTER STORAGE RESERVOIR**

Project No. **A9031-19**

Carried out for **Portsmouth Water**

Trial Pit

ATK-TPM-05

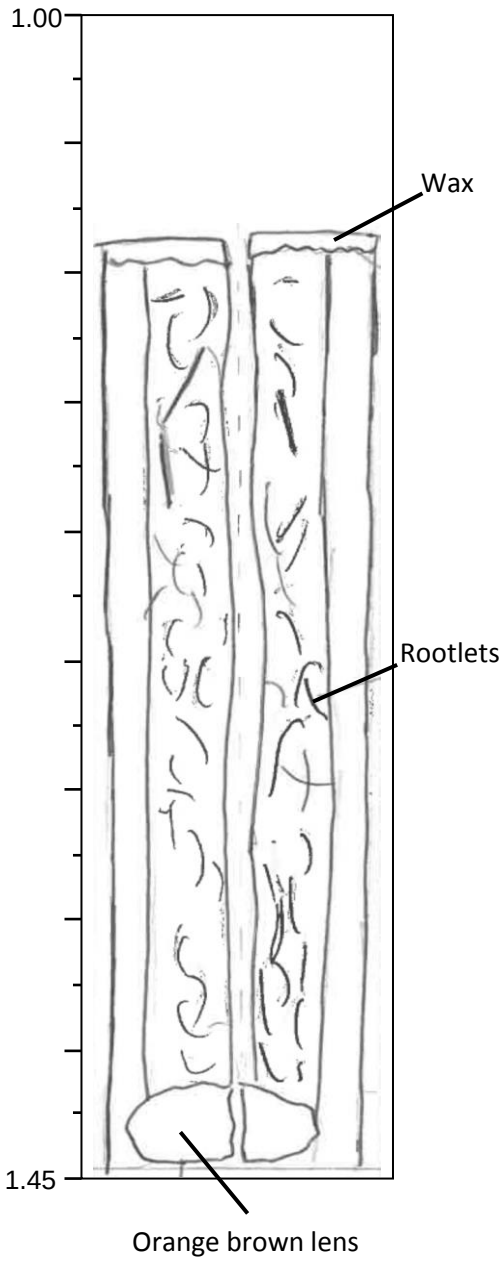
Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	6		
Sample Depth, mBGL	1.00	-	1.45
Sample Type	UT		

Description

1.00 - 1.09m, No recovery.

1.09 - 1.45m
Soft to firm brown, mottled bluish grey, CLAY with occasional rootlets (up to 20x2mm).



Detail:
1.42 - 1.45m
Dark orangish brown slightly sandy slightly gravelly clay lens. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of sandstone.

Remarks:
0.36m recovery. 10mm of wax at top of sample.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT6
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	8		
Sample Depth, mBGL	1.50	-	1.95
Sample Type	UT		

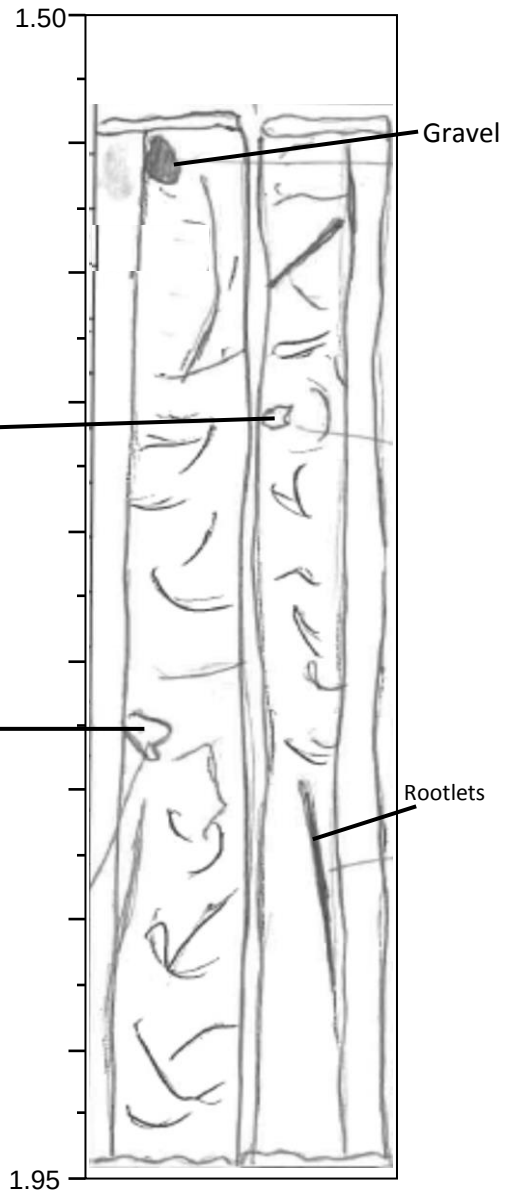
Description

1.50 - 1.54m, No recovery.

1.54 - 1.95m
Firm to stiff brown, mottled bluish grey, CLAY. Rare rootlets (up to 60x2mm).

Detail:
1.66m
Pocket (5x10mm) of white fine to coarse selenite crystals.

1.78m
Pocket (10x10mm) of white fine to coarse selenite crystals.



Remarks:
0.41m recovery. 5mm of wax at top and base.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT8
	Carried out for	Portsmouth Water	

Split Tube Sample Description

SOCOTEC

Borehole No	ATK-BH-01		
Sample No	10		
Sample Depth, mBGL	2.00	-	2.45
Sample Type	UT		

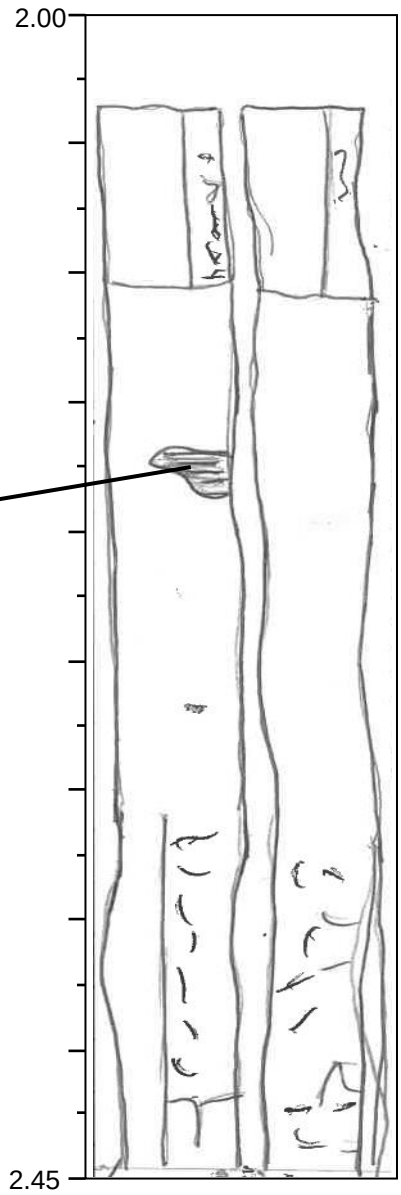
Description

2.00 - 2.03m, No recovery.

2.03 - 2.09m
Firm brown, mottled bluish grey, CLAY.

2.09 - 2.33m
Very soft brown, locally mottled bluish grey, silty CLAY with frequent rootlets.

Detail:
2.19m
Pocket (50x10mm) of dark brown rootlets, 0.5 degree orientation.



2.33 - 2.45m
Firm to stiff, locally fissured, orangish brown, mottled bluish grey, CLAY. Fissures are randomly orientated, extremely closely spaced, planar, smooth.

Remarks:
0.42m recovery. 5mm of wax at top and base.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT10
	Carried out for	Portsmouth Water	

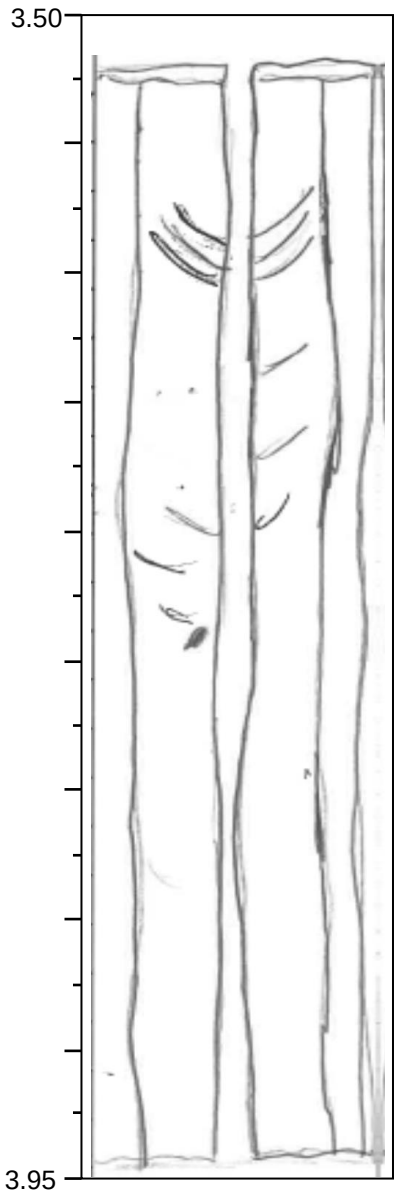
Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	16		
Sample Depth, mBGL	3.50	-	3.95
Sample Type	UT		

Description

3.50 - 3.52m, No recovery.

3.52 - 3.95m
Stiff indistinctly laminated orangish brown, locally mottled bluish grey, slightly sandy CLAY. Rare selenite crystals.



Detail:
3.72m
White shell fragment (20x5mm).

Remarks:
0.43m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT16
	Carried out for	Portsmouth Water	

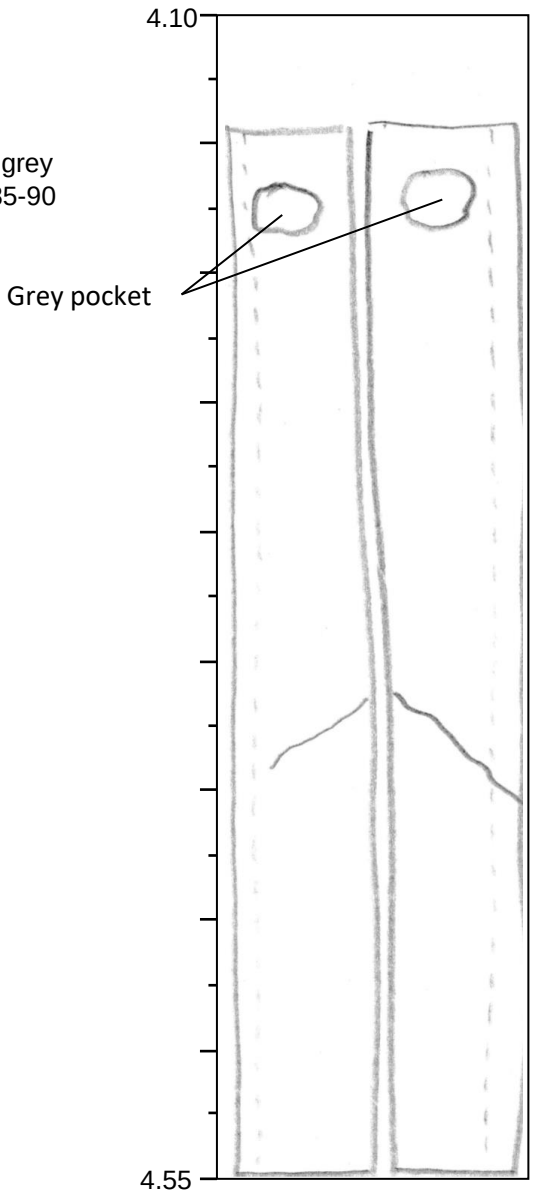
Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	18		
Sample Depth, mBGL	4.10	-	4.55
Sample Type	UT		

Description

4.10 - 4.14m, No reovery.

4.14 - 4.55m
Firm to stiff, locally fissured, greyish brown, mottled bluish grey and orangish brown, CLAY. Fissures are 0-5 degree and 85-90 degree, extremely closely spaced, planar, smooth.



Remarks:
0.41m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT18
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	20		
Sample Depth, mBGL	4.70	-	5.15
Sample Type	UT		

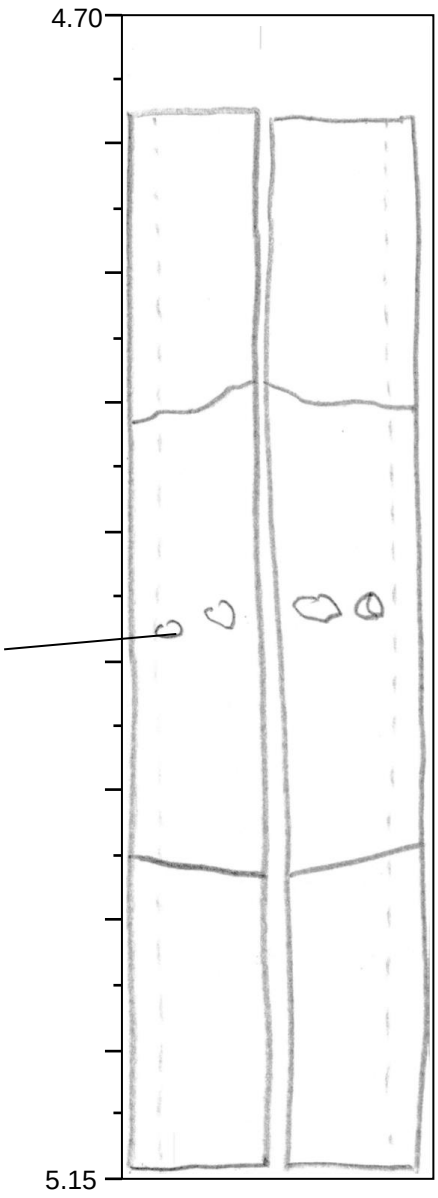
Description

4.70 - 4.74m, No recovery.

4.74 - 4.87m
Soft to firm brown, locally mottled orangish brown, CLAY.

4.87 - 5.15m
Stiff to very stiff indistinctly laminated dark greyish brown silty CLAY.

Detail:
4.93m
Local pockets (up to 20x15mm) of dark grey, mottled orangish brown, silt.



Remarks:
0.41m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT20
	Carried out for	Portsmouth Water	

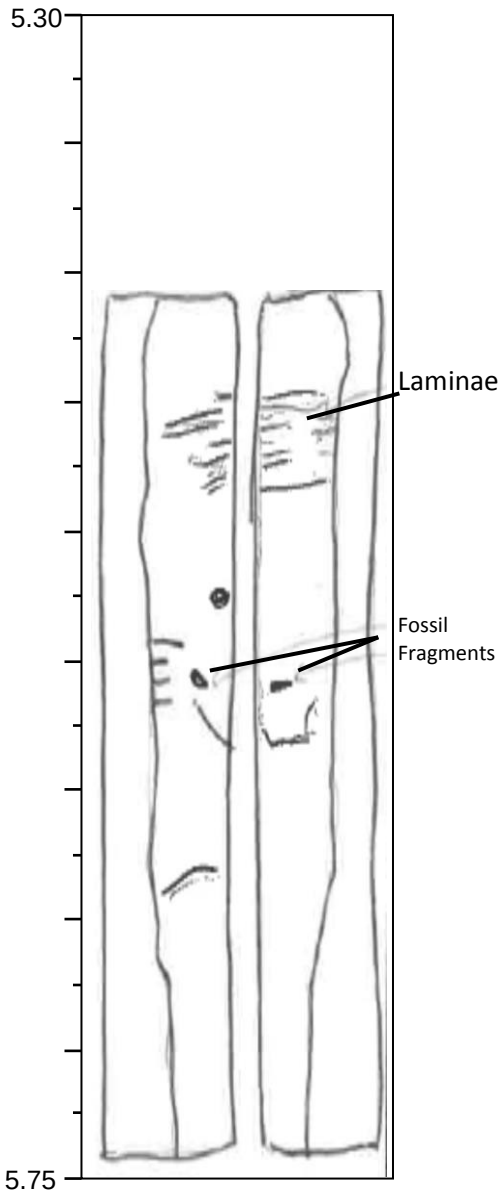
Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	22		
Sample Depth, mBGL	5.30	-	5.75
Sample Type	UT		

Description

5.30 - 5.41m, No recovery.

5.41 - 5.75m,
Very stiff indistinctly laminated, locally fissured, slightly micaceous dark brownish grey silty CLAY. Fissures are randomly orientated, extremely closely spaced, planar, smooth.
Rare shell fragments (up to 2x5mm).



Remarks:
0.34m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT22
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-01		
Sample No	24		
Sample Depth, mBGL	5.90	-	6.35
Sample Type	UT		

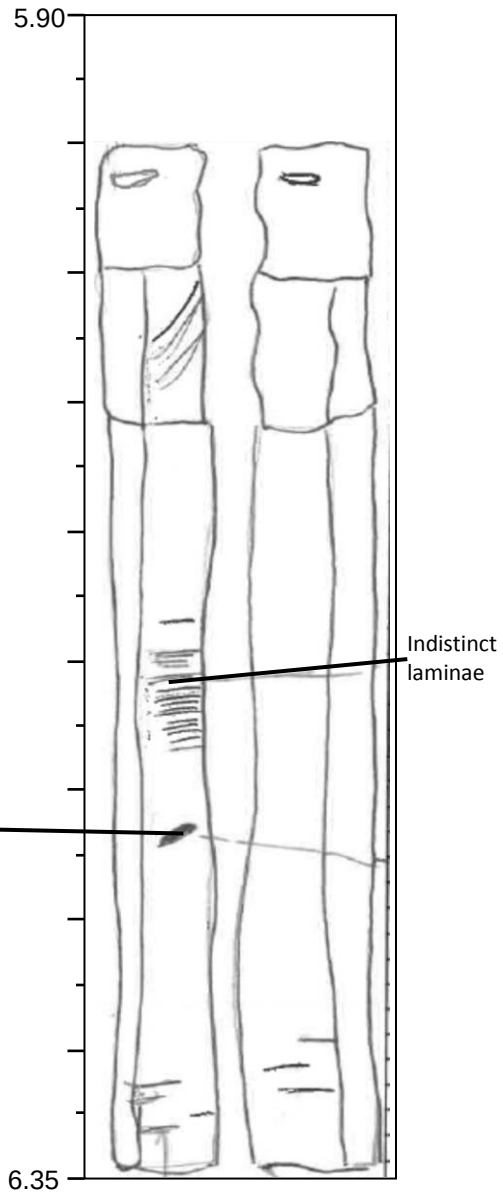
Description

5.90 - 5.95m, No recovery.

5.95 - 6.00m,
Very soft to soft greyish brown and brown CLAY.

6.00 - 6.06m,
Stiff bluish grey silty CLAY.

6.06 - 6.35m,
Very stiff indistinctly laminated greyish brown silty CLAY.



Detail:
6.21m,
Pocket (up to 20x5mm) of light grey fine sand/silt.

6.29m,
Frequent shell fragments (up to 20x10mm).

Remarks:
0.40m recovery. Wax within first 10mm.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT24
	Carried out for	Portsmouth Water	

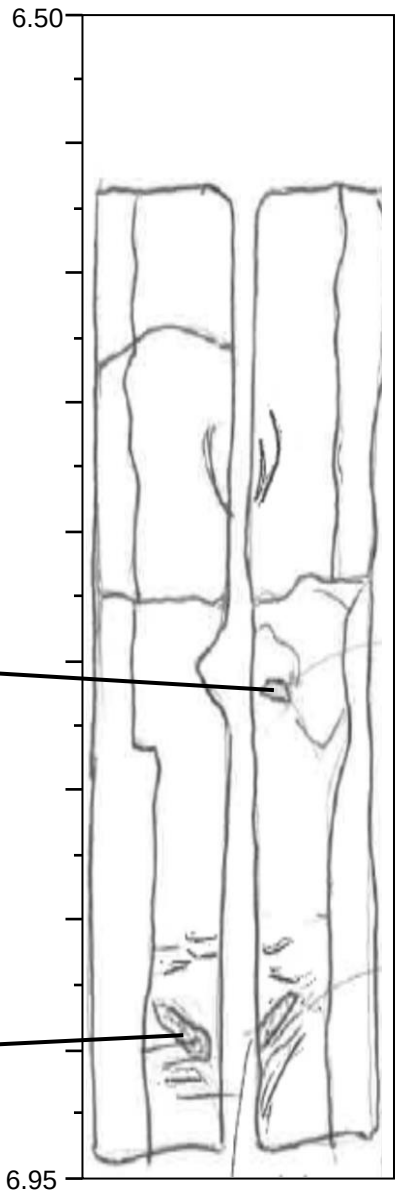
Split Tube Sample Description

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Borehole No	ATK-BH-01		
Sample No	26		
Sample Depth, mBGL	6.50	-	6.95
Sample Type	UT		

Description

6.50 - 6.56m, No recovery.



6.56 - 6.95m
Very stiff fissured slightly micaceous dark brownish grey silty CLAY. Fissures are randomly orientated, extremely closely spaced, planar, smooth.

6.75m
Pocket (25x7mm) of dark grey silt and fine sand.

Detail:
6.80 - 6.95m
Indistinct laminations.

6.89 - 6.92m
Pocket (20x20mm) of dark grey silt and fine sand.

Remarks:
0.39m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT26
	Carried out for	Portsmouth Water	

Split Tube Sample Description

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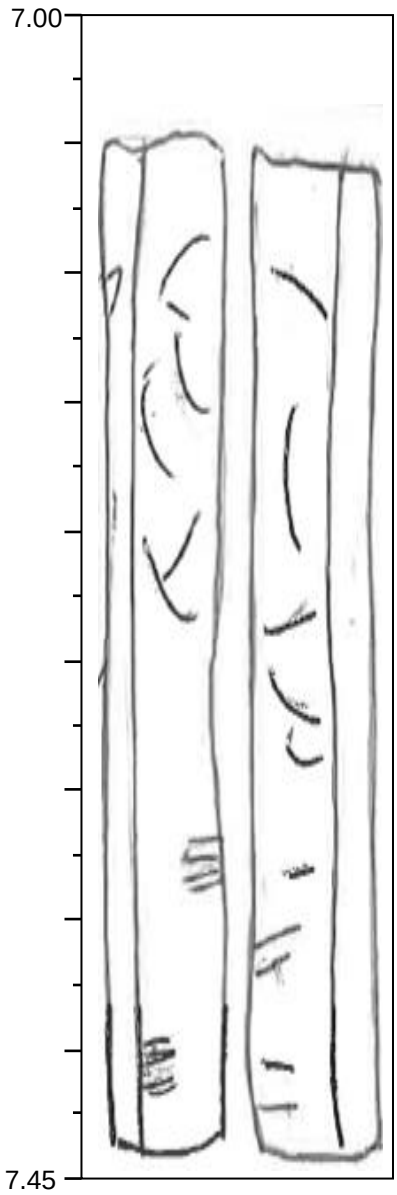
Borehole No	ATK-BH-01		
Sample No	27		
Sample Depth, mBGL	7.00	-	7.45
Sample Type	UT		

Description

7.00 - 7.03m, No recovery.

7.03 - 7.25m
Firm, locally soft, greyish brown silty CLAY.

7.25 - 7.45m
Very stiff indistinctly laminated slightly micaceous dark greyish brown silty CLAY.



Remarks:
0.42m recovery. 90mm of wax in top of sample.

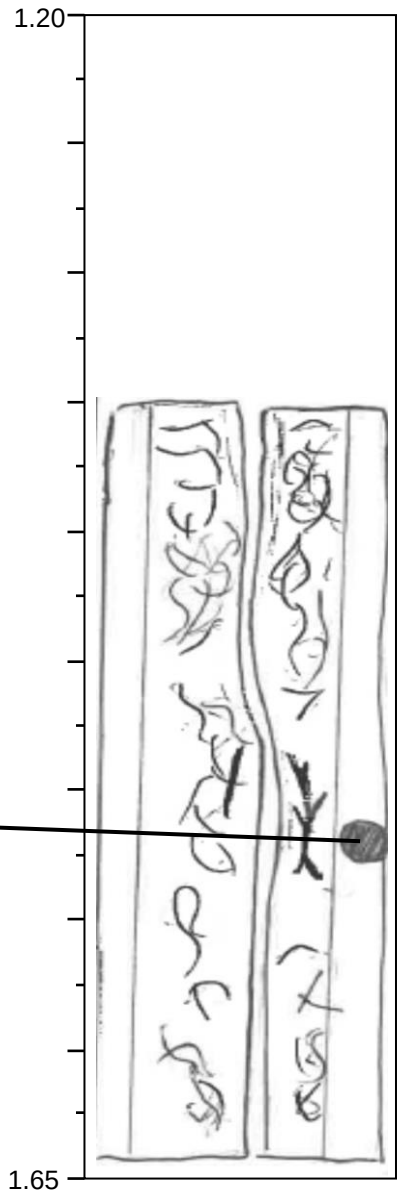
Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-01-UT27
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-02		
Sample No	5		
Sample Depth, mBGL	1.20	-	1.65
Sample Type	UT		

Description

1.20 - 1.34m, No recovery.



1.34 to 1.65m,
Firm orangish brown, mottled grey, slightly sandy CLAY.
Frequent plant material (up to 40x2mm).

Detail:
1.52m
Rare subangular to rounded gravel of mudstone and sandstone (up to 20x16mm).

Remarks:
0.33m recovery.

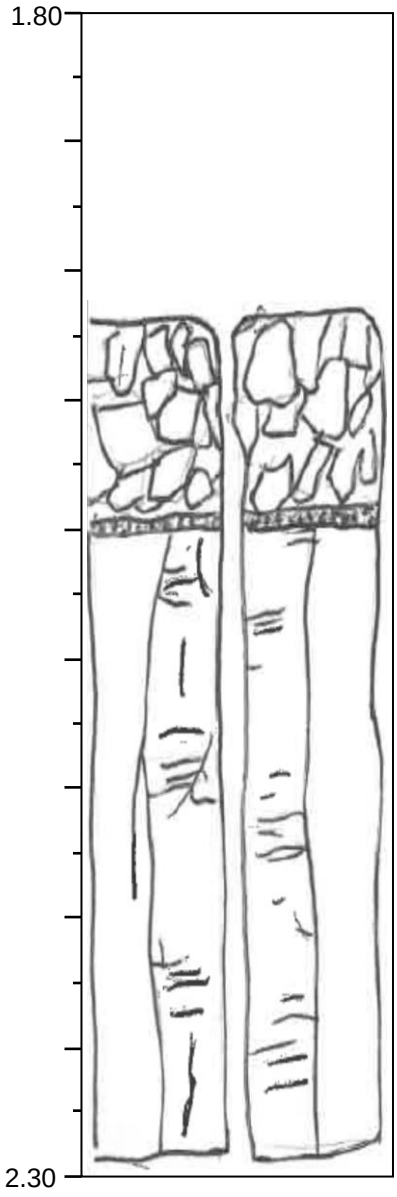
Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT5
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-02		
Sample No	7		
Sample Depth, mBGL	1.80	-	2.30
Sample Type	UT		

Description

1.80 - 1.92m, No recovery.



1.92 to 1.99m
Brown and grey slightly sandy clayey subangular to subrounded fine to coarse GRAVEL of mudstone, siltstone and chert.

1.99 to 2.04m
Orangish brown fine to coarse SAND.

2.04 to 2.30m
Firm to stiff, locally indistinctly laminated, brown and grey CLAY. Rare subangular to subrounded fine to medium gravel of mudstone and siltstone. Rare plant material (up to 40x2mm).

Remarks:
0.38m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT7
	Carried out for	Portsmouth Water	

Split Tube Sample Description

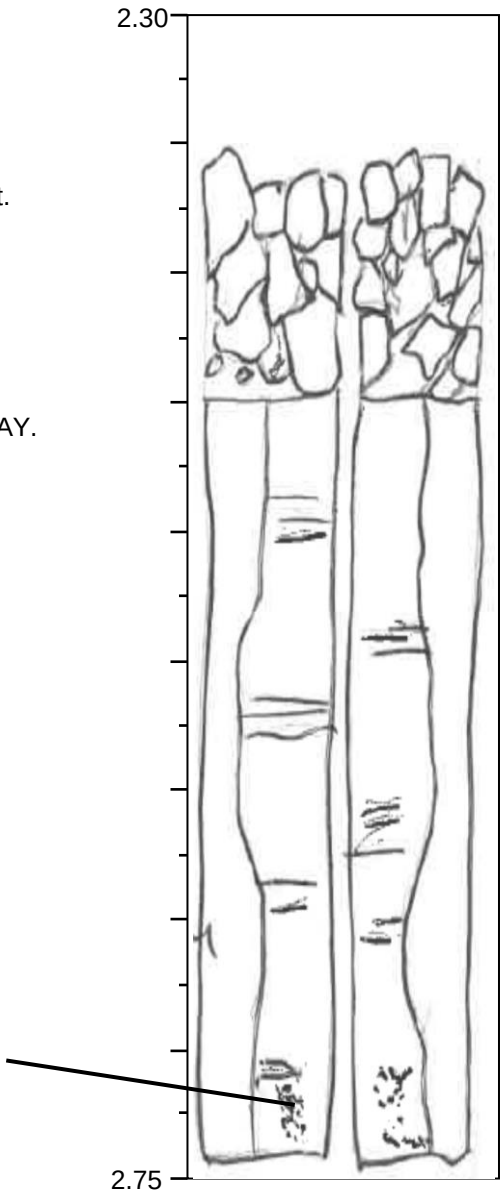
Borehole No	ATK-BH-02		
Sample No	8		
Sample Depth, mBGL	2.30	-	2.75
Sample Type	UT		

Description

2.30 - 2.35m, No recovery.

2.35 to 2.43m
Very soft brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and chert. Occasional plant material/rootlets (up to 30x2mm).

2.43 to 2.75m
Firm to stiff, locally indistinctly laminated, brown and grey CLAY.



Detail:
2.69 to 2.75m
Rare pockets/partings (up to 20x15mm) of white sand/silt.

Remarks:
0.40m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT8
	Carried out for	Portsmouth Water	

Split Tube Sample Description

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Borehole No	ATK-BH-02		
Sample No	9		
Sample Depth, mBGL	2.80	-	3.25
Sample Type	UT		

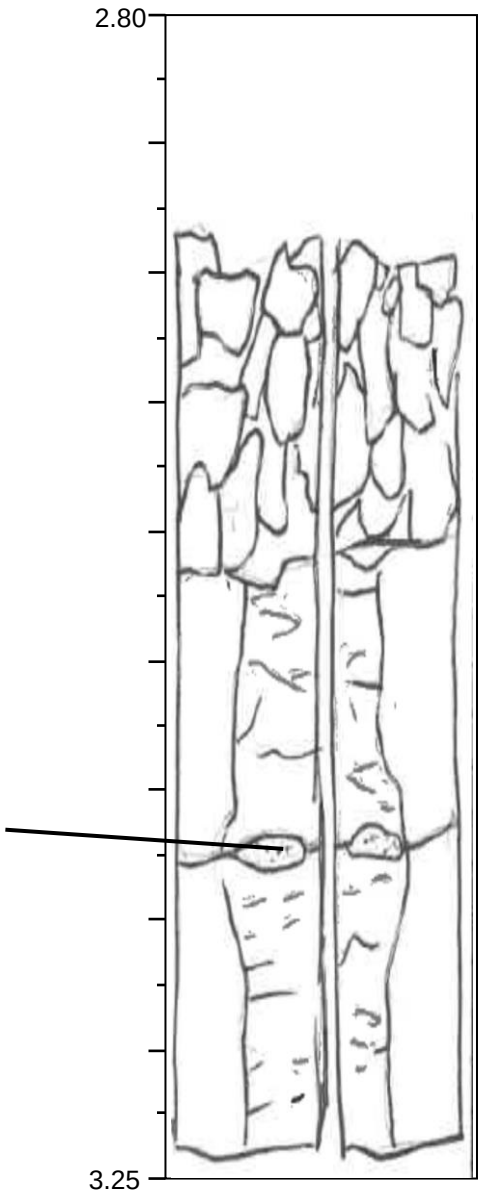
Description

2.80 to 2.88m, No recovery.

2.88 to 3.02m
Very soft brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone, siltstone and chert.

3.02 to 3.25m
Stiff brown, mottled grey, CLAY.

Detail:
3.12m
Pocket (30x20mm) of orangish brown slightly sandy slightly gravelly clay. Gravel is subangular fine to coarse of mudstone and sandstone.



Remarks:
0.37m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT9
	Carried out for	Portsmouth Water	

Split Tube Sample Description

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Borehole No	ATK-BH-02		
Sample No	11		
Sample Depth, mBGL	3.40	-	3.95
Sample Type	UT		

Description

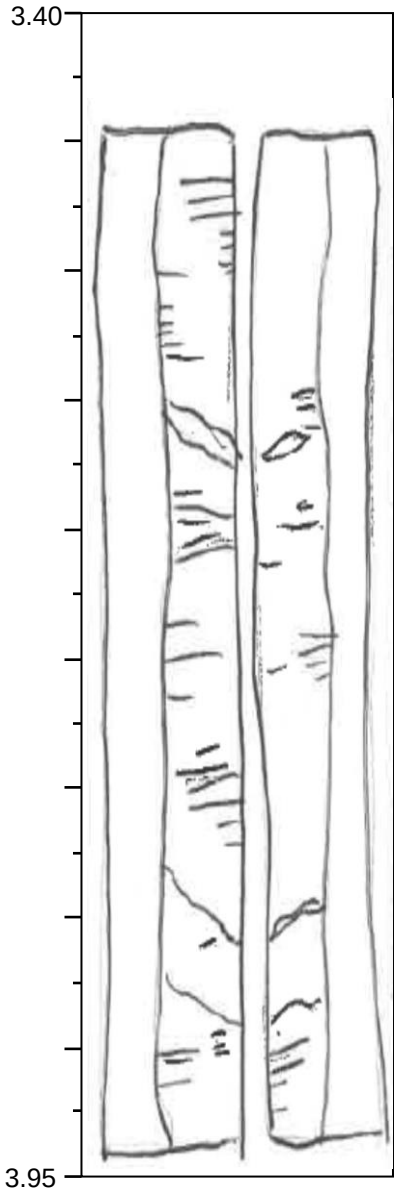
3.40 to 3.44m, No recovery.

3.44 to 3.95m
Indistinctly laminated, locally fissured, brown, mottled bluish grey, silty CLAY. Fissures are 0 to 5 degree, subhorizontal and subvertical, extremely closely spaced, planar, smooth.

Detail:
3.44 to 3.47m
Rare subangular coarse gravel of chert.

Detail:
3.70m,
Orangish brown lenses (up to 10x5mm) of fine to medium sand.

Detail:
3.78m,
Pocket (20x20mm) of grey fine sand/silt.



Remarks:
0.41m recovery.

Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT11
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-02		
Sample No	17		
Sample Depth, mBGL	5.10	-	5.55
Sample Type	UT		

Description

5.10 to 5.24m, No recovery.



5.24 to 5.55m
Stiff to very stiff indistinctly laminated, locally fissured, slightly micaceous silty CLAY. Fissures are 0 to 5 degree, extremely closely spaced, planar, smooth. Local pockets/lenses (up to 20x25mm) of dark grey fine sand and silt.

Remarks:
0.31 recovery.

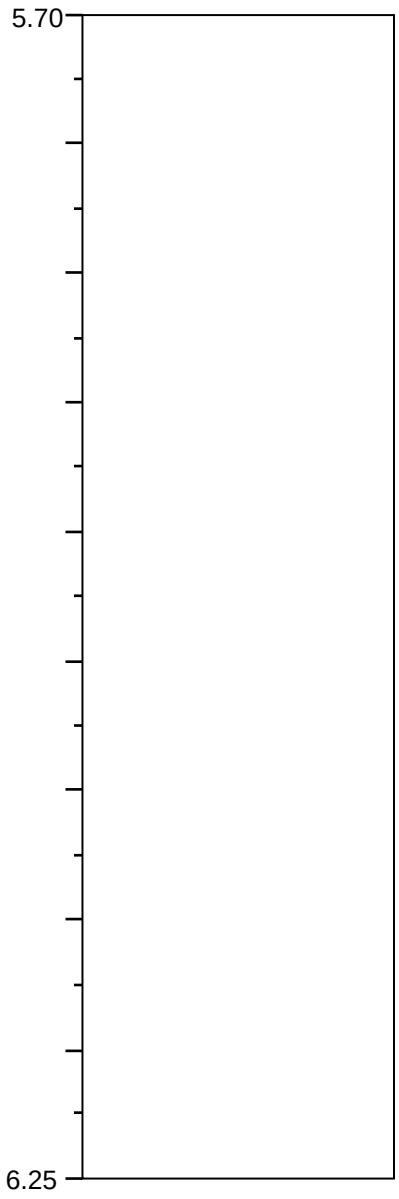
Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT17
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-02		
Sample No	19		
Sample Depth, mBGL	5.70	-	6.25
Sample Type	UT		

Description

5.70 to 5.95m, No recovery.



5.95 to 6.25m
Very stiff indistinctly laminated slightly micaceous slightly sandy silty CLAY. Sand is fine to medium. Rare pockets (up to 15x10mm) of dark grey fine sand and silt.

Remarks:
0.30m recovery.

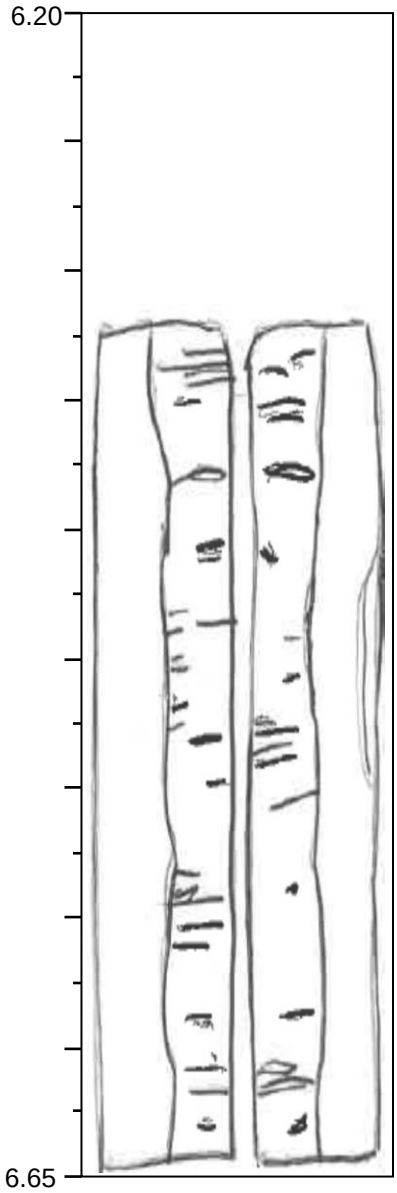
Notes:	Project	HAVANT THICKET WINTER STORAGE	Figure
	Project No.	A9031-19	ATK-BH-02-UT19
	Carried out for	Portsmouth Water	

Split Tube Sample Description

Borehole No	ATK-BH-02		
Sample No	21		
Sample Depth, mBGL	6.20	-	6.65
Sample Type	UT		

Description

6.20 to 6.32m, No recovery.



6.32 to 6.65m
Very stiff indistinctly laminated dark grey slightly micaceous slightly sandy silty CLAY. Sand is fine to medium. Rare pockets (up to 20x35mm) of silt and fine sand.

Detail:
6.38m
1no. fossil fragment (35x20mm).

Remarks:
0.33m recovery.

Notes:	**Project** HAVANT THICKET WINTER STORAGE **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Figure** ATK-BH-02-UT21

APPENDIX C
FIELD TESTING

Variable Head Permeability Tests	ATK-CP-01T1 and T2
	ATK-CP-02T1, T2 andT3
	ATK-CP-03T1
	ATK-CP-04T1, T2 and T3
	ATK-CP-05T1, T2 and T3
	ATK-CP-06T1 and T2
	ATK-CP-10T1
	ATK-CP-12T1
	ATK-CP-13AT1
	ATK-CP-15T1 and T2
	ATK-CP-16T1
	ATK-RC-01T1
	ATK-RC-02T1
	ATK-RC-02aT1
	ATK-RC-03T1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	2.00	m BGL
Depth of borehole	3.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.23	m

BOREHOLE No.	ATK-CP-01
TEST NUMBER	1
DATE OF TEST	07-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	1000	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	2.72	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	1.55	m BGL
Groundwater level for analysis	1.55	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.25	1.53	1.00
0.5	0.29	1.49	0.97
1	0.31	1.47	0.96
1.5	0.32	1.46	0.95
2	0.33	1.45	0.95
2.5	0.34	1.44	0.94
3	0.35	1.43	0.93
3.5	0.36	1.42	0.93
4	0.37	1.41	0.92
4.5	0.38	1.40	0.92
5	0.39	1.39	0.91
6	0.40	1.38	0.90
7	0.42	1.36	0.89
8	0.43	1.35	0.88
9	0.45	1.33	0.87
10	0.47	1.31	0.86
15	0.54	1.24	0.81
20	0.59	1.19	0.78
25	0.64	1.14	0.75
30	0.68	1.10	0.72
35	0.72	1.06	0.69
40	0.77	1.01	0.66
45	0.79	0.99	0.65
50	0.82	0.96	0.63
55	0.85	0.93	0.61
60	0.87	0.91	0.59

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	1.53	m
Differential head at end of test, H_f	0.91	m
Time elapsed at end of test	60	mins
Proportion of test recovery	41	%

Coordinates of best fit line to data:

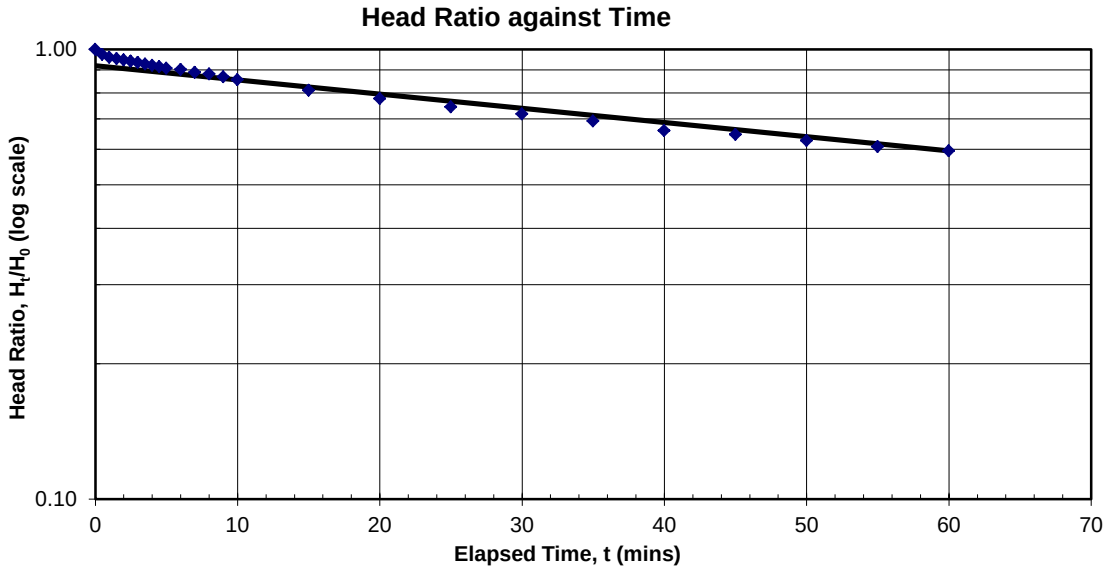
t_1 = 0.0 mins H_1/H_0 = 0.920

t_2 = 60.0 mins H_2/H_0= 0.595

Permeability (k) = 1.4E-06 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: RT Checked: TC Approved:	Notes:	Project	HAVANT THICKET WINTER STORAGE	Test ATK-CP-01T1
		Project No.	A9031-19	
		Carried out for	Portsmouth Water	

Variable Head Permeability Test

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	3.40	m BGL
Base of response zone	4.00	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.00	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-01
TEST NUMBER	2
DATE OF TEST	28-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	600	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	2.32	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	1.14	m BGL
Groundwater level for analysis	1.14	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	2.60	1.46	1.00
0.5	2.60	1.46	1.00
1	2.60	1.46	1.00
1.5	2.60	1.46	1.00
2	2.60	1.46	1.00
2.5	2.60	1.46	1.00
3	2.60	1.46	1.00
3.5	2.60	1.46	1.00
4	2.60	1.46	1.00
4.5	2.59	1.45	0.99
5	2.58	1.44	0.99
6	2.56	1.42	0.97
7	2.55	1.41	0.97
8	2.55	1.41	0.97
9	2.55	1.41	0.97
10	2.55	1.41	0.97
15	2.54	1.40	0.96
20	2.50	1.36	0.93
25	2.50	1.36	0.93
30	2.50	1.36	0.93
35	2.50	1.36	0.93
40	2.49	1.35	0.92
45	2.49	1.35	0.92
50	2.49	1.35	0.92
55	2.49	1.35	0.92
60	2.49	1.35	0.92

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	1.46	m
Differential head at end of test, H_f	1.35	m
Time elapsed at end of test	60	mins
Proportion of test recovery	8	%

Coordinates of best fit line to data:

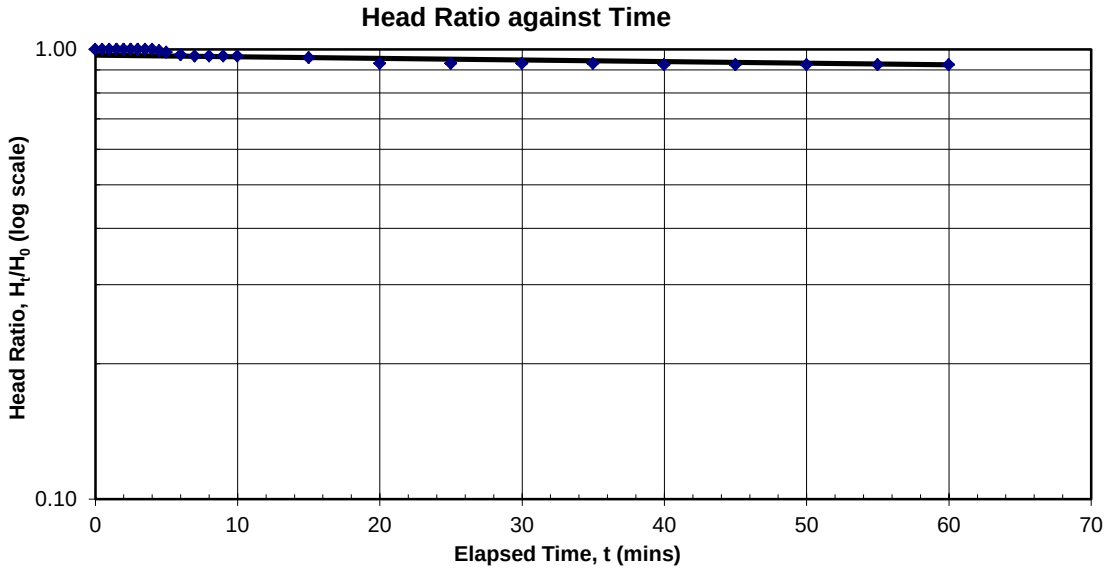
t_1 = 0.0 mins, H_1/H_0 = 0.970

t_2 = 60.0 mins, H_2/H_0 = 0.925

Permeability (k) = 2.8E-09 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: FC Checked: TC Approved:	Notes:	**Project** HAVANT THICKET WINTER STORAGE **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Test** ATK-CP-01T2

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	1.90	m BGL
Depth of borehole	1.90	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.90	m

BOREHOLE No.	ATK-CP-02
TEST NUMBER	1
DATE OF TEST	08-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	0	mm
Soil flush with bottom in uniform soil (4)		
Shape factor (F) after Hvorslev (1951)	0.55	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	Dry	m BGL
Groundwater level for analysis	1.90	m BGL
(Based on estimated value)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.09	2.71	1.00
0.5	0.09	2.71	1.00
1	0.09	2.71	1.00
1.5	0.09	2.71	1.00
2	0.09	2.71	1.00
2.5	0.09	2.71	1.00
3	0.09	2.71	1.00
3.5	0.10	2.70	1.00
4	0.10	2.70	1.00
4.5	0.10	2.70	1.00
5	0.10	2.70	1.00
6	0.10	2.70	1.00
7	0.10	2.70	1.00
8	0.10	2.70	1.00
9	0.10	2.70	1.00
10	0.10	2.70	1.00
15	0.12	2.68	0.99
20	0.12	2.68	0.99
25	0.12	2.68	0.99
30	0.14	2.66	0.98
35	0.16	2.64	0.97
40	0.18	2.62	0.97
45	0.20	2.60	0.96
50	0.23	2.57	0.95
55	0.24	2.56	0.94
60	0.24	2.56	0.94

CALCULATED VALUES

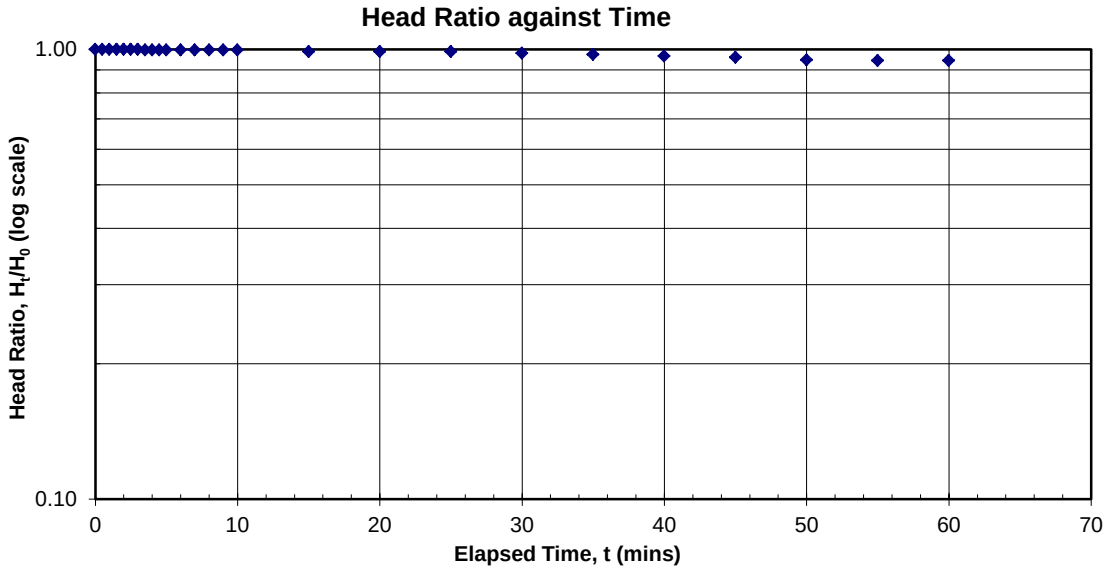
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	2.71	m
Differential head at end of test, H_f	2.56	m
Time elapsed at end of test	60	mins
Proportion of test recovery	6	%

Permeability (k) = m/sec

REMARKS

Test carried out in apparently unsaturated ground, borehole was dry. Groundwater level for analysis has been taken as base of borehole (1.90m).
Test did not achieve 75% recovery, insufficient recovery to assess permeability.



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project: HAVANT THICKET WATER STORAGE
Project No.: A9031-19
Carried out for: Portsmouth Water

Test: **ATK-CP-02T1**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	6.50	m BGL
Depth of borehole	7.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-02
TEST NUMBER	2
DATE OF TEST	11-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	500	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	1.91	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	0.50	m BGL
Groundwater level for analysis	0.50	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.09	0.41	1.00
0.5	0.09	0.41	1.00
1	0.09	0.41	1.00
1.5	0.09	0.41	1.00
2	0.09	0.41	1.00
2.5	0.09	0.41	1.00
3	0.09	0.41	1.00
3.5	0.10	0.40	0.98
4	0.10	0.40	0.98
4.5	0.10	0.40	0.98
5	0.10	0.40	0.98
6	0.10	0.40	0.98
7	0.10	0.40	0.98
8	0.10	0.40	0.98
9	0.10	0.40	0.98
10	0.10	0.40	0.98
15	0.12	0.38	0.93
20	0.12	0.38	0.93
25	0.12	0.38	0.93
30	0.14	0.36	0.88
35	0.16	0.34	0.83
40	0.18	0.32	0.78
45	0.20	0.30	0.73
50	0.23	0.27	0.66
55	0.24	0.26	0.63
60	0.24	0.26	0.63

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	0.41 m
Differential head at end of test, H_f	0.26 m
Time elapsed at end of test	60 mins
Proportion of test recovery	37 %

Coordinates of best fit line to data:

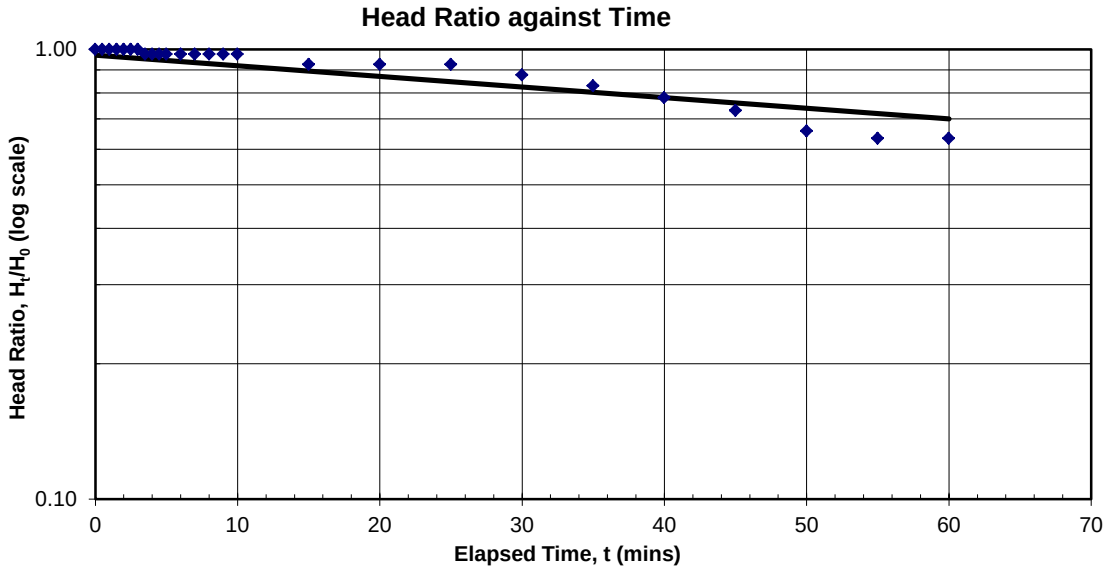
t_1 = 0.0 mins H_1/H_0 = 0.970

t_2 = 60.0 mins H_2/H_0= 0.700

Permeability (k) = 1.5E-06 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: FC Checked: TC Approved:	Notes:	**Project** HAVANT THICKET WATER STORAGE **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Test** ATK-CP-02T2

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	33.50	m BGL
Base of response zone	34.00	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.54	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-02
TEST NUMBER	3
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	500	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	2.13	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	4.63	m BGL
Groundwater level for analysis	2.56	m BGL
(Based on observation in installation)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	12.19	9.09	1.00
0.5	11.73	8.63	0.95
1	11.35	8.25	0.91
1.5	11.02	7.92	0.87
2	10.70	7.60	0.84
2.5	10.45	7.35	0.81
3	10.20	7.10	0.78
3.5	9.92	6.82	0.75
4	9.67	6.57	0.72
4.5	9.45	6.35	0.70
5	9.23	6.13	0.67
6	8.84	5.74	0.63
7	8.46	5.36	0.59
8	8.12	5.02	0.55
9	7.83	4.73	0.52
10	7.59	4.49	0.49
15	6.64	3.54	0.39
20	6.12	3.02	0.33
25	5.80	2.70	0.30
30	5.65	2.55	0.28
35	5.56	2.46	0.27
40	5.49	2.39	0.26
45	5.39	2.29	0.25
50	5.25	2.15	0.24
55	5.06	1.96	0.22

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	9.09	m
Differential head at end of test, H_f	1.96	m
Time elapsed at end of test	55	mins
Proportion of test recovery	78	%

Coordinates of best fit line to data:

t_1 = 0.0 mins H_1/H_0 = 1.000

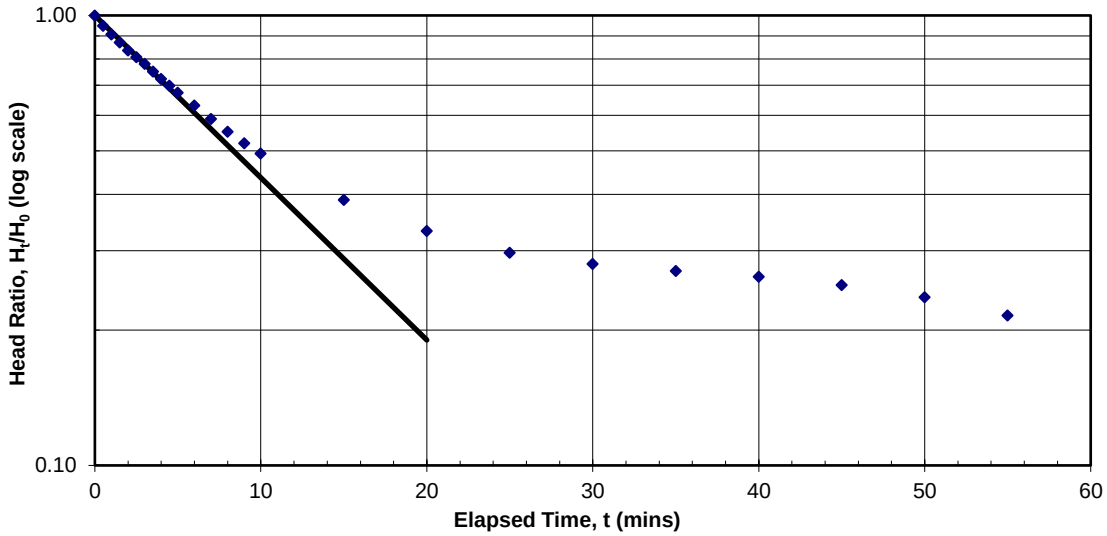
t_2 = 20.0 mins H_2/H_0= 0.190

Permeability (k) = 3.2E-07 m/sec

REMARKS

Permeability calculated over initial 15 minutes of recovery (approximately 70%). Calculation over later part of test would yield a lower permeability.

Head Ratio against Time



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project HAVANT THICKET WINTER STORAGE

Project No. A9031-19

Carried out for Portsmouth Water

Test ATK-CP-02T3

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	1.70	m BGL
Depth of borehole	5.50	m BGL
Diameter of borehole (D)	150	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-03
TEST NUMBER	1
DATE OF TEST	06-Dec-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	3800	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	6.08	m

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	5.50	1.00
0.5	0.00	5.50	1.00
1	0.00	5.50	1.00
1.5	0.00	5.50	1.00
2	0.00	5.50	1.00
2.5	0.00	5.50	1.00
3	0.00	5.50	1.00
3.5	0.00	5.50	1.00
4	0.00	5.50	1.00
4.5	0.00	5.50	1.00
5	0.00	5.50	1.00
6	0.00	5.50	1.00
7	0.00	5.50	1.00
8	0.00	5.50	1.00
9	0.00	5.50	1.00
10	0.00	5.50	1.00
15	0.00	5.50	1.00
20	0.00	5.50	1.00
25	0.00	5.50	1.00
30	0.00	5.50	1.00
35	0.00	5.50	1.00
40	0.00	5.50	1.00
45	0.00	5.50	1.00
50	0.00	5.50	1.00
55	0.00	5.50	1.00
60	0.00	5.50	1.00

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	Dry	m BGL
Groundwater level for analysis	5.50	m BGL
(Based on groundwater depth prior to test)		

CALCULATED VALUES

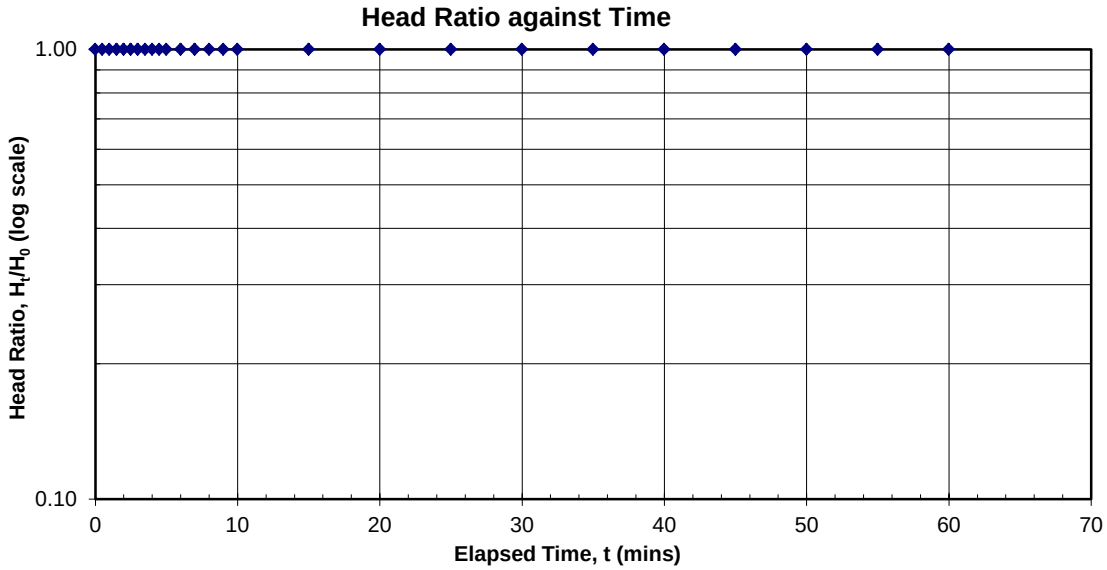
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	5.50	m
Differential head at end of test, H_f	5.50	m
Time elapsed at end of test	60	mins
Proportion of test recovery	0	%

Permeability (k) = m/sec

REMARKS

Test carried out in apparently unsaturated ground.
Test has not achieved 75% recovery (0%), unable to calculate permeability.



AGS

Testing: PC Checked: TC Approved:	Notes:	Project	HAVANT THICKET WINTER STORAGE	Test ATK-CP-03T1
		Project No.	A9031-19	
		Carried out for	Portsmouth Water	

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	4.50	m BGL
Depth of borehole	5.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-04
TEST NUMBER	1
DATE OF TEST	15-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	500	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	1.91	m

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.48	4.52	1.00
0.5	0.48	4.52	1.00
1	0.48	4.52	1.00
1.5	0.48	4.52	1.00
2	0.48	4.52	1.00
2.5	0.48	4.52	1.00
3	0.48	4.52	1.00
3.5	0.48	4.52	1.00
4	0.48	4.52	1.00
4.5	0.48	4.52	1.00
5	0.48	4.52	1.00
6	0.48	4.52	1.00
7	0.48	4.52	1.00
8	0.48	4.52	1.00
9	0.48	4.52	1.00
10	0.48	4.52	1.00
15	0.48	4.52	1.00
20	0.48	4.52	1.00
25	0.48	4.52	1.00
30	0.48	4.52	1.00
35	0.48	4.52	1.00
40	0.48	4.52	1.00
45	0.48	4.52	1.00
50	0.48	4.52	1.00
55	0.48	4.52	1.00
60	0.48	4.52	1.00

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	Dry	m BGL
Groundwater level for analysis	5.00	m BGL
(Based on groundwater depth prior to test)		

CALCULATED VALUES

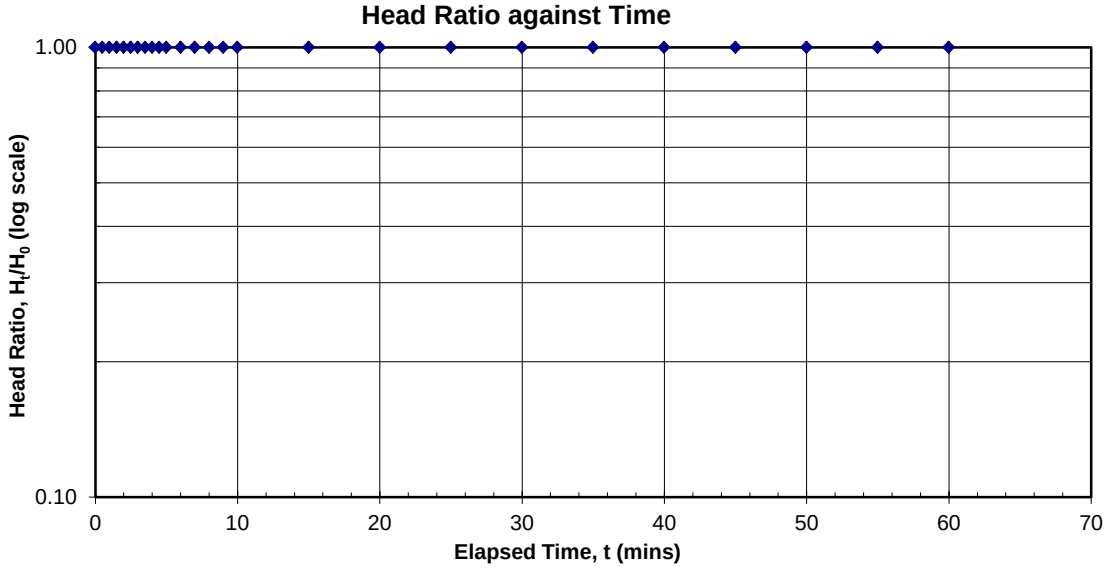
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	4.52	m
Differential head at end of test, H_f	4.52	m
Time elapsed at end of test	60	mins
Proportion of test recovery	0	%

Permeability (k) = m/sec

REMARKS

Test carried out in apparently unsaturated ground.
Test has not achieved 75% recovery (0%), unable to calculate permeability.



AGS

Testing: PC Checked: TC Approved:	Notes:	Project	HAVANT THICKET WATER STORAGE	Test ATK-CP-04T1
		Project No.	A9031-19	
		Carried out for	Portsmouth Water	

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	4.50	m BGL
Depth of borehole	11.50	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-04
TEST NUMBER	2
DATE OF TEST	18-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	7000	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	10.35	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	1.20	m BGL
Groundwater level for analysis	1.20	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	1.20	1.00
0.5	0.00	1.20	1.00
1	0.00	1.20	1.00
1.5	0.01	1.20	1.00
2	0.01	1.20	1.00
2.5	0.01	1.20	1.00
3	0.01	1.20	1.00
3.5	0.01	1.20	1.00
4	0.01	1.19	0.99
4.5	0.01	1.19	0.99
5	0.01	1.19	0.99
6	0.01	1.19	0.99
7	0.02	1.18	0.98
8	0.02	1.18	0.98
9	0.02	1.18	0.98
10	0.03	1.17	0.98
15	0.04	1.17	0.97
20	0.04	1.16	0.97
25	0.04	1.16	0.97
30	0.05	1.16	0.96
35	0.05	1.15	0.96
40	0.06	1.15	0.95
45	0.06	1.14	0.95
50	0.07	1.14	0.95
55	0.07	1.14	0.95
60	0.07	1.13	0.94

CALCULATED VALUES

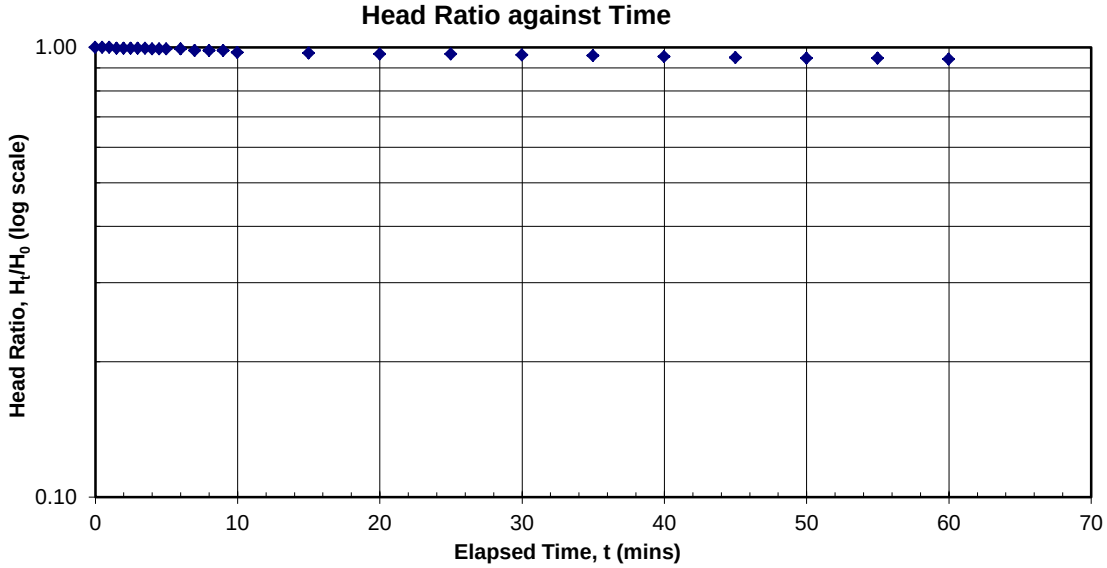
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	1.20	m
Differential head at end of test, H_f	1.13	m
Time elapsed at end of test	60	mins
Proportion of test recovery	6	%

Permeability (k) = m/sec

REMARKS

Test has not achieved 75% recovery (6%), unable to calculate permeability.



AGS

Testing: PC Checked: TC Approved:	Notes:	Project Project No. Carried out for	HAVANT THICKET WATER STORAGE A9031-19 Portsmouth Water	Test **ATK-CP-04T2**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	11.00	m BGL
Base of response zone	12.20	m BGL
Diameter of borehole (D)	150	mm
Height of tubing above ground level (datum)	0.48	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-04
TEST NUMBER	3
DATE OF TEST	29-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	1200	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	3.07	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	-0.48	m BGL
Groundwater level for analysis	-0.48	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	1.58	1.58	1.00
0.5	1.29	1.29	0.82
1	0.99	0.99	0.63
1.5	0.76	0.76	0.48
2	0.60	0.60	0.38
2.5	0.50	0.50	0.32
3	0.46	0.46	0.29
3.5	0.42	0.42	0.27
4	0.40	0.40	0.25
4.5	0.38	0.38	0.24
5	0.37	0.37	0.23
6	0.36	0.36	0.23
7	0.35	0.35	0.22
8	0.34	0.34	0.22
9	0.32	0.32	0.20
10	0.32	0.32	0.20
15	0.32	0.32	0.20

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	1.58	m
Differential head at end of test, H_f	0.32	m
Time elapsed at end of test	15	mins
Proportion of test recovery	80	%

Coordinates of best fit line to data:

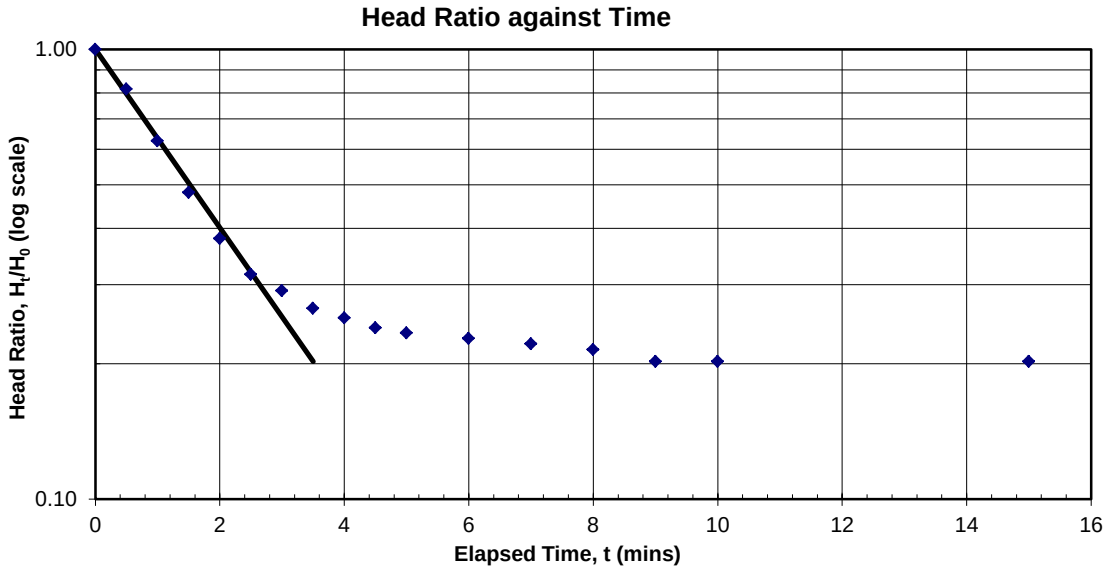
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 3.5 mins H_2/H_0= 0.203

Permeability (k) = 1.2E-06 m/sec

REMARKS

Raised cover full prior to commencement, GW at 0.48m AGL.
Top of standpipe at 0.16m AGL.
Test terminated when recovery reached top of standpipe.
Permeability calculated over initial 3 minutes of recovery (approximately 70%).
Calculation over later part of test would yield a lower permeability.



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project: HAVANT THICKET WINTER STORAGE
Project No.: A9031-19
Carried out for: Portsmouth Water

Test: **ATK-CP-04T3**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	3.00	m BGL
Depth of borehole	7.50	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-05
TEST NUMBER	1
DATE OF TEST	20-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	4500	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	7.43	m

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	7.50	1.00
0.5	0.01	7.50	1.00
1	0.01	7.49	1.00
1.5	0.02	7.49	1.00
2	0.02	7.48	1.00
2.5	0.02	7.48	1.00
3	0.02	7.48	1.00
3.5	0.02	7.48	1.00
4	0.02	7.48	1.00
4.5	0.02	7.48	1.00
5	0.02	7.48	1.00
6	0.02	7.48	1.00
7	0.02	7.48	1.00
8	0.02	7.48	1.00
9	0.02	7.48	1.00
10	0.02	7.48	1.00
15	0.03	7.47	1.00
20	0.03	7.47	1.00
25	0.04	7.47	1.00
30	0.04	7.47	1.00
35	0.05	7.46	0.99
40	0.05	7.46	0.99
45	0.05	7.45	0.99
50	0.05	7.45	0.99
55	0.06	7.45	0.99
60	0.06	7.44	0.99

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	Dry	m BGL
Groundwater level for analysis	7.50	m BGL
(Based on estimated value)		

CALCULATED VALUES

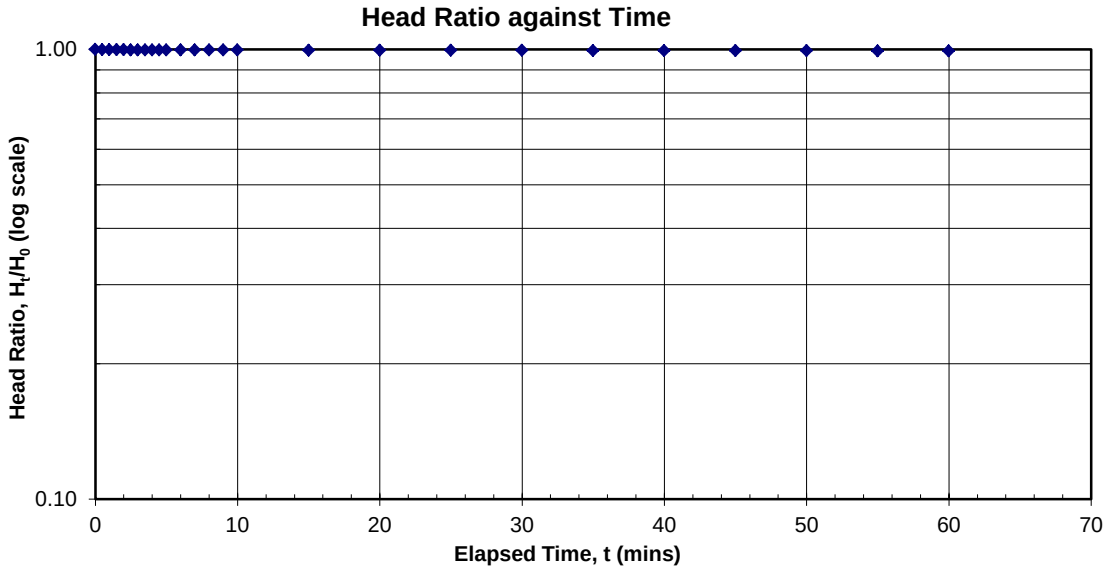
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	7.50	m
Differential head at end of test, H_f	7.44	m
Time elapsed at end of test	60	mins
Proportion of test recovery	1	%

Permeability (k) = m/sec

REMARKS

Test carried out in apparently unsaturated ground, borehole was dry. Groundwater level for analysis has been taken as base of borehole (7.50m). Test did not achieve 75% recovery (1%), insufficient recovery to assess permeability.



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project HAVANT THICKET WATER STORAGE

Project No. A9031-19

Carried out for Portsmouth Water

Test ATK-CP-05T1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	12.00	m BGL
Depth of borehole	13.00	m BGL
Diameter of borehole (D)	150	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-05
TEST NUMBER	2
DATE OF TEST	21-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	1000	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	2.42	m

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	13.00	1.00
0.5	0.06	12.94	1.00
1	0.08	12.92	0.99
1.5	0.09	12.91	0.99
2	0.11	12.89	0.99
2.5	0.12	12.89	0.99
3	0.12	12.88	0.99
3.5	0.13	12.87	0.99
4	0.13	12.87	0.99
4.5	0.14	12.87	0.99
5	0.14	12.86	0.99
6	0.15	12.86	0.99
7	0.15	12.85	0.99
8	0.16	12.84	0.99
9	0.16	12.84	0.99
10	0.17	12.83	0.99
15	0.21	12.80	0.98
20	0.23	12.77	0.98
25	0.26	12.74	0.98
30	0.28	12.72	0.98
35	0.30	12.70	0.98
40	0.33	12.67	0.97
45	0.35	12.65	0.97
50	0.37	12.63	0.97
55	0.38	12.62	0.97
60	0.39	12.61	0.97

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	Dry	m BGL
Groundwater level for analysis	13.00	m BGL
(Based on estimated value)		

CALCULATED VALUES

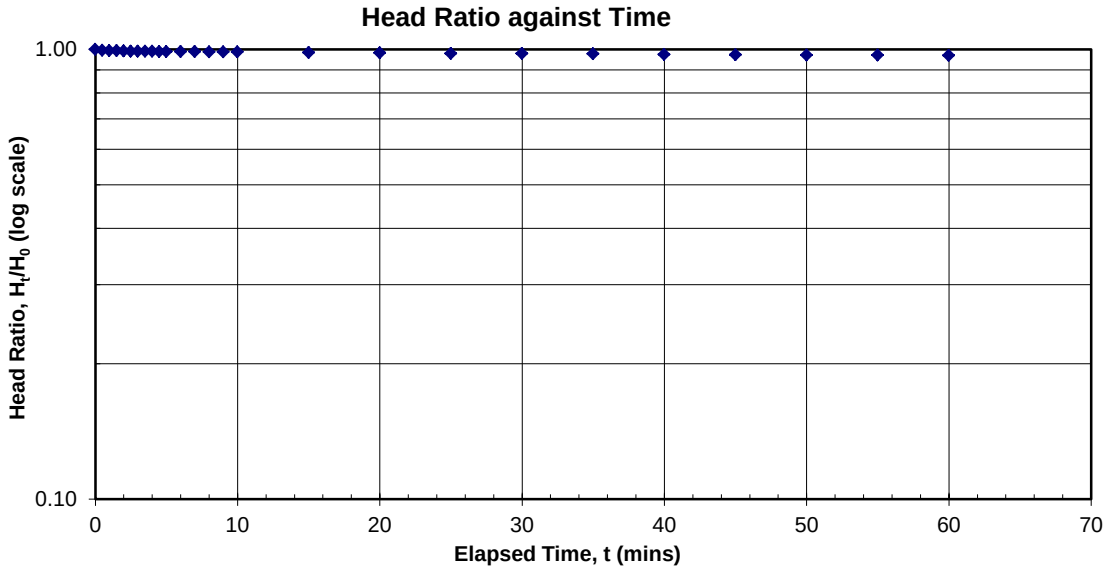
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	13.00	m
Differential head at end of test, H_f	12.61	m
Time elapsed at end of test	60	mins
Proportion of test recovery	3	%

Permeability (k) = m/sec

REMARKS

Test carried out in apparently unsaturated ground, borehole was dry. Groundwater level for analysis has been taken as base of borehole (13.00m). Test did not achieve 75% recovery (3%), insufficient recovery to assess permeability.



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project: HAVANT THICKET WATER STORAGE
Project No.: A9031-19
Carried out for: Portsmouth Water

Test: **ATK-CP-05T2**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	10.00	m BGL
Base of response zone	11.00	m BGL
Diameter of borehole (D)	150	mm
Height of tubing above ground level (datum)	0.47	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-05
TEST NUMBER	3
DATE OF TEST	29-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	1000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	2.73	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	2.18	m BGL
Groundwater level for analysis	2.18	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	8.80	6.15	1.00
0.5	7.43	4.78	0.78
1	6.39	3.74	0.61
1.5	5.94	3.29	0.53
2	5.42	2.77	0.45
2.5	4.99	2.34	0.38
3	4.60	1.95	0.32
3.5	4.26	1.61	0.26
4	3.92	1.27	0.21
4.5	3.70	1.05	0.17
5	3.57	0.92	0.15
6	3.29	0.64	0.10
7	3.09	0.44	0.07
8	2.93	0.28	0.05
9	2.87	0.22	0.04
10	2.82	0.17	0.03
15	2.71	0.06	0.01
20	2.69	0.04	0.01
25	2.68	0.03	0.00
30	2.68	0.03	0.00
35	2.68	0.03	0.00
40	2.68	0.03	0.00
45	2.67	0.02	0.00
50	2.66	0.01	0.00
55	2.66	0.01	0.00
60	2.65	0.00	0.00

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	6.15	m
Differential head at end of test, H_f	0.00	m
Time elapsed at end of test	60	mins
Proportion of test recovery	100	%

Coordinates of best fit line to data:

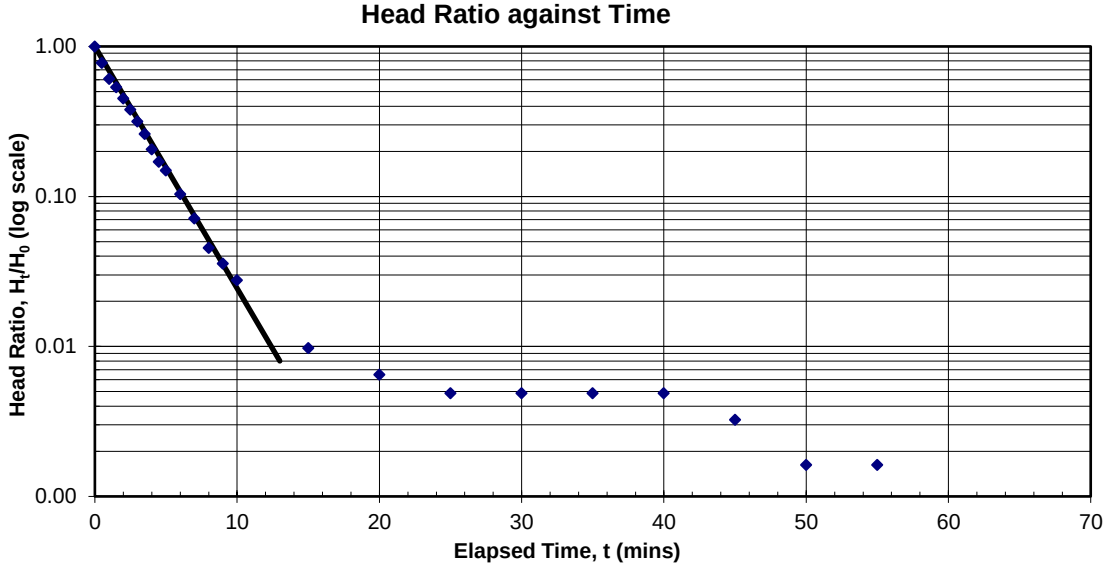
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 13.0 mins H_2/H_0= 0.008

Permeability (k) = 1.1E-06 m/sec

REMARKS

Permeability calculated over initial 13 minutes of recovery (approximately 98%).



AGS

Testing: PC Checked: TC Approved:	Notes:	**Project** HAVANT THICKET WINTER STORAGE **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Test** ATK-CP-05T3

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	1.50	m BGL
Depth of borehole	2.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.25	m

BOREHOLE No.	ATK-CP-06
TEST NUMBER	1
DATE OF TEST	04-Dec-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	500	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	1.91	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	1.80	m BGL
Groundwater level for analysis	1.80	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	2.05	1.00
0.5	0.00	2.05	1.00
1	0.01	2.04	1.00
1.5	0.01	2.04	1.00
2	0.02	2.04	0.99
2.5	0.02	2.04	0.99
3	0.02	2.04	0.99
3.5	0.02	2.03	0.99
4	0.02	2.03	0.99
4.5	0.02	2.03	0.99
5	0.03	2.03	0.99
6	0.03	2.03	0.99
7	0.03	2.03	0.99
8	0.03	2.02	0.99
9	0.04	2.02	0.98
10	0.04	2.02	0.98
15	0.05	2.00	0.98
20	0.08	1.98	0.96
25	0.10	1.95	0.95
30	0.12	1.93	0.94
35	0.14	1.91	0.93
40	0.16	1.90	0.92
45	0.17	1.89	0.92
50	0.18	1.87	0.91
55	0.20	1.86	0.90
60	0.22	1.84	0.90

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	2.05	m
Differential head at end of test, H_f	1.84	m
Time elapsed at end of test	60	mins
Proportion of test recovery	10	%

Coordinates of best fit line to data:

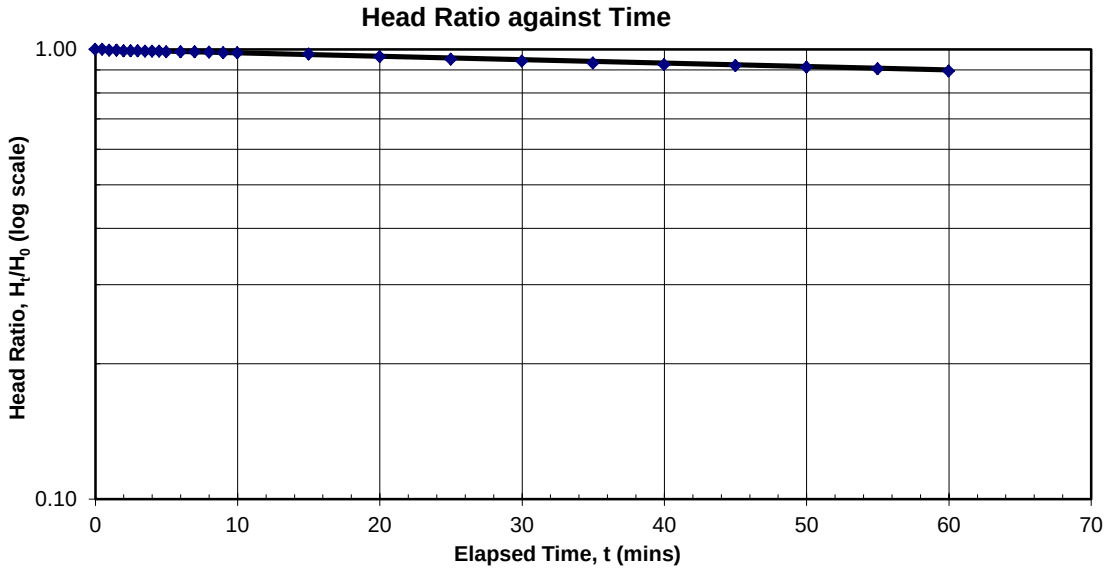
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 60.0 mins H_2/H_0= 0.900

Permeability (k) = 4.8E-07 m/sec

REMARKS

Test carried out in apparently unsaturated ground.
Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: RP Checked: TC Approved:	Notes:	**Project**	**HAVANT THICKET WATER STORAGE**	**Test** **ATK-CP-06T1**
		Project No.	**A9031-19**	
		Carried out for	**Portsmouth Water**	

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	0.81	m BGL
Base of response zone	3.50	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.65	m
Diameter of standpipe tubing	50	mm

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	2.90	1.44	1.00
0.5	2.73	1.27	0.88
1	2.67	1.21	0.84
1.5	2.60	1.14	0.79
2	2.55	1.09	0.76
2.5	2.49	1.03	0.72
3	2.42	0.96	0.67
3.5	2.36	0.90	0.63
4	2.30	0.84	0.58
4.5	2.26	0.80	0.56
5	2.24	0.78	0.54
6	2.21	0.75	0.52
7	2.18	0.72	0.50
8	2.16	0.70	0.49
9	2.13	0.67	0.47
10	2.10	0.64	0.44
15	2.03	0.57	0.40
20	1.96	0.50	0.35
25	1.72	0.26	0.18
30	1.65	0.19	0.13
35	1.61	0.15	0.10
40	1.61	0.15	0.10
45	1.59	0.13	0.09
50	1.59	0.13	0.09
55	1.59	0.13	0.09
60	1.59	0.13	0.09

BOREHOLE No.	ATK-CP-06
TEST NUMBER	2
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	2690	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	5.83	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	0.81	m BGL
Groundwater level for analysis	0.81	m BGL
(Based on groundwater depth prior to test)		

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	1.44	m
Differential head at end of test, H_f	0.13	m
Time elapsed at end of test	60	mins
Proportion of test recovery	91	%

Coordinates of best fit line to data:

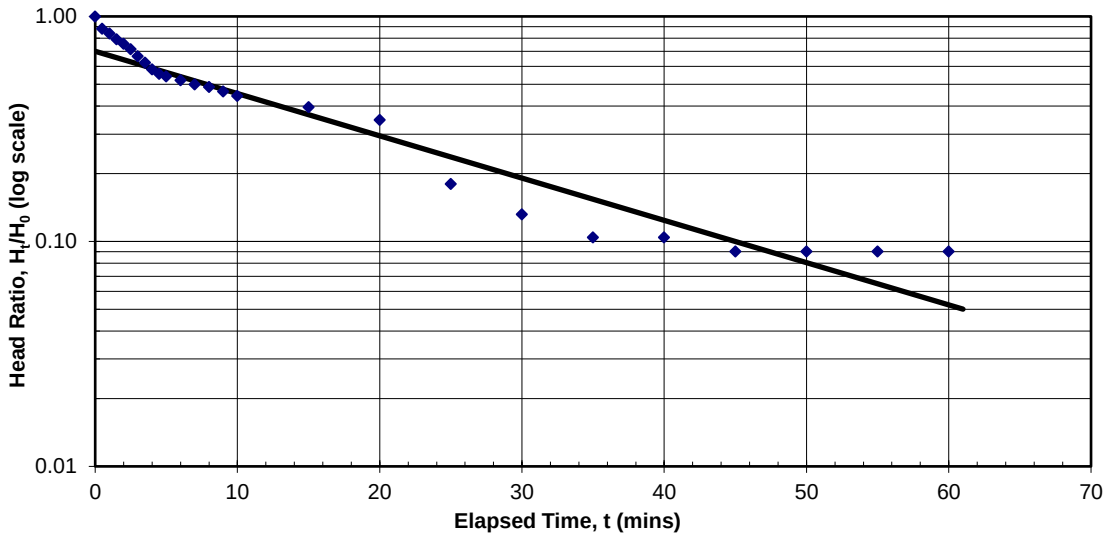
t_1 = 0.0 mins H_1/H_0 = 0.700

t_2 = 61.0 mins H_2/H_0= 0.050

Permeability (k) = 2.4E-07 m/sec

REMARKS

Response zone was not fully saturated prior to test. Therefore, as this is a rising head test, the response zone for analysis has been taken as the groundwater level prior to test (0.81 mBGL).



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project: HAVANT THICKET WINTER STORAGE

Project No.: A9031-19

Carried out for: Portsmouth Water

Test: **ATK-CP-06T2**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	10.50	m BGL
Depth of borehole	11.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.30	m

BOREHOLE No.	ATK-CP-10
TEST NUMBER	1
DATE OF TEST	22-Nov-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	500	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	1.91	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	4.40	m BGL
Groundwater level for analysis	4.40	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	4.70	1.00
0.5	0.00	4.70	1.00
1	0.00	4.70	1.00
1.5	0.01	4.69	1.00
2	0.01	4.69	1.00
2.5	0.01	4.69	1.00
3	0.01	4.69	1.00
3.5	0.01	4.69	1.00
4	0.02	4.68	1.00
4.5	0.02	4.68	1.00
5	0.02	4.68	1.00
6	0.02	4.68	1.00
7	0.02	4.68	1.00
8	0.02	4.68	1.00
9	0.02	4.68	1.00
10	0.03	4.67	0.99
15	0.04	4.66	0.99
20	0.05	4.65	0.99
25	0.05	4.65	0.99
30	0.07	4.63	0.99
35	0.07	4.63	0.99
40	0.07	4.63	0.99
45	0.07	4.63	0.99
50	0.07	4.63	0.99
55	0.07	4.63	0.99
60	0.07	4.63	0.99

CALCULATED VALUES

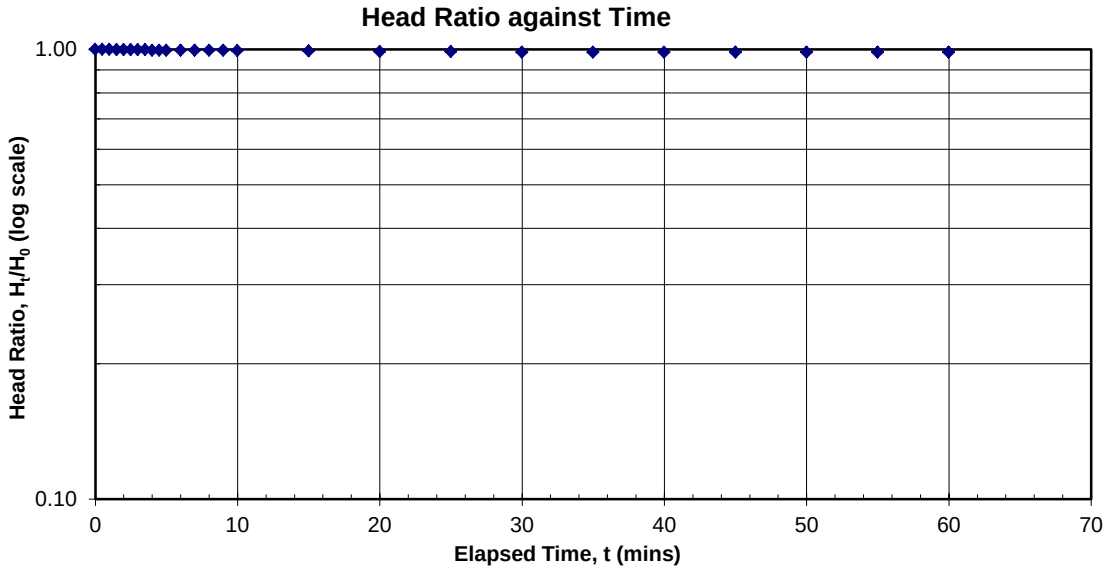
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	4.70	m
Differential head at end of test, H_f	4.63	m
Time elapsed at end of test	60	mins
Proportion of test recovery	1	%

Permeability (k) = m/sec

REMARKS

Test has not achieved 75% recovery (1%), unable to calculate permeability.



AGS

Testing: PC Checked: TC Approved:	Notes:	Project Project No. Carried out for	HAVANT THICKET WATER STORAGE A9031-19 Portsmouth Water	Test **ATK-CP-10T1**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	4.00	m BGL
Base of response zone	5.00	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.40	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-12
TEST NUMBER	1
DATE OF TEST	29-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	1000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	3.06	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	0.16	m BGL
Groundwater level for analysis	0.16	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	4.00	3.44	1.00
0.5	3.14	2.58	0.75
1	2.67	2.11	0.61
1.5	2.22	1.66	0.48
2	1.90	1.34	0.39
2.5	1.60	1.04	0.30
3	1.45	0.89	0.26
3.5	1.26	0.70	0.20
4	1.12	0.56	0.16
4.5	1.03	0.47	0.14
5	0.90	0.34	0.10
6	0.82	0.26	0.08
7	0.73	0.17	0.05
8	0.67	0.11	0.03
9	0.65	0.09	0.03
10	0.63	0.07	0.02
15	0.59	0.03	0.01
20	0.58	0.02	0.01
25	0.57	0.01	0.00
30	0.56	0.00	0.00

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	3.44	m
Differential head at end of test, H_f	0.00	m
Time elapsed at end of test	30	mins
Proportion of test recovery	100	%

Coordinates of best fit line to data:

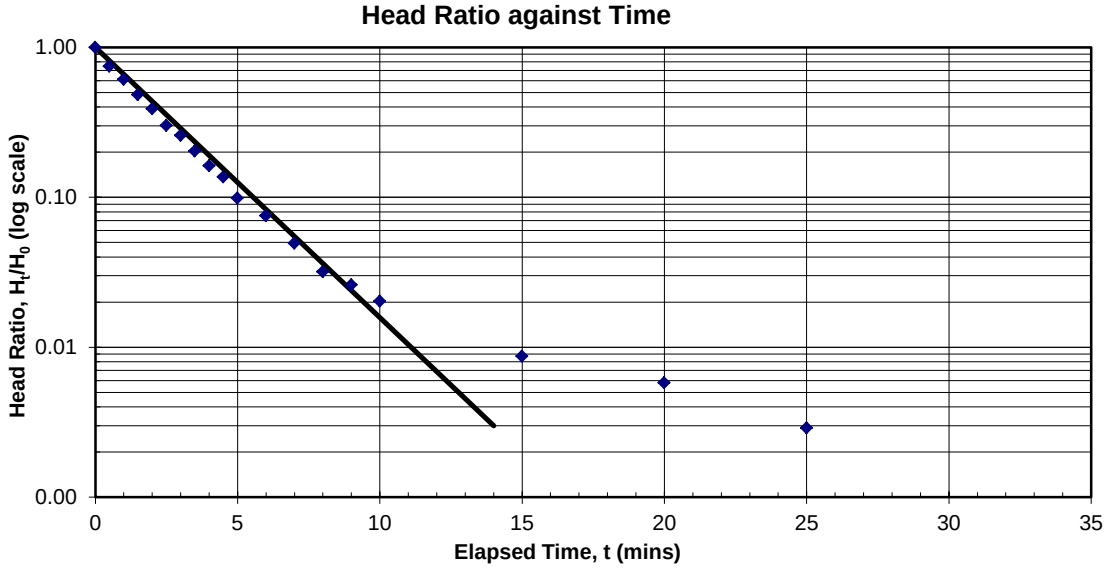
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 14.0 mins H_2/H_0= 0.003

Permeability (k) = 1.1E-06 m/sec

REMARKS

Permeability calculated over initial 12 minutes of recovery (approximately 98%).



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project	HAVANT THICKET WINTER STORAGE
Project No.	A9031-19
Carried out for	Portsmouth Water

Test **ATK-CP-12T1**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	3.50	m BGL
Base of response zone	4.50	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.67	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-13A
TEST NUMBER	1
DATE OF TEST	29-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	1000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	3.06	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	0.54	m BGL
Groundwater level for analysis	0.54	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	4.30	3.09	1.00
0.5	4.28	3.07	0.99
1	4.22	3.01	0.97
1.5	4.18	2.97	0.96
2	4.13	2.92	0.94
2.5	4.09	2.88	0.93
3	4.04	2.83	0.92
3.5	4.00	2.79	0.90
4	3.96	2.75	0.89
4.5	3.93	2.72	0.88
5	3.90	2.69	0.87
6	3.80	2.59	0.84
7	3.70	2.49	0.81
8	3.68	2.47	0.80
9	3.60	2.39	0.77
10	3.57	2.36	0.76
15	3.35	2.14	0.69
20	3.16	1.95	0.63
25	2.97	1.76	0.57
30	2.82	1.61	0.52
35	2.63	1.42	0.46
40	2.53	1.32	0.43
45	2.41	1.20	0.39
50	2.31	1.10	0.36
55	2.22	1.01	0.33
60	2.12	0.91	0.29

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	3.09 m
Differential head at end of test, H_f	0.91 m
Time elapsed at end of test	60 mins
Proportion of test recovery	71 %

Coordinates of best fit line to data:

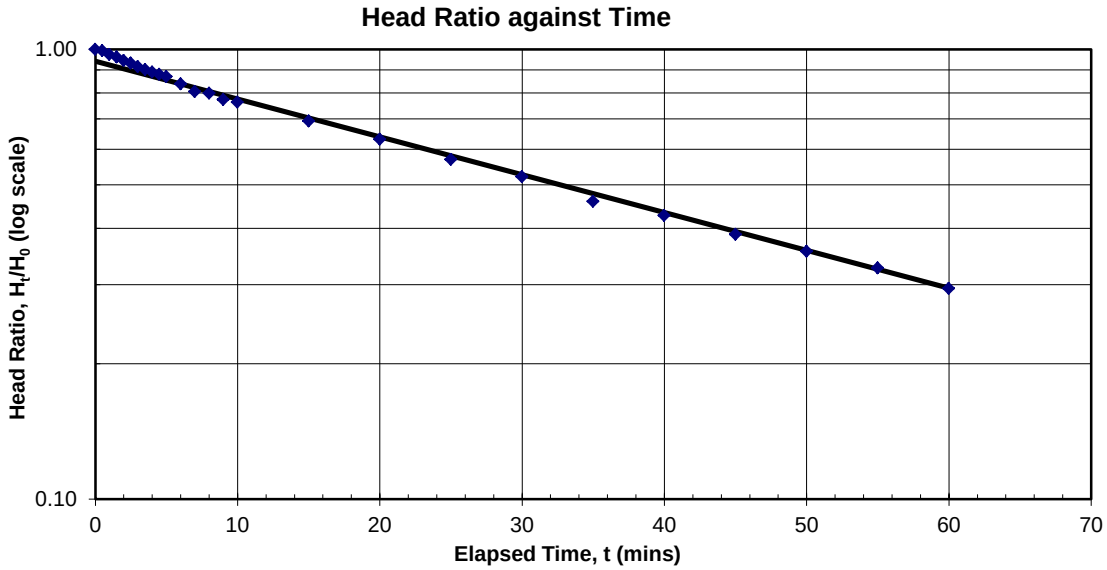
t_1 = 0.0 mins H_1/H_0 = 0.940

t_2 = 60.0 mins H_2/H_0= 0.294

Permeability (k) = 5.2E-08 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: PC Checked: TC Approved:	Notes:	**Project** HAVANT THICKET WINTER STORAGE **Project No.** A9031-19 **Carried out for** Portsmouth Water	**Test** ATK-CP-13AT1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Borehole
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Depth of casing	6.00	m BGL
Depth of borehole	16.00	m BGL
Diameter of borehole (D)	200	mm
Height of casing above ground level (datum)	0.00	m

BOREHOLE No.	ATK-CP-15
TEST NUMBER	1
DATE OF TEST	02-Dec-19

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	10000	mm
Well point or hole extended in uniform soil (8)		
Shape factor (F) after Hvorslev (1951)	13.64	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	5.00	m BGL
Groundwater level for analysis	5.00	m BGL
(Based on observation in borehole)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.00	5.00	1.00
0.5	0.00	5.00	1.00
1	0.01	4.99	1.00
1.5	0.02	4.98	1.00
2	0.02	4.98	1.00
2.5	0.02	4.98	1.00
3	0.03	4.97	0.99
3.5	0.03	4.97	0.99
4	0.03	4.97	0.99
4.5	0.03	4.97	0.99
5	0.04	4.97	0.99
6	0.04	4.96	0.99
7	0.04	4.96	0.99
8	0.04	4.96	0.99
9	0.05	4.95	0.99
10	0.05	4.95	0.99
15	0.08	4.92	0.98
20	0.08	4.92	0.98
25	0.11	4.90	0.98
30	0.12	4.88	0.98
35	0.13	4.87	0.97
40	0.15	4.86	0.97
45	0.15	4.85	0.97
50	0.15	4.85	0.97
55	0.15	4.85	0.97
60	0.16	4.85	0.97

CALCULATED VALUES

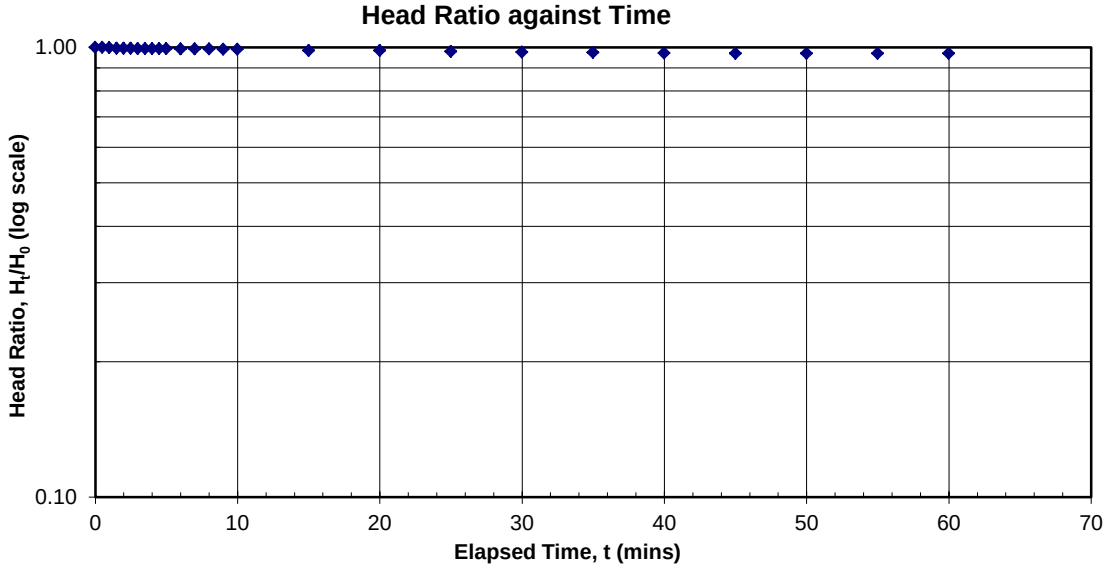
Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	5.00	m
Differential head at end of test, H_f	4.85	m
Time elapsed at end of test	60	mins
Proportion of test recovery	3	%

Permeability (k) = m/sec

REMARKS

Test has not achieved 75% recovery (3%), unable to calculate permeability.



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project: HAVANT THICKET WATER STORAGE
Project No.: A9031-19
Carried out for: Portsmouth Water

Test: **ATK-CP-15T1**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	17.50	m BGL
Base of response zone	18.50	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.56	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-CP-15
TEST NUMBER	2
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	1000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	3.06	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	2.94	m BGL
Groundwater level for analysis	2.94	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	12.77	9.27	1.00
0.5	12.63	9.13	0.98
1	12.62	9.12	0.98
1.5	12.61	9.11	0.98
2	12.59	9.09	0.98
2.5	12.56	9.06	0.98
3	12.54	9.04	0.98
3.5	12.53	9.03	0.97
4	12.51	9.01	0.97
4.5	12.49	8.99	0.97
5	12.47	8.97	0.97
6	12.44	8.94	0.96
7	12.42	8.92	0.96
8	12.39	8.89	0.96
9	12.38	8.88	0.96
10	12.36	8.86	0.96
15	12.28	8.78	0.95
20	12.23	8.73	0.94
25	12.14	8.64	0.93
30	12.08	8.58	0.93
35	12.02	8.52	0.92
40	11.98	8.48	0.91
45	11.90	8.40	0.91
50	11.83	8.33	0.90
55	11.75	8.25	0.89
60	11.69	8.19	0.88

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	9.27 m
Differential head at end of test, H_f	8.19 m
Time elapsed at end of test	60 mins
Proportion of test recovery	12 %

Coordinates of best fit line to data:

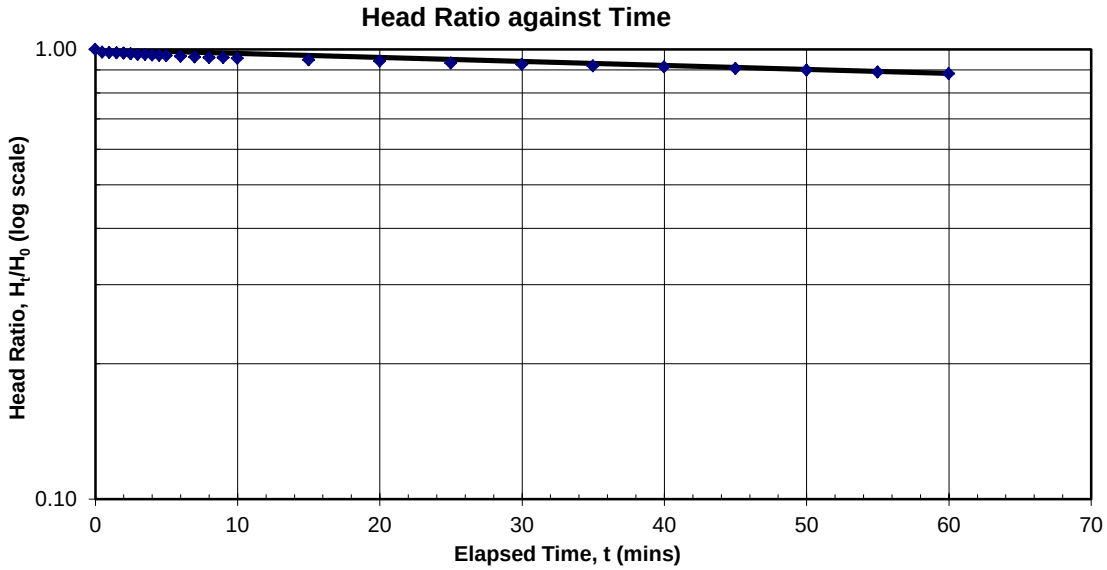
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 60.0 mins H_2/H_0= 0.883

Permeability (k) = 5.5E-09 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: PC Checked: TC Approved:	Notes:	Project Project No. Carried out for	HAVANT THICKET WINTER STORAGE A9031-19 Portsmouth Water	Test **ATK-CP-15T2**

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	1.30	m BGL
Base of response zone	2.50	m BGL
Diameter of borehole (D)	200	mm
Height of tubing above ground level (datum)	0.47	m
Diameter of standpipe tubing	50	mm

BOREHOLE No.	ATK-CP-16
TEST NUMBER	1
DATE OF TEST	29-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	200	mm
Length of response zone (L)	1200	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	3.41	m

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	1.04	0.20	1.00
0.5	0.98	0.14	0.70
1	0.95	0.11	0.55
1.5	0.94	0.10	0.50
2	0.93	0.09	0.45
2.5	0.92	0.08	0.40
3	0.91	0.07	0.35
3.5	0.90	0.06	0.30
4	0.90	0.06	0.30
4.5	0.90	0.06	0.30
5	0.89	0.05	0.25
6	0.89	0.05	0.25
7	0.89	0.05	0.25
8	0.88	0.04	0.20
9	0.88	0.04	0.20
10	0.87	0.03	0.15
15	0.86	0.02	0.10
20	0.85	0.01	0.05
25	0.84	0.00	0.00

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	0.37	m BGL
Groundwater level for analysis	0.37	m BGL
(Based on groundwater depth prior to test)		

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	0.20	m
Differential head at end of test, H_f	0.00	m
Time elapsed at end of test	25	mins
Proportion of test recovery	100	%

Coordinates of best fit line to data:

t_1 = 0.0 mins H_1/H_0 = 0.800

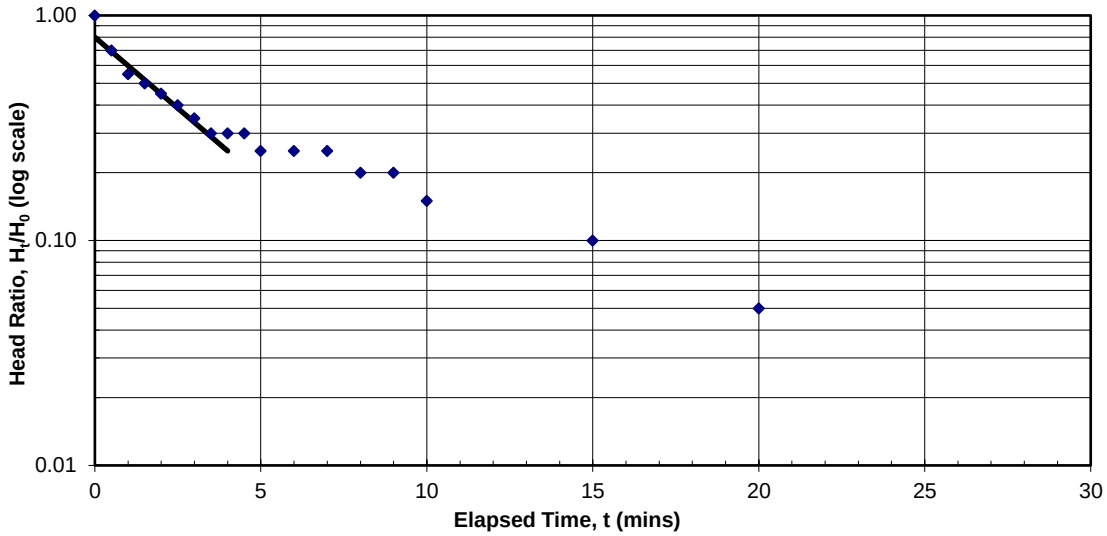
t_2 = 4.0 mins H_2/H_0= 0.250

Permeability (k) = 2.8E-06 m/sec

REMARKS

Permeability calculated over initial 4 minutes of recovery (approximately 70%).

Head Ratio against Time



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project HAVANT THICKET WINTER STORAGE

Project No. A9031-19

Carried out for Portsmouth Water

Test ATK-CP-16T1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Top of response zone	35.50	m BGL
Base of response zone	36.50	m BGL
Diameter of borehole (D)	146	mm
Height of tubing above ground level (datum)	0.44	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-RC-01
TEST NUMBER	1
DATE OF TEST	04-Feb-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	146	mm
Length of response zone (L)	1000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	2.71	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	20.33	m BGL
Groundwater level for analysis	20.33	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.04	20.73	1.00
0.5	0.30	20.47	0.99
1	0.51	20.26	0.98
1.5	0.70	20.07	0.97
2	0.82	19.95	0.96
2.5	0.98	19.79	0.95
3	1.14	19.63	0.95
3.5	1.26	19.51	0.94
4	1.38	19.39	0.94
4.5	1.52	19.25	0.93
5	1.65	19.12	0.92
6	1.78	18.99	0.92
7	2.08	18.69	0.90
8	2.31	18.46	0.89
9	2.45	18.32	0.88
10	2.61	18.16	0.88
15	3.25	17.52	0.85
20	3.68	17.09	0.82
25	3.94	16.83	0.81
30	4.11	16.66	0.80
35	4.24	16.53	0.80
40	4.33	16.44	0.79
45	4.39	16.38	0.79
50	4.42	16.35	0.79
55	4.44	16.33	0.79
60	4.46	16.31	0.79

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

Differential head at start of test, H_0	20.73	m
Differential head at end of test, H_f	16.31	m
Time elapsed at end of test	60	mins
Proportion of test recovery	21	%

Coordinates of best fit line to data:

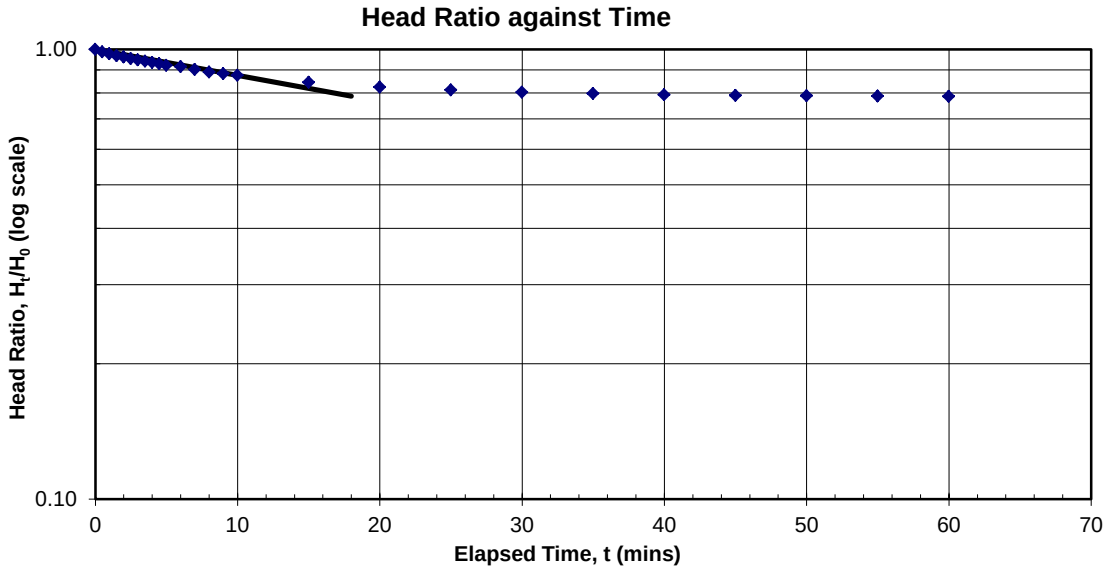
t_1 = 0.0 mins H_1/H_0 = 1.000

t_2 = 18.0 mins H_2/H_0= 0.787

Permeability (k) = 4.0E-08 m/sec

REMARKS

Test did not achieve 75% recovery, calculated permeability should be used with caution.



AGS

Testing: Checked: Approved:	Notes:	Project	HAVANT THICKET WINTER STORAGE	Test ATK-RC-01T1
		Project No.	A9031-19	
		Carried out for	Portsmouth Water	

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Top of response zone	68.90	m BGL
Base of response zone	72.00	m BGL
Diameter of borehole (D)	150	mm
Height of tubing above ground level (datum)	0.67	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-RC-02
TEST NUMBER	1
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	3100	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	5.96	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	20.95	m BGL
Groundwater level for analysis	20.96	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	11.49	10.14	1.00
0.5	12.76	8.87	0.87
1	15.52	6.11	0.60
1.5	17.86	3.77	0.37
2	18.91	2.72	0.27
2.5	19.47	2.16	0.21
3	19.88	1.75	0.17
3.5	20.18	1.45	0.14
4	20.27	1.36	0.13
4.5	20.30	1.33	0.13
5	20.34	1.29	0.13
6	20.22	1.41	0.14
7	20.12	1.51	0.15
8	20.02	1.61	0.16
9	19.86	1.77	0.17
10	19.64	1.99	0.20
15	18.70	2.93	0.29
20	17.88	3.75	0.37
25	16.85	4.78	0.47
30	16.35	5.28	0.52
35	15.60	6.03	0.59
40	14.77	6.86	0.68
45	14.07	7.56	0.75
50	13.21	8.42	0.83
55	12.46	9.17	0.90
60	11.87	9.76	0.96
70	11.17	10.46	1.03
80	10.54	11.09	1.09
90	10.07	11.56	1.14
100	9.77	11.86	1.17

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

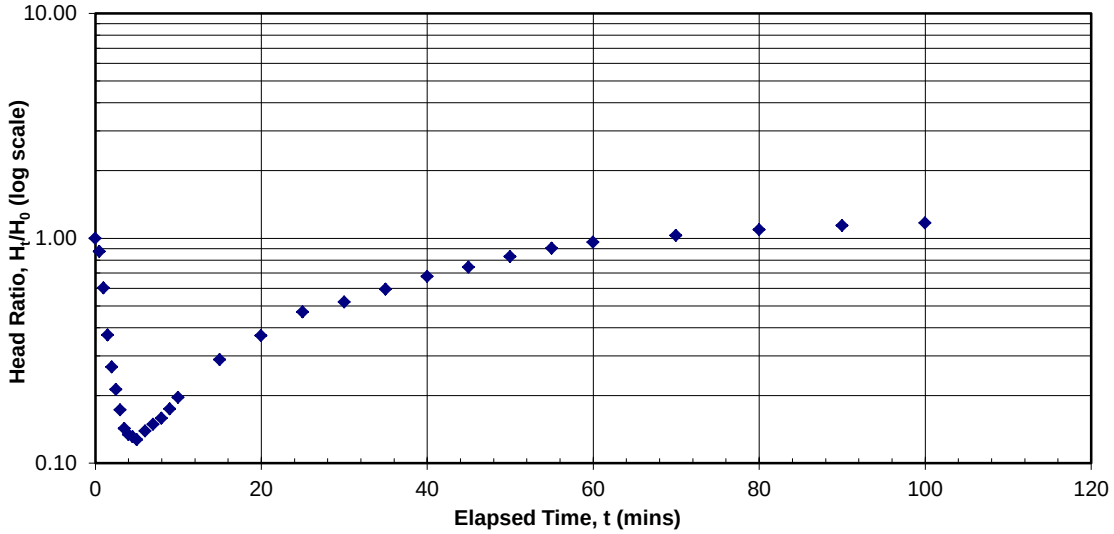
Differential head at start of test, H_0	10.14	m
Differential head at end of test, H_f	11.86	m
Time elapsed at end of test	100	mins
Proportion of test recovery	-17	%

Permeability (k) = m/sec

REMARKS

Unusual variation in water level during test, unable to calculate permeability. Water level initiallly fell close to pre-test level in about 5 minutes, then rose significantly.

Head Ratio against Time



AGS

Testing: PC
Checked: TC
Approved:

Notes:

Project HAVANT THICKET WINTER STORAGE
Project No. A9031-19
Carried out for Portsmouth Water

Test ATK-RC-02T1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Rising Head

DETAILS OF TEST ZONE:

Top of response zone	36.00	m BGL
Base of response zone	40.00	m BGL
Diameter of borehole (D)	150	mm
Height of tubing above ground level (datum)	0.74	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-RC-02A
TEST NUMBER	1
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	4000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	7.20	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	1.11	m BGL
Groundwater level for analysis	1.11	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	12.25	10.40	1.00
0.5	11.57	9.72	0.93
1	11.04	9.19	0.88
1.5	10.73	8.88	0.85
2	10.27	8.42	0.81
2.5	9.87	8.02	0.77
3	9.47	7.62	0.73
3.5	9.05	7.20	0.69
4	8.60	6.75	0.65
4.5	8.38	6.53	0.63
5	8.25	6.40	0.62
6	7.99	6.14	0.59
7	7.62	5.77	0.55
8	7.20	5.35	0.51
9	6.91	5.06	0.49
10	6.72	4.87	0.47
15	5.53	3.68	0.35
20	4.96	3.11	0.30
25	4.36	2.51	0.24
30	3.62	1.77	0.17
35	3.10	1.25	0.12
40	2.94	1.09	0.10
45	2.86	1.01	0.10
50	2.67	0.82	0.08
55	2.59	0.74	0.07
60	2.52	0.67	0.06

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

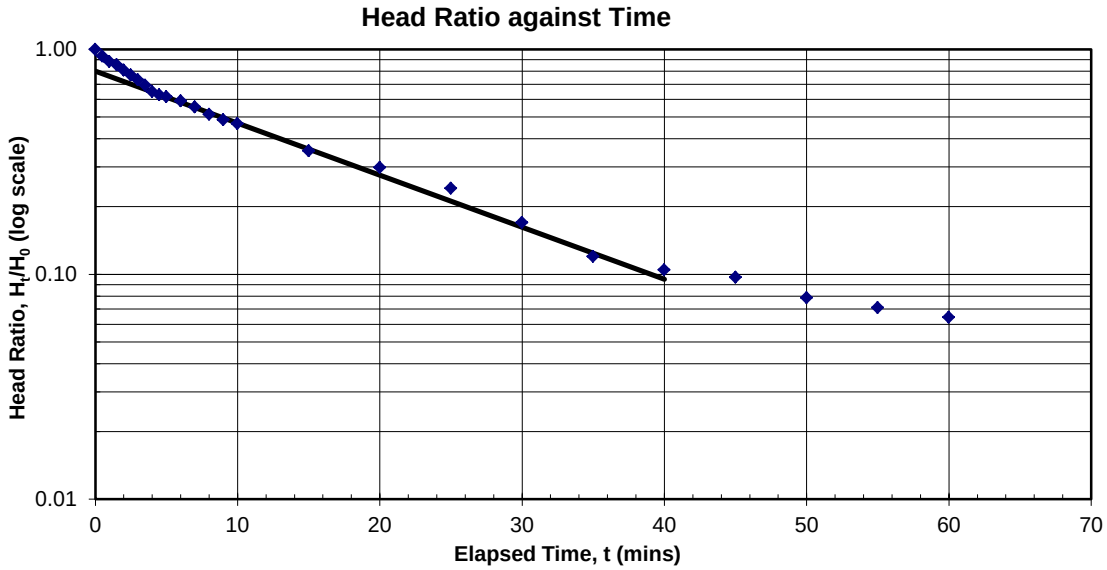
Differential head at start of test, H_0	10.40	m
Differential head at end of test, H_f	0.67	m
Time elapsed at end of test	60	mins
Proportion of test recovery	94	%

Coordinates of best fit line to data:

t_1 = 0.0 mins	H_1/H_0 = 0.800
t_2 = 40.0 mins	H_2/H_0= 0.095

Permeability (k) = 6.1E-08 m/sec

REMARKS



AGS

Testing: PC Checked: TC Approved:	Notes:	Project Project No. Carried out for	HAVANT THICKET WINTER STORAGE A9031-19 Portsmouth Water	Test ATK-RC-02AT1

Variable Head Permeability Test

SOCOTEC

LOCATION TYPE	Standpipe
TEST TYPE	Falling Head

DETAILS OF TEST ZONE:

Top of response zone	43.00	m BGL
Base of response zone	48.00	m BGL
Diameter of borehole (D)	150	mm
Height of tubing above ground level (datum)	0.75	m
Diameter of standpipe tubing	25	mm

BOREHOLE No.	ATK-RC-03
TEST NUMBER	1
DATE OF TEST	30-Jan-20

TEST ZONE CONDITIONS

Diameter of response zone (D)	150	mm
Length of response zone (L)	5000	mm
Standpipe piezometer		
Shape factor (F) after Hvorslev (1951)	8.53	m

GROUNDWATER CONDITIONS

Depth to groundwater prior to test	12.90	m BGL
Groundwater level for analysis	12.90	m BGL
(Based on groundwater depth prior to test)		

TEST DATA

Elapsed time, t (minutes)	Depth to water below datum (m)	Head, H_t (m)	Head Ratio H_t/H_0
0	0.29	13.36	1.00
0.5	0.50	13.15	0.98
1	0.68	12.97	0.97
1.5	0.79	12.86	0.96
2	0.88	12.77	0.96
2.5	0.95	12.70	0.95
3	1.00	12.65	0.95
3.5	1.05	12.60	0.94
4	1.06	12.59	0.94
4.5	1.08	12.57	0.94
5	1.09	12.56	0.94
6	1.09	12.56	0.94
7	1.09	12.56	0.94
8	1.09	12.56	0.94
9	1.09	12.56	0.94
10	1.09	12.56	0.94
15	1.09	12.56	0.94
20	1.10	12.55	0.94
25	1.10	12.55	0.94
30	1.10	12.55	0.94
35	1.10	12.55	0.94
40	1.10	12.55	0.94
45	1.10	12.55	0.94
50	1.10	12.55	0.94
55	1.10	12.55	0.94
60	1.10	12.55	0.94

CALCULATED VALUES

Permeability calculation based on BS EN ISO 22282-2 : 2012 Section B.4.2 (Hvorslev method - general approach)

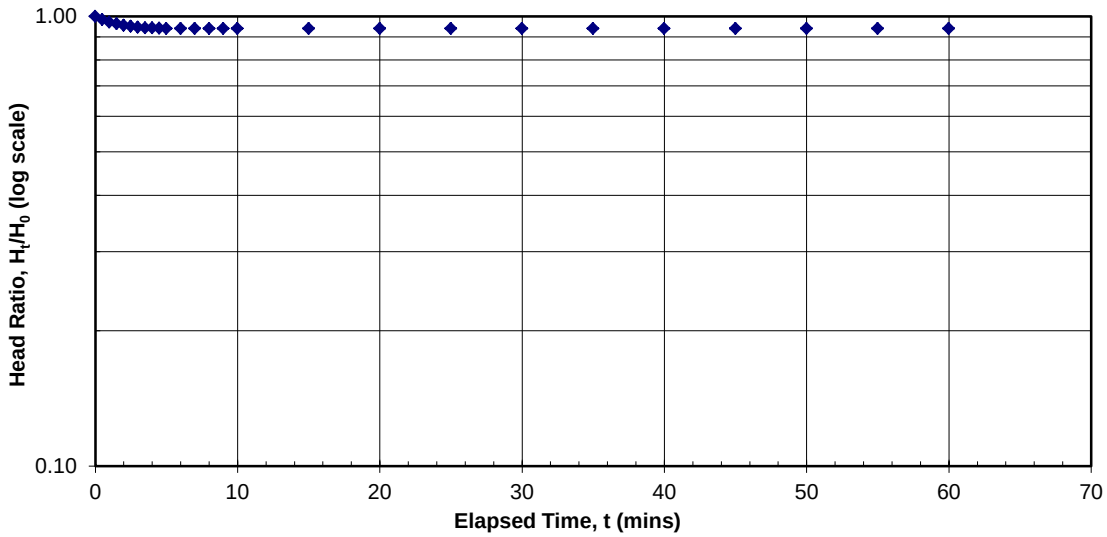
Differential head at start of test, H_0	13.36	m
Differential head at end of test, H_f	12.55	m
Time elapsed at end of test	60	mins
Proportion of test recovery	6	%

Permeability (k) = m/sec

REMARKS

Test has not achieved 75% recovery (6%), unable to calculate permeability.

Head Ratio against Time



AGS

Testing: PC Checked: TC Approved:	Notes:	**Project**	**HAVANT THICKET WINTER STORAGE**	**Test** **ATK-RC-03T1**
		Project No.	**A9031-19**	
		Carried out for	**Portsmouth Water**	

APPENDIX D

INSTRUMENTATION AND MONITORING

Monitoring Installation Details	Table D1
Groundwater Monitoring	Table D2
VWP Calculation and Report Sheets, with VWP Calibration Certificates	ATK-BH-01 (S), 346208 ATK-BH-01 (D), 346219 ATK-BH-02 (S), 346209 ATK-BH-02 (D), 346220 ATK-CP-11 (1), 346197

Groundwater Monitoring Installations Summary

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
ATK-BH-01 (S)	EPIE	10/12/2019	-	7.00	-	-	Raised cover	
ATK-BH-01 (D)	EPIE	10/12/2019	-	11.00	-	-		
ATK-BH-02 (S)	EPIE	16/12/2019	-	4.00	-	-	Raised cover	
ATK-BH-02 (D)	EPIE	16/12/2019	-	8.50	-	-		
ATK-CP-01 (1)	SPIE	12/11/2019	25	3.90	3.40 to 4.00	Cap	Raised cover	
ATK-CP-02 (1)	SPIE	14/11/2019	19	33.90	33.50 to 34.00	Cap	Raised cover	
ATK-CP-04 (1)	SPIE	19/11/2019	25	11.80	11.00 to 12.20	Cap	Raised cover	
ATK-CP-05 (1)	SPIE	21/11/2019	25	10.70	10.00 to 11.00	Cap	Raised cover	
ATK-CP-06 (1)	SP	04/12/2019	50	3.50	0.50 to 3.50	Cap	Raised cover	
ATK-CP-11 (1)	EPIE	17/12/2019	-	11.20	-	-	Raised cover	
ATK-CP-12 (1)	SPIE	20/11/2019	25	4.50	4.00 to 5.00	Cap	Raised cover	
ATK-CP-13A (1)	SPIE	25/11/2019	19	4.00	3.50 to 4.50	Cap	Raised cover	
ATK-CP-15 (1)	SPIE	04/12/2019	19	18.00	17.50 to 18.50	Cap	Raised cover	
ATK-CP-16 (1)	SP	18/12/2019	50	2.50	1.30 to 2.50	Cap	Raised cover	
ATK-RC-01 (1)	SPIE	10/12/2019	19	36.00	35.50 to 36.50	Cap	Raised cover	
ATK-RC-02 (1)	SPIE	11/12/2019	25	70.90	68.90 to 71.90	Cap	Embed cover	
ATK-RC-02A (1)	SPIE	18/12/2019	25	39.00	36.00 to 40.00	Cap	Raised cover	
ATK-RC-03 (1)	SPIE	18/12/2019	25	45.00	43.00 to 48.00	Cap	Raised cover	

Groundwater Monitoring

SOCOTEC

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Groundwater depth, mbgl	Groundwater level, mOD	Comments
ATK-CP-01 (1)	SPIE	3.90	03/12/2019 09:28:00	1.14	36.31	
			04/12/2019 11:15:00	1.15	36.30	
			09/12/2019 14:25:00	1.12	36.33	
			09/01/2020 13:20:00	0.98	36.47	
			14/01/2020 11:45:00	1.30	36.15	GW sample recovered
			28/01/2020 14:00:00	1.14	36.31	
			29/01/2020 10:14:00	2.45	35.00	GW sample recovered
			11/02/2020 16:32:00	1.31	36.14	GW sample recovered
ATK-CP-02 (1)	SPIE	33.90	20/11/2019 00:00:00	5.67	24.36	
			03/12/2019 09:00:00	5.95	24.08	
			04/12/2019 11:30:00	5.95	24.08	
			09/12/2019 13:30:00	4.60	25.43	
			11/12/2019 00:00:00	4.04	25.99	
			08/01/2020 14:55:00	0.05	29.98	
			14/01/2020 00:00:00	4.44	25.59	
			30/01/2020 10:02:00	4.63	25.40	
			12/02/2020 10:19:00	2.56	27.47	
ATK-CP-04 (1)	SPIE	11.80	03/12/2019 10:45:00	-0.20	25.10	Artesian
			04/12/2019 10:45:00	-0.18	25.08	Artesian
			09/12/2019 13:45:00	-0.20	25.10	Artesian
			08/01/2020 16:17:00	-0.23	25.13	Artesian
			09/01/2020 09:30:00	-0.20	25.10	Artesian
			14/01/2020 00:00:00	-0.38	25.28	Artesian
			28/01/2020 16:15:00	-0.48	25.38	Artesian
			29/01/2020 10:40:00	-0.48	25.38	Artesian
			11/02/2020 11:05:00	-0.48	25.38	Artesian
ATK-CP-05 (1)	SPIE	10.70	03/12/2019 10:30:00	2.24	25.67	
			04/12/2019 10:30:00	2.24	25.67	
			09/12/2019 13:55:00	2.13	25.78	
			09/01/2020 10:28:00	2.28	25.63	
			14/01/2020 10:15:00	2.20	25.71	GW sample recovered
			29/01/2020 11:30:00	2.20	25.71	GW sample recovered
			11/02/2020 13:32:00	2.18	25.73	GW sample recovered
ATK-CP-06 (1)	SP	3.50	11/12/2019 00:00:00	0.70	34.03	
			10/01/2020 08:50:00	0.70	34.03	
			14/01/2020 13:00:00	0.73	34.00	GW sample recovered
			30/01/2020 16:10:00	0.81	33.92	GW sample recovered
			11/02/2020 17:52:00	0.81	33.92	GW sample recovered
ATK-CP-12 (1)	SPIE	4.50	03/12/2019 09:50:00	-0.05	26.95	Artesian
			04/12/2019 09:50:00	0.00	26.90	
			09/12/2019 14:15:00	0.00	26.90	
			09/01/2020 11:49:00	0.05	26.85	
			14/01/2020 11:15:00	0.18	26.72	GW sample recovered
			28/01/2020 15:32:00	0.19	26.71	
			29/01/2020 16:45:00	0.16	26.74	GW sample recovered
			11/02/2020 15:15:00	0.19	26.71	GW sample recovered

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

AGS

Project HAVANT THICKET WINTER STORAGE

Project No. A9031-19

Carried out for Portsmouth Water

D2

Groundwater Monitoring

SOCOTEC

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Groundwater depth, mbgl	Groundwater level, mOD	Comments
ATK-CP-13A (1)	SPIE	4.00	03/12/2019 10:10:00	-0.05	29.80	Artesian
			04/12/2019 10:10:00	0.54	29.21	
			09/12/2019 14:00:00	0.75	29.00	
			09/01/2020 11:12:00	0.50	29.25	
			14/01/2020 00:00:00	0.51	29.24	
			29/01/2020 13:00:00	0.54	29.21	
			12/02/2020 10:50:00	0.57	29.18	
ATK-CP-15 (1)	SPIE	18.00	09/01/2020 12:30:00	3.09	30.36	
			14/01/2020 00:00:00	3.02	30.43	
			30/01/2020 08:22:00	2.94	30.51	
			11/02/2020 11:57:00	2.97	30.48	
ATK-CP-16 (1)	SP	2.50	10/01/2020 10:30:00	0.22	37.48	
			14/01/2020 00:00:00	0.30	37.40	
			29/01/2020 14:30:00	0.37	37.33	
			11/02/2020 12:20:00	0.46	37.24	
ATK-RC-01 (1)	SPIE	36.00	11/12/2019 00:00:00	33.02	7.51	
			10/01/2020 09:50:00	27.00	13.53	
			14/01/2020 00:00:00	23.21	17.32	
			29/01/2020 15:30:00	25.50	15.03	
			04/02/2020 00:00:00	20.33	20.20	
			11/02/2020 12:31:00	7.23	33.30	
ATK-RC-02 (1)	SPIE	70.90	08/01/2020 13:27:00	22.10	17.77	
			09/01/2020 13:56:00	18.60	21.27	
			14/01/2020 00:00:00	19.46	20.41	
			30/01/2020 11:15:00	20.95	18.92	
			12/02/2020 09:50:00	22.36	17.51	
ATK-RC-02A (1)	SPIE	39.00	08/01/2020 12:55:00	1.52	38.33	
			14/01/2020 00:00:00	1.35	38.50	
			30/01/2020 11:30:00	1.11	38.74	
			12/02/2020 09:17:00	1.36	38.49	
ATK-RC-03 (1)	SPIE	45.00	09/01/2020 15:50:00	12.60	18.92	
			14/01/2020 00:00:00	12.82	18.70	
			30/01/2020 15:10:00	12.90	18.62	
			12/02/2020 14:35:00	6.55	24.97	

VWP CALCULATION AND REPORT SHEET

SOCOTEC

Contract No.:	Contract:	Carried out for:
A9031-19	**HAVANT THICKET WINTER STORAGE RESERVOIR**	**Portsmouth Water**

Borehole installation details

Instrument ref.	ATK-BH-01 (S)	Ground level, mOD	25.73
Date installed.	10-Dec-19	Installation depth, mbgl	7.00
Data logger ref.			

VWP details

Make	Geosense	Model	VWP-3200
Serial No	346208	Calibration Factor in kPa	0.059474595
			Linear (G) kPa/digit

Zero reading

Date	06-Dec-19
Time	09:51
Remark	

Period	Linear
	10071.9

Calibration

Gauge factor	Units
60.78303609	mH2O

Date / Time	Reading		Calculated pressure, mH2O	Groundwater depth, mbgl	Groundwater level, mOD
	Period	Linear			
Calibration zero		10089.1	-0.10		
In borehole		10042.2	0.18	6.82	18.91
After grouting		10019.4	0.32	6.68	19.05
28/01/2020		9082.7	6.01	0.99	24.74
11/02/2020 16:05		9084.2	6.00	1.00	24.73
11/02/2020 16:06		9084.8	6.00	1.00	24.73

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	8
DATE :	Dec-18
SIG.	GC

LOW PRESSURE VW PIEZOMETER LAE CALIBRATION

Model	VWP-3200	Cal date	28/10/2019	SN.	8233
Serial	346208	Baro	1014.0	Readout No.	2108
Works ID	G7 11 74	Temp °C	20	R/O Cal. date	03/06/2019

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1st Cycle	2nd Cycle	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	10071.9	10071.0	10071.4	0.15	0.00	0.09%	0.00%
5.004	34.500	9494.8	9493.8	9494.3	34.48	34.51	-0.01%	0.00%
10.007	69.000	8916.2	8915.4	8915.8	68.88	69.00	-0.07%	0.00%
15.011	103.500	8336.3	8335.5	8335.9	103.37	103.50	-0.07%	0.00%
20.015	138.000	7754.6	7754.1	7754.3	137.96	137.99	-0.02%	0.00%
25.018	172.500	7171.1	7170.7	7170.9	172.66	172.51	0.09%	0.00%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 8th May 2019. Certificate of Calibration No 61189, Chamois Metrology UKAS No 0822

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.059474595	-0.008626	-0.006065

Polynomial factors

	kPa	psi	mH_2O
A	-1.38506E-07	-2.00878E-08	-1.4124E-08
B	-0.057086409	-0.008279	-0.005821
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.16084251	0.023327413	0.016401

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading²) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

THIS CERTIFICATE IS VALID ONLY WHEN CARRYING THE OFFICIAL ORIGINAL STAMP OF GEOSENSE BELOW

VWP CALCULATION AND REPORT SHEET

SOCOTEC

Contract No.:	Contract:	Carried out for:
A9031-19	**HAVANT THICKET WINTER STORAGE RESERVOIR**	**Portsmouth Water**

Borehole installation details

Instrument ref.	ATK-BH-01 (D)	Ground level, mOD	25.73
Date installed.	10-Dec-19	Installation depth, mbgl	11.00
Data logger ref.			

VWP details

Make	Geosense	Model	VWP-3200
Serial No	346219	Calibration Factor in kPa	0.055092182
			Linear (G) kPa/digit

Zero reading

Date	06-Dec-19
Time	10:00
Remark	

Period	Linear
	9622.6

Calibration

Gauge factor	Units
56.30421	mH2O

Date / Time	Reading		Calculated pressure, mH2O	Groundwater depth, mbgl	Groundwater level, mOD
	Period	Linear			
Calibration zero		9650.5	-0.16		
In borehole		9595.3	0.15	10.85	14.88
After grouting		9526.0	0.54	10.46	15.27
28/01/2020		7914.0	9.62	1.38	24.35
11/02/2020 16:15		7905.7	9.67	1.33	24.40
11/02/2020 16:16		7904.5	9.67	1.33	24.40

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	8
DATE :	Dec-18
SIG.	GC

LOW PRESSURE VW PIEZOMETER LAE CALIBRATION

Model	VWP-3200	Cal date	28/10/2019	SN.	8233
Serial	346219	Baro	1014.0	Readout No.	2108
Works ID	G7 11 85	Temp °C	20	R/O Cal. date	03/06/2019

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1st Cycle	2nd Cycle	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9622.6	9620.0	9621.3	0.27	0.00	0.16%	0.00%
5.004	34.500	9002.2	8999.9	9001.0	34.44	34.50	-0.03%	0.00%
10.007	69.000	8378.8	8376.6	8377.7	68.78	69.00	-0.13%	0.00%
15.011	103.500	7752.4	7750.8	7751.6	103.28	103.50	-0.13%	0.00%
20.015	138.000	7122.9	7121.5	7122.2	137.95	138.01	-0.03%	0.01%
25.018	172.500	6490.8	6489.8	6490.3	172.77	172.50	0.15%	0.00%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 8th May 2019. Certificate of Calibration No 61189, Chamois Metrology UKAS No 0822

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.055092182	-0.007990	-0.005618

Polynomial factors

	kPa	psi	mH_2O
A	-2.07396E-07	-3.00791E-08	-2.1148E-08
B	-0.051750632	-0.007506	-0.005277
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.26021356	0.037739458	0.026534

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading²) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

THIS CERTIFICATE IS VALID ONLY WHEN CARRYING THE OFFICIAL ORIGINAL STAMP OF GEOSENSE BELOW

VWP CALCULATION AND REPORT SHEET

SOCOTEC

Contract No.:	Contract:	Carried out for:
A9031-19	**HAVANT THICKET WINTER STORAGE RESERVOIR**	**Portsmouth Water**

Borehole installation details

Instrument ref.	ATK-BH-02 (S)	Ground level, mOD	21.45
Date installed.	16-Dec-19	Installation depth, mbgl	4.50
Data logger ref.			

VWP details

Make	Geosense	Model	VWP-3200
Serial No	346209	Calibration Factor in kPa	0.055535676
			Linear (G) kPa/digit

Zero reading

Date	06-Dec-19
Time	09:41
Remark	

Period	Linear
	10493.6

Calibration

Gauge factor	Units
56.75746087	mH2O

Date / Time	Reading		Calculated pressure, mH2O	Groundwater depth, mbgl	Groundwater level, mOD
	Period	Linear			
Calibration zero		10515.5	-0.12		
In borehole		10482.3	0.06	4.44	17.01
After grouting		9661.1	4.73	-0.23	21.68
28/01/2020		9708.0	4.46	0.04	21.41
11/02/2020 14:34		9715.7	4.42	0.08	21.37
11/02/2020 14:35		9716.9	4.41	0.09	21.36
11/02/2020 14:36		9716.9	4.41	0.09	21.36
11/02/2020 14:37		9716.9	4.41	0.09	21.36

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	8
DATE :	Dec-18
SIG.	GC

LOW PRESSURE VW PIEZOMETER LAE CALIBRATION

Model	VWP-3200	Cal date	28/10/2019	SN.	8233
Serial	346209	Baro	1014.0	Readout No.	2108
Works ID	G7 11 75	Temp °C	20	R/O Cal. date	03/06/2019

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1st Cycle	2nd Cycle	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	10494.1	10493.1	10493.6	0.20	0.00	0.11%	0.00%
5.004	34.500	9877.1	9875.8	9876.5	34.47	34.51	-0.02%	0.00%
10.007	69.000	9258.1	9256.9	9257.5	68.84	69.00	-0.09%	0.00%
15.011	103.500	8636.9	8635.9	8636.4	103.33	103.50	-0.10%	0.00%
20.015	138.000	8013.5	8012.6	8013.0	137.95	138.00	-0.03%	0.00%
25.018	172.500	7387.7	7386.9	7387.3	172.70	172.50	0.12%	0.00%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 8th May 2019. Certificate of Calibration No 61189, Chamois Metrology UKAS No 0822

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.055535676	-0.008054	-0.005663

Polynomial factors

	kPa	psi	mH_2O
A	-1.55812E-07	-2.25979E-08	-1.5888E-08
B	-0.052749569	-0.007650	-0.005379
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.173058225	0.02509909	0.017647

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading²) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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VWP CALCULATION AND REPORT SHEET

SOCOTEC

Contract No.:	Contract:	Carried out for:
A9031-19	**HAVANT THICKET WINTER STORAGE RESERVOIR**	**Portsmouth Water**

Borehole installation details

Instrument ref.	ATK-BH-02 (D)	Ground level, mOD	21.45
Date installed.	16-Dec-19	Installation depth, mbgl	8.50
Data logger ref.			

VWP details

Make	Geosense	Model	VWP-3200
Serial No	346220	Calibration Factor in kPa	0.05022757
			Linear (G) kPa/digit

Zero reading

Date	06-Dec-19
Time	09:41
Remark	

Period	Linear
	10623.6

Calibration

Gauge factor	Units
51.33257654	mH2O

Date / Time	Reading		Calculated pressure, mH2O	Groundwater depth, mbgl	Groundwater level, mOD
	Period	Linear			
Calibration zero		10641.5	-0.09		
In borehole		10314.7	1.59	6.91	14.54
After grouting		10233.9	2.00	6.50	14.95
28/01/2020		8894.5	8.88	-0.38	21.83
11/02/2020 14:51		8864.9	9.03	-0.53	21.98
11/02/2020 14:52		8866.1	9.02	-0.52	21.97
11/02/2020 14:53		8864.9	9.03	-0.53	21.98

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	8
DATE :	Dec-18
SIG.	GC

LOW PRESSURE VW PIEZOMETER LAE CALIBRATION

Model	VWP-3200	Cal date	28/10/2019	SN.	8233
Serial	346220	Baro	1014.0	Readout No.	2108
Works ID	G7 11 86	Temp °C	20	R/O Cal. date	03/06/2019

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1st Cycle	2nd Cycle	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	10624.3	10622.8	10623.6	0.33	0.00	0.19%	0.00%
5.004	34.500	9945.4	9943.8	9944.6	34.44	34.50	-0.04%	0.00%
10.007	69.000	9262.6	9261.2	9261.9	68.72	68.99	-0.16%	-0.01%
15.011	103.500	8575.3	8574.2	8574.8	103.24	103.51	-0.15%	0.00%
20.015	138.000	7884.5	7883.6	7884.0	137.93	138.00	-0.04%	0.00%
25.018	172.500	7189.7	7188.9	7189.3	172.83	172.50	0.19%	0.00%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 8th May 2019. Certificate of Calibration No 61189, Chamois Metrology UKAS No 0822

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.05022757	-0.007285	-0.005122

Polynomial factors

	kPa	psi	mH_2O
A	-2.11085E-07	-3.06142E-08	-2.1525E-08
B	-0.046467445	-0.006739	-0.004738
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.171598773	0.024887422	0.017498

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading²) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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VWP CALCULATION AND REPORT SHEET

SOCOTEC

Contract No.:	Contract:	Carried out for:
A9031-19	**HAVANT THICKET WINTER STORAGE RESERVOIR**	**Portsmouth Water**

Borehole installation details

Instrument ref.	ATK-CP-11 (1)	Ground level, mOD	26.15
Date installed.	18-Dec-19	Installation depth, mbgl	11.00
Data logger ref.			

VWP details

Make	Geosense	Model	VWP-3200
Serial No	346197	Calibration Factor in kPa	0.049154584
			Linear (G) kPa/digit

Zero reading

Date	16-Dec-19
Time	13:29
Remark	

Period	Linear
	9848.1

Calibration

Gauge factor	Units
50.23598485	mH2O

Date / Time	Reading		Calculated pressure, mH2O	Groundwater depth, mbgl	Groundwater level, mOD
	Period	Linear			
Calibration zero		9837.5	0.05		
In borehole		8873.0	4.90	6.10	20.05
After grouting		8861.4	4.96	6.04	20.11
28/01/2020		7628.4	11.15	-0.15	26.30
28/01/2020 15:23		7627.5	11.16	-0.16	26.31
28/01/2020 15:24		7627.0	11.16	-0.16	26.31
28/01/2020 15:25		7627.0	11.16	-0.16	26.31

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	8
DATE :	Dec-18
SIG.	GC

LOW PRESSURE VW PIEZOMETER LAE CALIBRATION

Model	VWP-3200	Cal date	28/10/2019	SN.	8233
Serial	346197	Baro	1014.0	Readout No.	2108
Works ID	G7 11 63	Temp °C	20	R/O Cal. date	03/06/2019

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1st Cycle	2nd Cycle	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9850.1	9846.0	9848.1	0.31	0.00	0.18%	0.00%
5.004	34.500	9155.6	9151.5	9153.6	34.45	34.51	-0.03%	0.01%
10.007	69.000	8457.8	8454.0	8455.9	68.74	68.99	-0.15%	0.00%
15.011	103.500	7755.6	7752.6	7754.1	103.24	103.49	-0.15%	0.00%
20.015	138.000	7049.4	7046.8	7048.1	137.94	138.01	-0.03%	0.00%
25.018	172.500	6339.7	6337.7	6338.7	172.81	172.50	0.18%	0.00%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 8th May 2019. Certificate of Calibration No 61189, Chamois Metrology UKAS No 0822

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.049154584	-0.007129	-0.005012

Polynomial factors

	kPa	psi	mH_2O
A	-1.91981E-07	-2.78435E-08	-1.9577E-08
B	-0.046046961	-0.006678	-0.004695
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.451714903	0.065513402	0.046062

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading²) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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APPENDIX E

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX (6 sheets)
Particle Size Distribution Analyses	PSD (71 sheets)
Determination of Shrinkage Characteristics – Summary of Results	LINS (1 sheet)
Dry Density / Moisture Content Relationship (Light Compaction - 2.5 kg rammer)	COMPL (52 sheets)
Dry Density / Moisture Content Relationship (Heavy Compaction - 4.5 kg rammer)	COMPH (8 sheets)
Moisture Condition Value (MCV) Test	MCV (41 sheets)
Moisture Condition Value (MCV) / Moisture Content	MCVREL (60 sheets)
Shear Strength by Pilcon Hand method – Summary of Results	HV (13 sheets)
Unconsolidated Undrained Triaxial Compression Tests – Summary of Results	UUSUM (2 sheets)
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure	CU (33 sheets)
One Dimensional Consolidation Test	OED (15 sheets)
Determination of Permeability in a Triaxial Cell	TXLP (9 sheets)
Small Shear Box	SSB (20 sheets)
Determination of Residual Shear Strength using Ring Shear Apparatus	RS (8 sheets)
Determination of Dispersibility - Pinhole Method	24 Reports
Test Report – Chemical Tests	EFS/205161 to EFS/201167

INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
						Mg/m3		%	%	%	%		Mg/m3	
ATK-BH-01	5	0.50	1.00	B	Brown slightly sandy slightly gravelly CLAY.			26.9*						
ATK-BH-01	6	1.00		UT	Brown slightly sandy CLAY			23.7*	100 n	69 a	31	38		
ATK-BH-01	8	1.50		UT	Brown slightly sandy CLAY			33.2*	100 n	73 a	33	40		
ATK-BH-01	10	2.00		UT	Brown slightly sandy CLAY			44.8*	100 n	72 a	27	45		
ATK-BH-01	16	3.50		UT	Brown slightly sandy CLAY			26.7*	100 n	76 a	30	46		
ATK-BH-01	18	4.10		UT	Brown slightly sandy CLAY			32.2*	100 n	75 a	30	45		
ATK-BH-01	20	4.70		UT	Brown slightly sandy CLAY			46.3*	100 s	77 a	31	46		
ATK-BH-01	22	5.30		UT	Brown slightly sandy CLAY			27.4*	100 n	65 a	30	35		
ATK-BH-01	24	5.90		UT	Dark brown slightly sandy CLAY			26.6*	100 n	70 a	30	40		
ATK-BH-01	26	6.50		UT	Brown slightly sandy CLAY			29.9*	100 n	69 a	26	43		
ATK-BH-01	27	7.00		UT	Brown slightly sandy CLAY			36.3*	100 n	71 a	28	43		
ATK-BH-02	3	0.50	0.80	B	Brown slightly sandy CLAY.			43.0*	99 n	72 a	33	39		
ATK-BH-02	5	1.20		UT	Grey brown slightly sandy slightly gravelly CLAY			27.5*	93 s	60 a	24	36		
ATK-BH-02	7	1.80		UT	Brown slightly gravelly slightly sandy CLAY			22.9*	88 s	69 a	26	43		
ATK-BH-02	8	2.30		UT	Light brown slightly sandy gravelly CLAY			22.8*	60 s	67 a	26	41		
ATK-BH-02	9	2.80		UT	Brown slightly sandy CLAY			31.4*	100 s	75 a	30	45		
ATK-BH-02	11	3.40		UT	Brown slightly sandy CLAY			33.5*	100 n	79 a	34	45		
ATK-BH-02	17	5.10		UT	Brown slightly sandy CLAY.			27.5*	100 n	73 a	28	45		
ATK-BH-02	19	5.70		UT	Dark grey slightly sandy CLAY			30.1*	100 n	68 a	32	36		
ATK-BH-02	21	6.20		UT	Dark grey slightly sandy CLAY			29.2*	100 n	73 a	29	44		
ATK-CP-01	3	0.50		D	Brown slightly sandy CLAY			24.3*	100 n	53 a	24	29		
ATK-CP-01	7	1.20	1.65	D	Brown very sandy very silty CLAY			27.3*	100 s	47 b	22	25		
ATK-CP-01	11	2.00		UT	Firm yellowish brown slightly sandy silty CLAY.			29.5*	100 n	50 a	23	27		
ATK-CP-01	12	2.50		D	Brown slightly gravelly very sandy silty CLAY.			27.9*						
ATK-CP-01	15	3.00		D	Brown very sandy silty CLAY			35.8*	100 n	51 a	28	23		
ATK-CP-01	19	4.00		UT	Stiff greyish brown slightly sandy silty CLAY.			23.6*	100 n	57 a	26	31		
ATK-CP-01	26	6.00		UT	Firm greyish brown slightly sandy silty CLAY			22.7*	100 n	53 a	25	28		
ATK-CP-01	34	8.00		UT	Stiff friable greyish brown slightly sandy silty CLAY.			22.6*	100 n	62 a	26	36		
ATK-CP-01	53	13.00		UT	Stiff thinly laminated greyish brown slightly sandy CLAY.			25.1*	100 n	67 a	27	40		
ATK-CP-01	65	16.00		UT	Very stiff thinly laminated greyish brown slightly sandy CLAY.			26.5*	100 n	79 a	32	47		
ATK-CP-02	15	4.50	5.00	D	Brown sandy CLAY			36.6*	100 n	39 a	21	18		

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

Key : p bulk density, linear
pd dry density
w moisture content
* test carried out to BS EN ISO 17892

WL Liquid limit
a 4 point cone test
b 1 point cone test

WP Plastic limit
NP non - plastic
IP Plasticity Index

<425um preparation
n from natural soil
s sieved specimen
h removed by hand

ps particle density
-g = gas jar
-p = small pyknometer

QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

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INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
						Mg/m3		%	%	%	%		Mg/m3	
ATK-CP-02	16	5.00	5.45	D	Dark grey brown slightly sandy CLAY			27.6*	100 n	44 a	19	25		
ATK-CP-02	19	6.00	6.45	D	Dark grey brown slightly sandy CLAY			27.3*	100 n	46 a	19	27		
ATK-CP-02	22	7.00	7.45	UT	Soft brown slightly sandy silty CLAY			24.4*	100 n	47 a	23	24		
ATK-CP-02	29	9.00	9.45	UT	Stiff greyish brown slightly sandy silty CLAY.			23.6*	100 n	49 a	25	24		
ATK-CP-02	37	11.50	11.95	UT	Stiff friable greyish brown slightly sandy silty CLAY.			21.8*	100 n	46 a	22	24		
ATK-CP-02	47	14.50	14.95	UT	Firm brown laminated slightly sandy CLAY			24.8*	100 n	62 a	28	34		
ATK-CP-02	57	17.50	17.95	UT	Firm to stiff brownish grey slightly sandy CLAY.			26.7*	100 n	65 a	25	40		
ATK-CP-03	7	1.20		UT	Firm to stiff brown slightly sandy slightly gravelly CLAY.			28.8*	100 n	69 a	26	43		
ATK-CP-03	15	3.00	3.45	UT	Very stiff brown slightly sandy CLAY.			33.1*	100 n	75 a	32	43		
ATK-CP-03	22	5.00	5.45	UT	Firm greyish brown slightly sandy CLAY.			29.8*	100 n	71 a	28	43		
ATK-CP-03	30	7.00	7.45	UT	Firm brown slightly sandy CLAY.			30.1*	100 n	72 a	28	44		
ATK-CP-04	5	1.00		D	Brown mottled grey slightly sandy silty CLAY			41.2*	100 n	81 a	31	50		
ATK-CP-04	11	2.00		UT	Firm brown slighlty sandy CLAY.			32.1*	100 n	73 a	29	44		
ATK-CP-04	13	2.50	3.00	B	Brown slightly sandy CLAY.			31.2*						
ATK-CP-04	19	4.00		UT	Firm laminated brown silty CLAY			29.3*	100 n	71 a	28	43		
ATK-CP-04	26	6.00		UT	Firm to stiff greyish brown slightly sandy silty CLAY.			25.4*	100 n	55 a	22	33		
ATK-CP-04	34	8.00		UT	Stiff laminated brown silty CLAY.			25.4*	100 n	68 a	31	37		
ATK-CP-04	42	10.00		UT	Firm to stiff greyish brown slightly sandy CLAY.			24.1*	100 n	60 a	24	36		
ATK-CP-05	5	1.00		D	Brown mottled grey slightly sandy silty CLAY			36.4*	100 n	80 a	31	49		
ATK-CP-05	11	2.00		UT	Firm to stiff greyish brown mottled orangish brown slightly sandy CLAY.			32.5*	100 n	72 a	30	42		
ATK-CP-05	19	4.00		UT	Stiff brown slightly sandy silty CLAY			27.9*	100 n	64 a	26	38		
ATK-CP-05	26	6.00		UT	Firm to stiff greyish brown slightly sandy silty CLAY.			22.6*	100 n	55 a	23	32		
ATK-CP-05	34	8.00		UT	Stiff brown slightly sandy silty CLAY			24.0*	100 n	63 a	26	37		
ATK-CP-05	45	11.50		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			14.3*	100 n	45 a	17	28		
ATK-CP-05	55	14.50		UT	Firm to stiff light brownish grey mottled reddish brown slightly sandy silty CLAY.			17.4*	100 n	52 a	21	31		
ATK-CP-05	65	17.50		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			14.9*	100 n	45 a	20	25		
ATK-CP-06	9	1.20	1.65	D	Grey reddish brown slightly sandy GRAVEL			6.2*		b	NP			
ATK-CP-06	15	3.00	3.45	D	Dark brown slightly gravelly slightly sandy CLAY			21.1*	87 s	38 b	17	21		
ATK-CP-06	20	4.00	4.45	UT	Firm red and grey mottled slightly sandy CLAY			26.0*	100 n	57 a	23	34		
ATK-CP-06	27	6.00	6.45	UT	Firm multicoloured slightly sandy CLAY.			19.8*	100 n	55 a	21	34		
ATK-CP-06	34	8.00	8.45	UT	Stiff multicoloured slightly sandy CLAY.			13.7*	100 n	46 a	17	29		

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

Key : p bulk density, linear; *pd* dry density; *w* moisture content; * test carried out to BS EN ISO 17892

WL Liquid limit; a 4 point cone test; b 1 point cone test

WP Plastic limit; NP non - plastic; IP Plasticity Index

<425um preparation: n from natural soil; s sieved specimen; h removed by hand

ps particle density; -g = gas jar; -p = small pyknometer

QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

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INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
						Mg/m3		%	%	%	%		Mg/m3	
ATK-CP-06	41	10.00	10.45	UT	Firm to stiff reddish brown mottled grey slightly sandy CLAY.			19.1*	100 n	43 a	20	23		
ATK-CP-06	51	13.00	13.40	UT	Stiff reddish brown mottled grey slightly sandy CLAY.			15.8*	100 n	44 a	21	23		
ATK-CP-07	7	2.00	2.45	UT	Brown slightly sandy CLAY.			29.4*						
ATK-CP-07A	3	1.20	1.65	D	Reddish brown slightly sandy gravelly CLAY.			26.6*						
ATK-CP-07A	5	1.50	2.00	D	Light brown slightly sandy CLAY			43.2*	100 n	49 a	22	27		
ATK-CP-07A	12	3.50	4.00	D	Grey and reddish brown slightly sandy slightly gravelly CLAY.			19.5*						
ATK-CP-07A	13	4.00	4.45	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			19.3*	100 n	51 a	22	29		
ATK-CP-07A	21	6.00	6.40	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			11.6*	100 n	35 a	15	20		
ATK-CP-07A	22	6.40	6.40	D	Grey and reddish brown slightly sandy CLAY.			10.9*						
ATK-CP-07A	28	8.00	8.35	UT	Very stiff grey mottled reddish brown slightly sandy CLAY.			17.9*	100 n	57 a	22	35		
ATK-CP-07A	34	9.50	10.00	D	Reddish brown slightly sandy CLAY			21.1*	100 n	47 a	19	28		
ATK-CP-07A	35	10.00	10.35	UT	Very stiff reddish brown mottled grey and brown slightly sandy CLAY.			15.7*	100 n	51 a	20	31		
ATK-CP-08	9	2.20	2.65	UT	Firm brown slightly sandy silty CLAY.			25.5*	100 n	45 a	22	23		
ATK-CP-08	10	2.65		D	Red brown grey slightly sandy slightly gravelly CLAY			21.0*	91 s	50 a	22	28		
ATK-CP-08	15	4.20	4.65	UT	Very stiff reddish brown slightly sandy CLAY.			20.0*	100 n	58 a	24	34	2.79-p	
ATK-CP-08	26	7.65		D	Reddish grey slightly sandy CLAY			19.4*	100 n	54 a	24	30		
ATK-CP-09	4	0.80		D	Brown slightly gravelly sandy silty CLAY			34.1*	88 n	37 a	26	11		
ATK-CP-09	14	3.50		D	Grey reddish brown slightly sandy CLAY			19.2*	100 n	43 a	19	24		
ATK-CP-09	16	4.20	4.65	UT	Stiff reddish brown mottled grey slightly sandy CLAY.			19.9*	100 n	56 a	23	33		
ATK-CP-09	27	7.65		D	Reddish grey slightly sandy CLAY			21.4*	100 n	61 a	25	36		
ATK-CP-10	5	1.20	1.65	UT	Brown slightly sandy CLAY.			32.2*	100 n	63 a	28	35		
ATK-CP-10	12	3.00	3.45	UT	Stiff brown slightly sandy CLAY.			31.5*	100 n	74 a	29	45		
ATK-CP-10	18	4.50	5.00	D	Brown slightly sandy silty CLAY			28.1*	96 n	60 a	24	36		
ATK-CP-10	19	5.00	5.45	UT	Firm grey slightly sandy CLAY.			29.3*	100 n	78 a	31	47		
ATK-CP-10	26	7.00	7.45	UT	Very stiff thinly laminated dark brown slightly sandy CLAY.			23.5*	100 n	65 a	25	40		
ATK-CP-11	11	2.00		UT	Stiff light brown mottled grey slightly sandy CLAY.			30.3*	100 n	70 a	27	43		
ATK-CP-11	19	4.00		UT	Firm to stiff greyish brown slightly sandy CLAY			25.9*	100 n	76 a	32	44		
ATK-CP-11	27	6.00		UT	Firm laminated CLAY with silt on laminae.			29.4*	100 n	71 a	27	44		
ATK-CP-11	35	8.00		UT	Stiff greyish brown slightly sandy silty CLAY.			20.3*	100 n	57 a	23	34		
ATK-CP-11	43	10.00		UT	Very stiff thinly laminated greyish brown slightly sandy CLAY.			23.4*	100 n	63 a	30	33		
ATK-CP-12	5	1.20	1.65	D	Brown sandy CLAY.			26.7*						

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

Key : p bulk density, linear
pd dry density
w moisture content
* test carried out to BS EN ISO 17892

WL Liquid limit
a 4 point cone test
b 1 point cone test

WP Plastic limit
NP non - plastic
IP Plasticity Index

<425um preparation
n from natural soil
s sieved specimen
h removed by hand

ps particle density
-g = gas jar
-p = small pyknometer

QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

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INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p Mg/m3	p_d Mg/m3	w %	< 425 µm sieve %	W_L %	W_P %	I_P	p_s Mg/m3	Remarks
ATK-CP-12	8	2.00	2.45	UT	Brown slightly sandy CLAY.			38.8*	100 n	61 a	25	36		
ATK-CP-12	11	3.00	3.45	D	Red brown slightly gravelly slightly sandy CLAY			28.8*	97 s	42 a	19	23		
ATK-CP-12	19	5.00	5.45	UT	Reddish brown mottled grey slightly gravelly CLAY.			16.6*	77 s	38 a	17	21		
ATK-CP-12	23	6.00	6.45	D	Reddish grey slightly sandy CLAY				100 s	44 b	17	27		
ATK-CP-12	24	6.00	6.50	B	Grey and reddish brown slightly sandy CLAY.			16.1*						
ATK-CP-13A	4	0.50	0.80	B	Brown slightly sandy CLAY.			34.8*						
ATK-CP-13A	6	1.20		D	Brown mottled grey sandy silty CLAY			44.0*	100 n	80 a	29	51		
ATK-CP-13A	14	3.00		D	Brown slightly gravelly very sandy very silty CLAY			35.4*	100 n	60 a	27	33		
ATK-CP-13A	19	4.00		UT	Firm multicoloured slightly sandy slightly gravelly CLAY.			20.2*	90 n	45 a	21	24		
ATK-CP-13A	27	6.00		UT	Soft reddish brown mottled grey slightly sandy CLAY becoming stiff towards base.			18.3*	92 n	47 a	18	29		
ATK-CP-13A	35	8.00		UT	Stiff reddish brown mottled grey slightly sandy CLAY.			16.8*	89 n	48 a	21	27		
ATK-CP-13A	43	10.00		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			17.7*	100 n	51 a	20	31		
ATK-CP-14	3	0.50	1.00	B	Brown slightly sandy CLAY.			13.4*						
ATK-CP-14	7	2.00	2.45	UT	Soft to firm brown slightly sandy CLAY.	1.89	1.35	40.4*						
ATK-CP-14	14	4.00	4.45	UT	Stiff greyish brown slightly sandy silty CLAY.	2.06	1.69	22.1*						
ATK-CP-14	17	5.00	5.40	D	Dark brown slightly gravelly sandy CLAY				62 s	48 b	20	28		
ATK-CP-15	4	0.50	0.80	B	Brown slightly sandy CLAY.			38.2*	100 n	73 a	27	46		
ATK-CP-15	7	1.20		UT	Firm brown slightly sandy slightly gravelly CLAY.			30.9*						
ATK-CP-15	14	3.00		UT	Firm to stiff brown slightly sandy CLAY.			31.2*	100 n	70 a	31	39		
ATK-CP-15	21	5.00		UT	Firm laminated greyish brown CLAY with silt on laminae.			30.1*	100 n	72 a	32	40		
ATK-CP-15	29	7.00		UT	Firm to stiff dark greyish brown silty CLAY.			29.9*	100 n	71 a	28	43		
ATK-CP-15	37	9.00		UT	Very stiff thinly laminated dark brown slightly sandy CLAY.			26.8*	100 n	73 a	27	46		
ATK-CP-15	48	12.00		UT	Very stiff thinly laminated dark brown slightly sandy CLAY.			25.8*	100 n	72 a	31	41		
ATK-CP-15	59	15.00		UT	Stiff thinly laminated dark brown slightly sandy CLAY.			24.5*	100 n	64 a	26	38		
ATK-CP-15	80	21.00		UT	Very stiff reddish brown slightly sandy CLAY.			10.4*	100 n	32 a	15	17		
ATK-CP-16	6	3.00		UT	Firm to stiff reddish brown mottled grey slightly sandy CLAY.			23.6*	100 n	56 a	22	34		
ATK-CP-16	21	7.00	7.45	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.			18.1*	100 n	59 a	23	36		
ATK-CP-16	28	9.00	9.45	UT	Very stiff brown mottled grey slightly sandy CLAY.			18.3*	100 n	54 a	23	31		
ATK-RC-02	7	1.50		D	Brown slightly gravelly sandy CLAY.			20.2*	97 s	29 a	21	8		
ATK-RC-02	15	3.00		D	Brown silty SAND.			21.9*		b	NP			
ATK-RC-02	19	4.00		D	Brown sandy silty CLAY			24.2*	100 s	32 b	24	8		

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

Key : p bulk density, linear; *pd* dry density; *w* moisture content; * test carried out to BS EN ISO 17892

WL Liquid limit; a 4 point cone test; b 1 point cone test

WP Plastic limit; NP non - plastic; IP Plasticity Index

<425um preparation: n from natural soil; s sieved specimen; h removed by hand

ps particle density; -g = gas jar; -p = small pyknometer

QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

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INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
						Mg/m3		%	%	%	%		Mg/m3	
ATK-RC-02	23	5.00		D	Brown sandy silty CLAY			26.5*	88 s	36 b	22	14		
ATK-RC-02	27	6.00		UT	Firm greyish brown slightly sandy silty CLAY.			24.0*	100 n	42 a	19	23		
ATK-TP-01	2	0.40		D	Brown slightly gravelly slightly sandy CLAY			37.9*	92 n	67 a	28	39		
ATK-TP-01	7	1.00		D	Brown slightly sandy silty CLAY			35.1*	100 n	77 a	33	44		
ATK-TP-01	11	2.80		D	Brown silty slightly sandy CLAY			32.4*	100 n	71 a	32	39		
ATK-TP-01	13	3.00		D	Brown sandy silty CLAY			27.8*	100 n	63 a	29	34		
ATK-TP-02	3	0.50	0.70	B	Brown slightly sandy CLAY			38.3*	100 n	70 a	29	41		
ATK-TP-02	5	1.20		D	Brown orangish slightly sandy CLAY			32.7*	100 n	68 a	29	39		
ATK-TP-02	7	2.20		D	Brown slightly sandy silty CLAY			31.7*	100 n	66 a	29	37		
ATK-TP-03	2	0.50		D	Brown slightly sandy silty CLAY			31.7*	100 n	63 a	22	41		
ATK-TP-03	5	0.90		D	Brown slightly sandy slightly gravelly CLAY			39.0*	96 n	68 a	27	41		
ATK-TP-03	8	1.60		D	Brown slightly sandy CLAY			26.9*	100 n	56 a	25	31		
ATK-TP-03	10	2.20		D	Brown slightly sandy silty CLAY			33.1*	100 n	73 a	30	43		
ATK-TP-03	12	3.10		D	Dark brown slightly sandy CLAY			23.5*	100 n	53 a	21	32		
ATK-TP-04	2	0.40		D	Brown slightly sandy CLAY.			34.5*	100 s	43 a	22	21		
ATK-TP-04	9	1.40		D	Brown slightly sandy CLAY			30.8*	100 s	60 a	23	37		
ATK-TP-04	11	2.00		D	Reddish brown slightly sandy CLAY			26.9*	100 n	59 a	24	35		
ATK-TP-04	13	3.00		D	Reddish brown slightly sandy CLAY			25.4*	100 n	50 a	22	28		
ATK-TP-05	2	0.50		D	Brown slightly clayey SAND.			26.6*		b	NP			
ATK-TP-05	5	1.00		D	Brown SAND.			24.9*		b	NP			
ATK-TP-06	4	0.30	0.80	B	Brown slightly sandy silty CLAY.			36.1*	98 n	53 a	26	27		
ATK-TP-06	7	0.90		D	Brown slightly sandy CLAY			36.4*	100 n	75 a	32	43		
ATK-TP-06	10	2.00		D	Brown slightly sandy CLAY			30.9*	99 s	70 b	26	44		
ATK-TP-06	12	3.00		D	Brown slightly sandy CLAY			27.5*	100 n	59 a	25	34		
ATK-TP-07	3	0.50		D	Greyish brown slightly sandy slightly gravelly CLAY.			21.0*	74 s	45 a	22	23		
ATK-TP-07	5	0.90		D	Orangish brown slightly sandy silty CLAY			36.1*	100 n	75 a	31	44		
ATK-TP-08	3	0.30		D	Brown orangish slightly gravelly slightly sandy CLAY			37.4*	99 n	77 a	33	44		
ATK-TP-08	7	0.90		D	Brown mottled grey slightly sandy gravelly CLAY			17.3*	50 s	57 b	24	33		
ATK-TP-08	10	1.50		D	Brown silty SAND.			27.6*		b	NP			
ATK-TPM-02	3	0.50		D	Light brown slightly sandy slightly gravelly CLAY			22.5*	99 n	53 a	21	32		
ATK-TPM-02	7	1.00		D	Brown slightly sandy slightly gravelly CLAY.			21.2*						

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

Key : p bulk density, linear
pd dry density
w moisture content
* test carried out to BS EN ISO 17892

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a 4 point cone test
b 1 point cone test

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NP non - plastic
IP Plasticity Index

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QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

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INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
						Mg/m3		%	%	%	%		Mg/m3	
ATK-TPM-02	10	2.70		D	Brown slightly sandy CLAY			32.6*	100 n	74 a	28	46		
ATK-TPM-03	2	0.50		D	Brown mottled grey slightly gravelly slightly sandy CLAY			31.8*	94 n	66 a	31	35		
ATK-TPM-03	5	1.60		D	Brown gravelly slightly sandy silty CLAY			25.1*	100 n	45 a	22	23		
ATK-TPM-03	7	2.50		D	Brown gravelly sandy silty CLAY			16.6*	50 s	57 b	25	32		
ATK-TPM-03	9	2.80		D	Brown slightly gravelly slightly sandy CLAY			22.0*	78 s	74 a	30	44		
ATK-TPM-03	12	3.60	3.70	B	Brown slightly sandy CLAY.			33.9*	100 n	71 a	30	41		
ATK-TPM-04	3	0.50		D	Brown slightly sandy CLAY			37.5*	100 n	80 a	30	50		
ATK-TPM-04	6	1.50		D	Brown slightly sandy silty CLAY			30.4*	100 n	78 a	28	50		
ATK-TPM-04	8	2.50		D	Brown slightly sandy CLAY			32.7*	100 n	75 a	33	42		
ATK-TPM-05	5	1.00	1.00	D	Brown slightly sandy silty CLAY			42.7*	100 n	87 a	32	55		
ATK-TPM-05	9	1.70	1.70	D	Brown slightly sandy CLAY			32.5*	100 n	76 a	31	45		
ATK-TPM-05	101	2.20	2.20	D	Brown slightly gravelly sandy silty CLAY.			28.7*	98 n	57 a	24	33		
ATK-TPM-05	11	3.00	3.00	D	Brown slightly sandy CLAY.			32.3*	100 n	76 a	30	46		
ATK-TPM-05	16	4.40	4.40	D	Greyish brown slightly sandy CLAY			21.2*	100 n	46 a	19	27		

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

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QA Ref
SLR 1
Rev 2.94
Mar 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

INDX

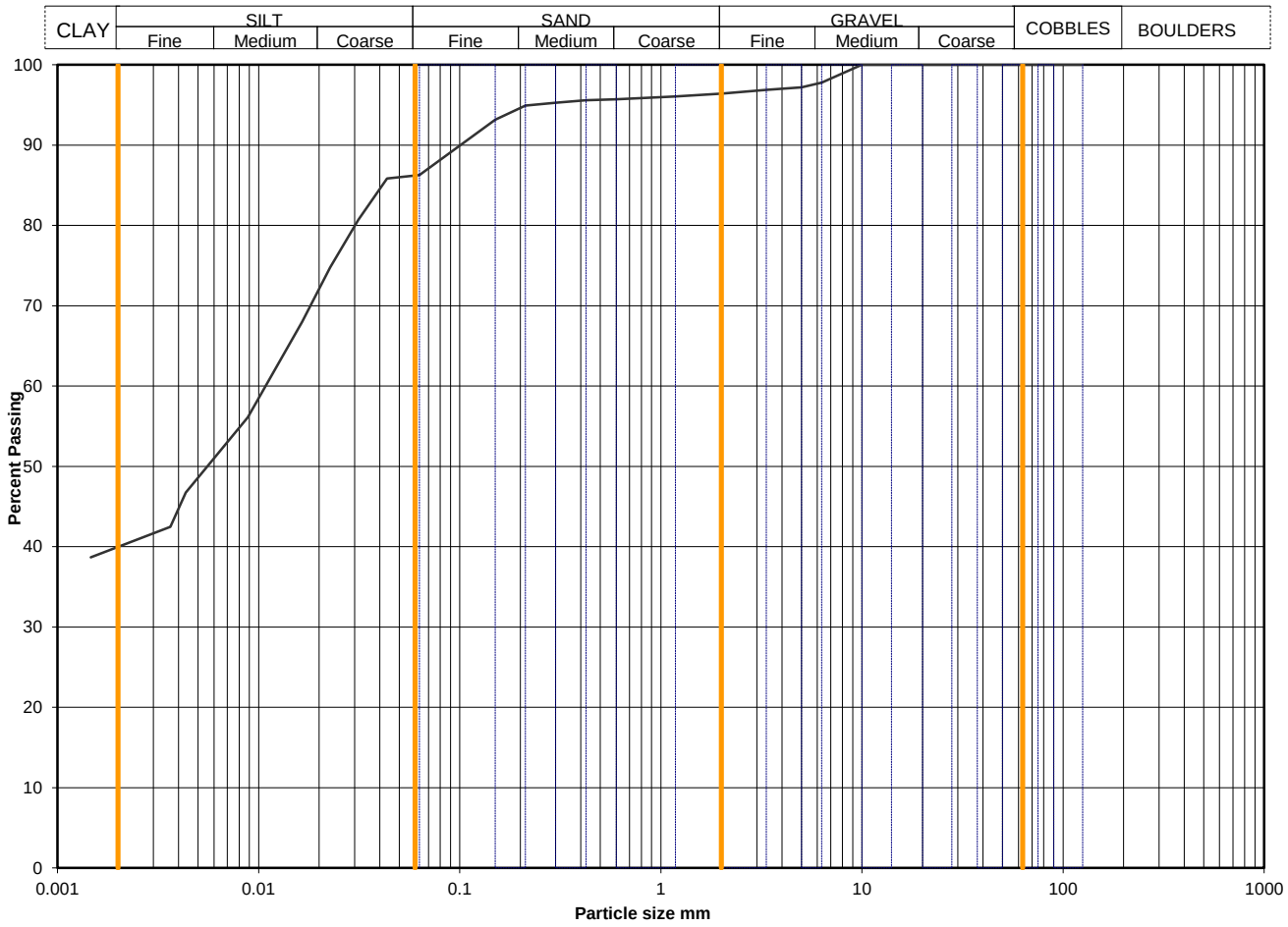
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191213100633

Hole No	ATK-BH-01
Sample Depth (m BGL)	0.50 - 1.00
Sample Type and No	B5
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	86
90	100	0.0435	86
75	100	0.0314	81
63	100	0.0227	75
50	100	0.0164	68
37.5	100	0.0088	56
28	100	0.0043	47
20	100	0.0036	42
14	100	0.0015	39
10	100		
6.3	98		
5.0	97		
3.35	97		
2.00	96		
1.18	96	Particle density, Mg/m3	
0.600	96		
0.425	96	2.65 assumed	
0.300	95	Dry mass of sample, kg	
0.212	95		
0.150	93	0.9	
0.063	86		

Soil description	Brown slightly sandy slightly gravelly CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	3.5	3.5
	Sand	10.2	10.2
*<60mm values to aid description only	Silt	46.3	46.3
	Clay	40.0	40.0

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

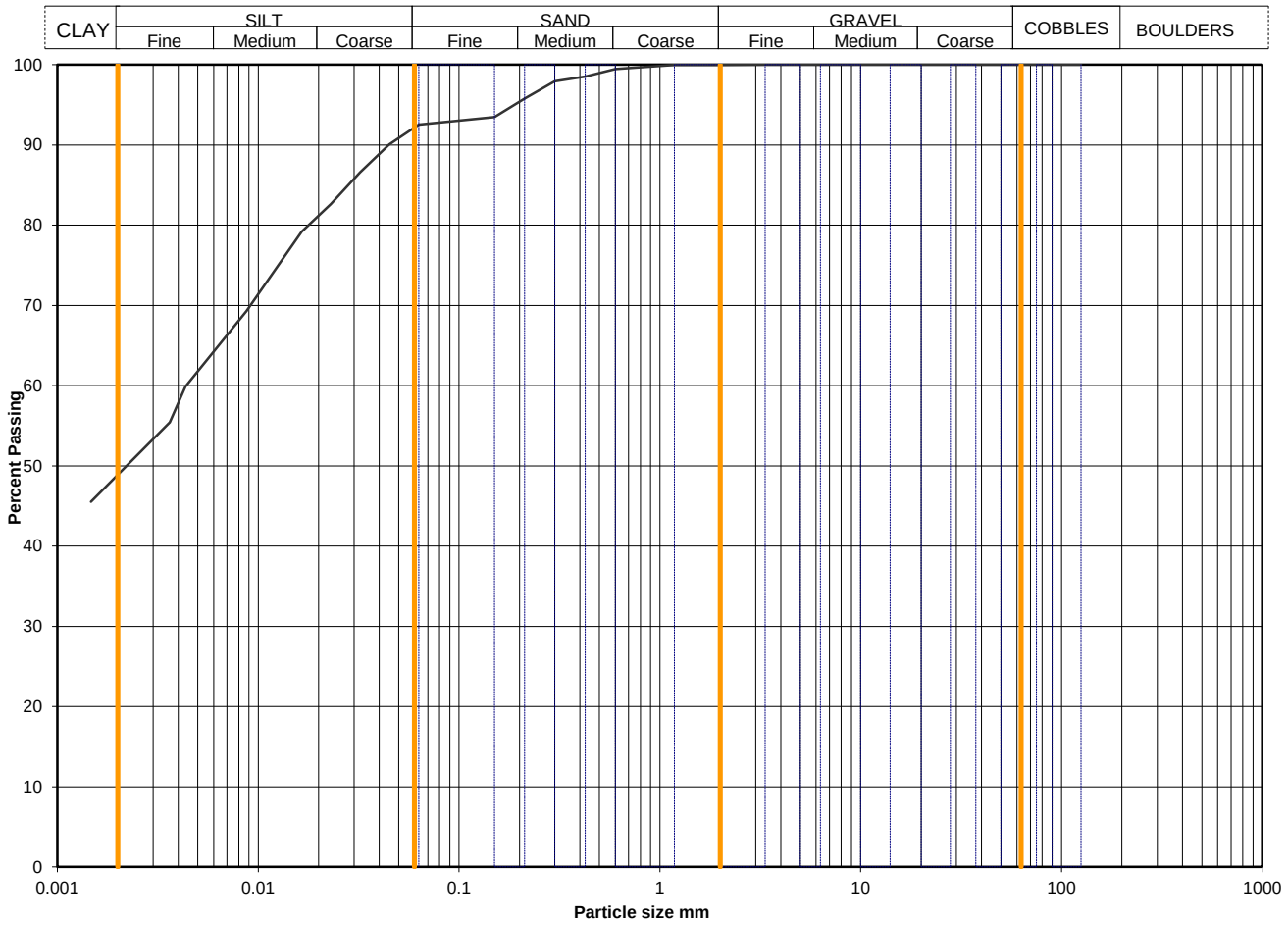
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191218095028

Hole No	ATK-BH-02
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B3
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	93
90	100	0.0449	90
75	100	0.0321	87
63	100	0.0230	83
50	100	0.0164	79
37.5	100	0.0087	69
28	100	0.0043	60
20	100	0.0036	55
14	100	0.0015	46
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	96		
0.150	93	0.3	
0.063	93		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	7.5	7.5
*<60mm values to aid description only	Silt	43.6	43.6
	Clay	48.9	48.9

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

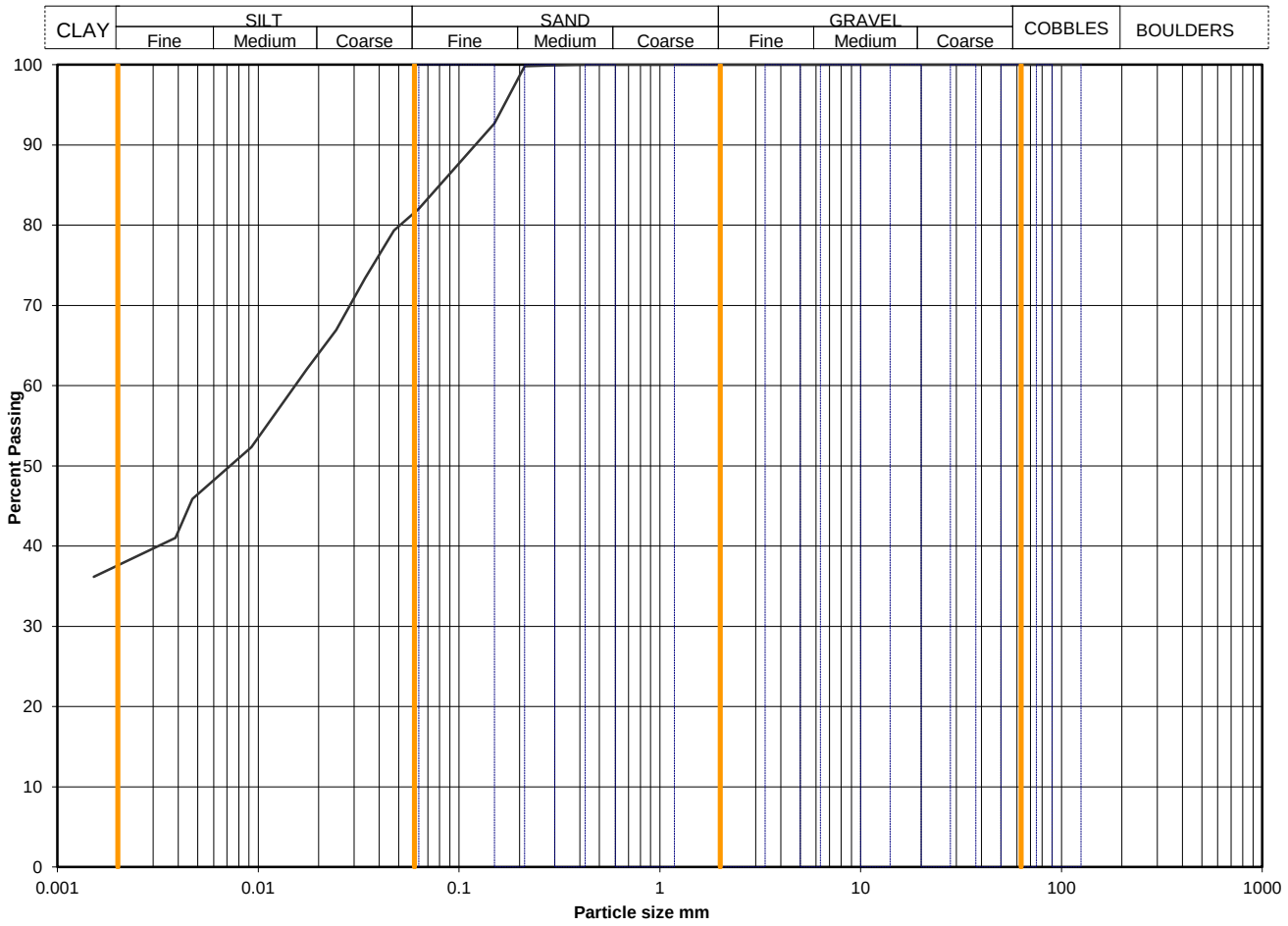
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191107112613

Hole No	ATK-CP-01
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	82
90	100	0.0474	79
75	100	0.0340	73
63	100	0.0245	67
50	100	0.0175	62
37.5	100	0.0093	52
28	100	0.0047	46
20	100	0.0039	41
14	100	0.0015	36
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	93	12.8	
0.063	82		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	18.0	18.0
*<60mm values to aid description only	Silt	44.4	44.4
	Clay	37.6	37.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

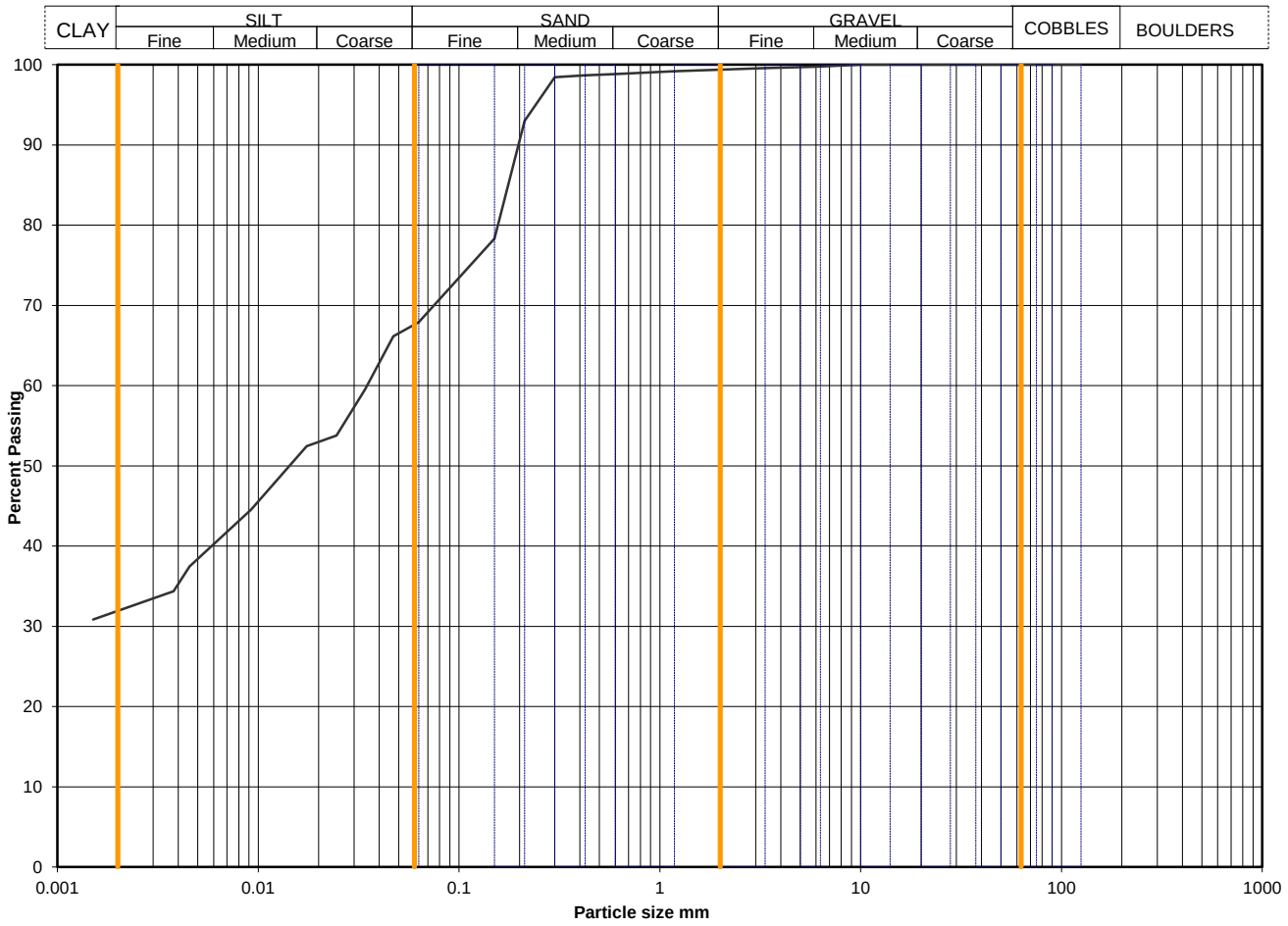
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191112122811

Hole No	ATK-CP-01
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	68
90	100	0.0472	66
75	100	0.0341	60
63	100	0.0245	54
50	100	0.0174	52
37.5	100	0.0092	45
28	100	0.0045	37
20	100	0.0038	34
14	100	0.0015	31
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	93		
0.150	78	13.0	
0.063	68		

Soil description	Brown slightly sandy slightly gravelly silty CLAY with rootlets.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.6	0.6
	Sand	31.5	31.5
*<60mm values to aid description only	Silt	36.0	36.0
	Clay	31.9	31.9

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

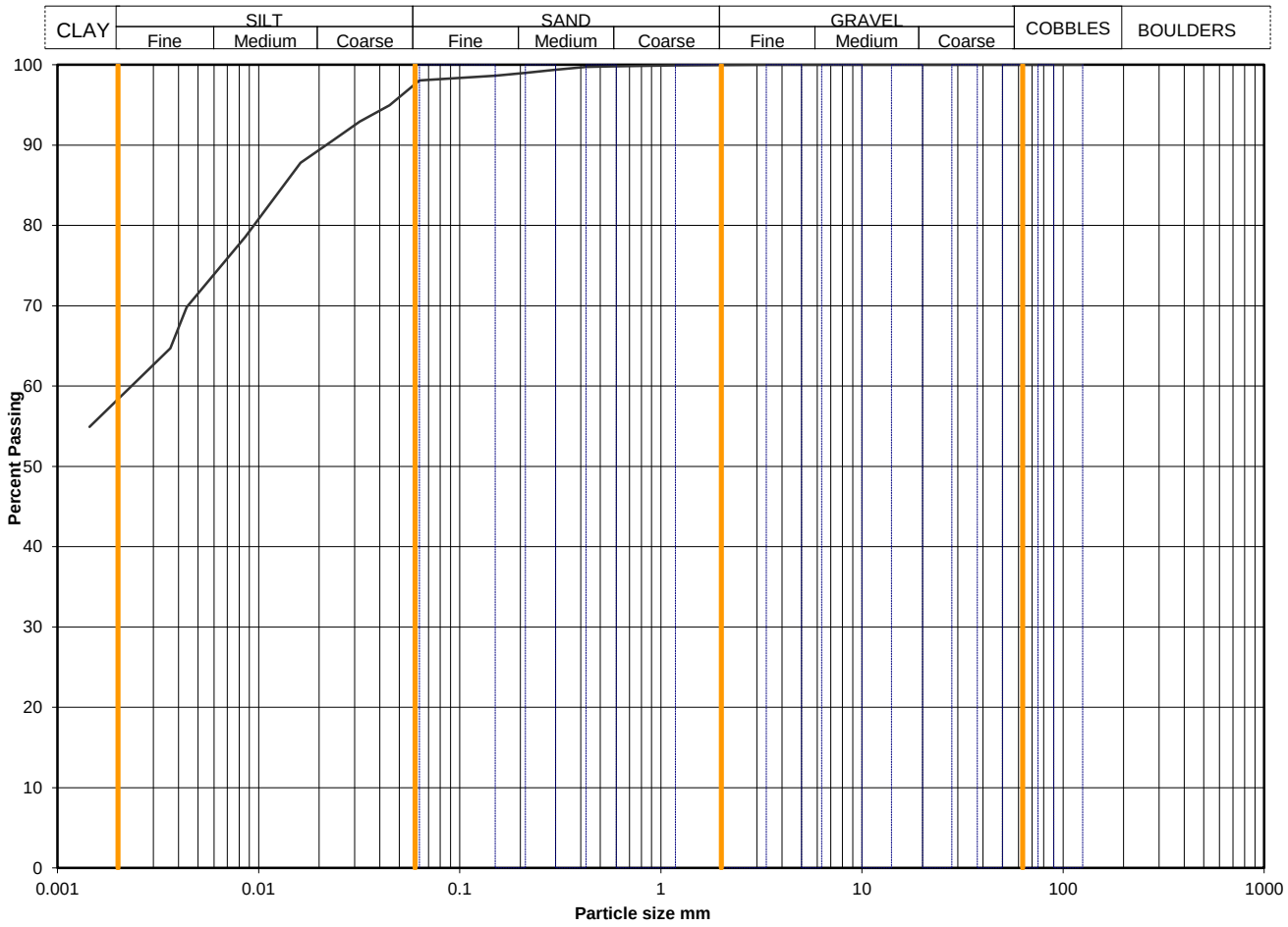
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191112122901

Hole No	ATK-CP-01
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B13
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0447	95
75	100	0.0318	93
63	100	0.0227	90
50	100	0.0162	88
37.5	100	0.0086	79
28	100	0.0044	70
20	100	0.0036	65
14	100	0.0014	55
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	0.4	
0.063	98		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	1.9	1.9
*<60mm values to aid description only	Silt	39.7	39.7
	Clay	58.4	58.4

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

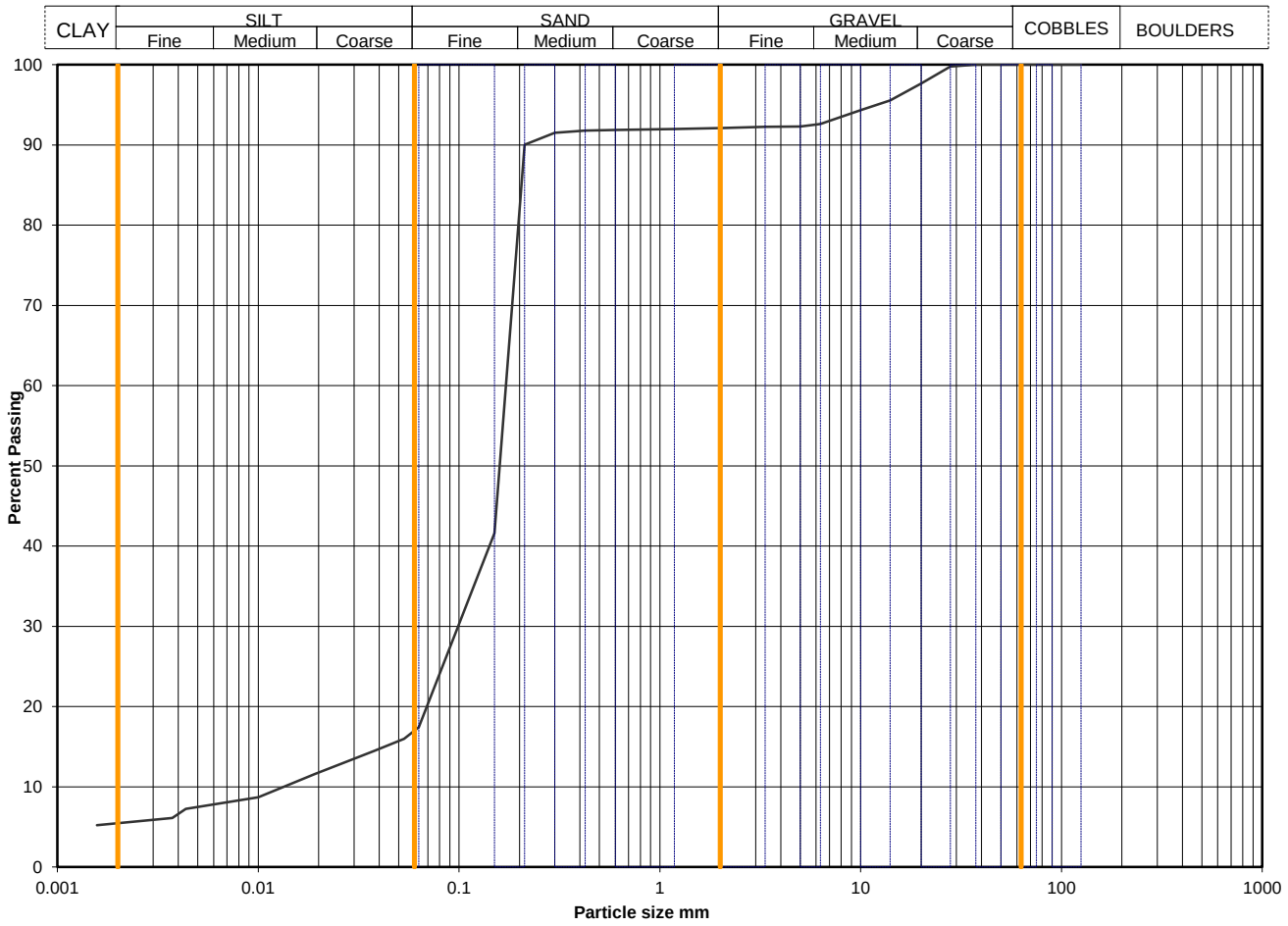
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191108103105

Hole No	ATK-CP-02
Sample Depth (m BGL)	0.40 - 1.00
Sample Type and No	B3
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	17
90	100	0.0533	16
75	100	0.0379	15
63	100	0.0269	13
50	100	0.0192	12
37.5	100	0.0100	9
28	100	0.0044	7
20	98	0.0037	6
14	96	0.0016	5
10	94		
6.3	93		
5.0	92		
3.35	92		
2.00	92		
1.18	92	Particle density, Mg/m3	
0.600	92		
0.425	92	2.65 assumed	
0.300	92	Dry mass of sample, kg	
0.212	90		
0.150	42	15.8	
0.063	17		

Soil description	Brown gravelly silty SAND.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	7.9	7.9
	Sand	74.7	74.7
*<60mm values to aid description only	Silt	11.9	11.9
	Clay	5.5	5.5

Uniformity Coefficient	D60 / D10	13

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

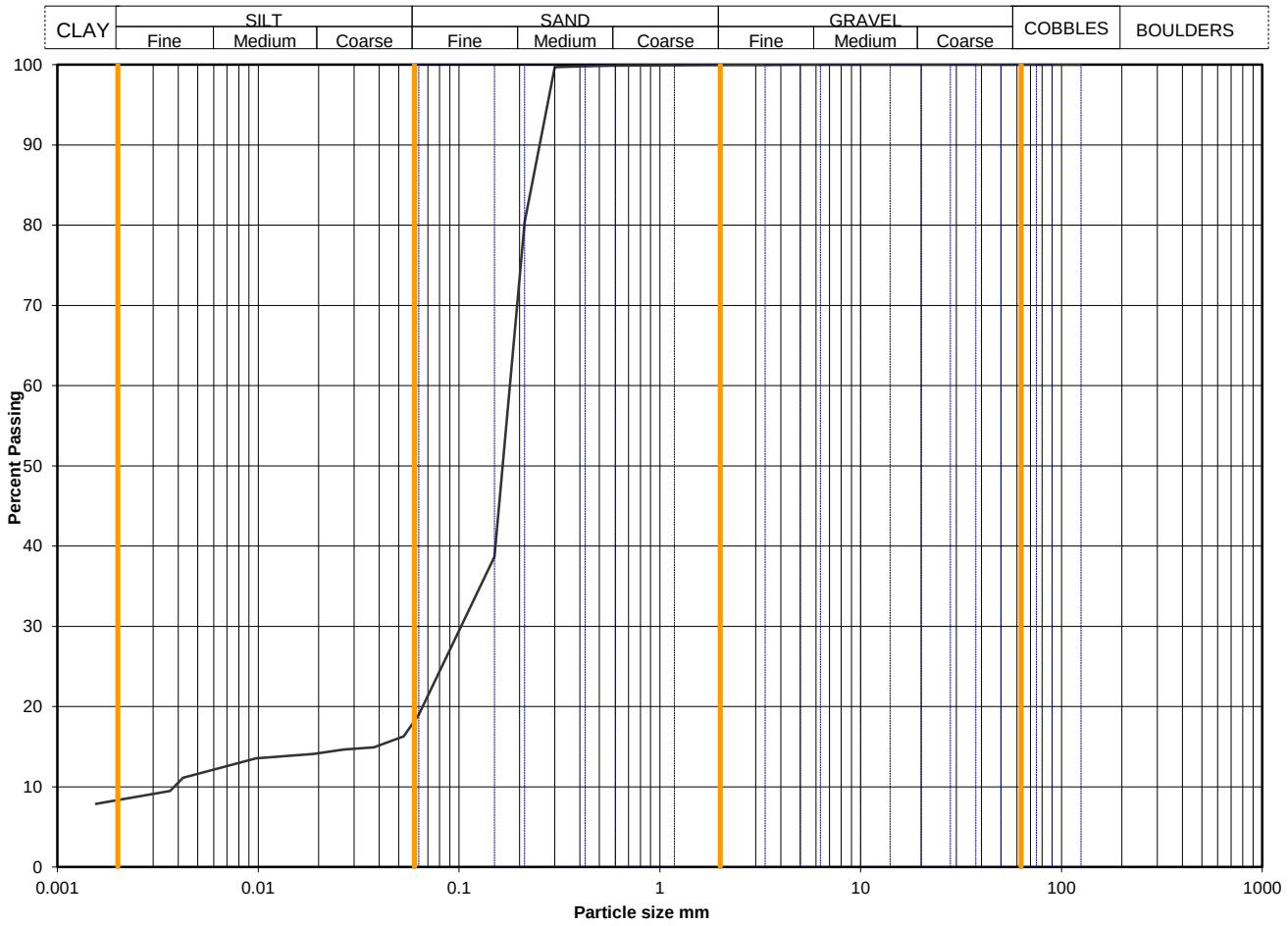
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191112124237

Hole No	ATK-CP-02
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	19
90	100	0.0530	16
75	100	0.0377	15
63	100	0.0267	15
50	100	0.0189	14
37.5	100	0.0098	14
28	100	0.0042	11
20	100	0.0036	9
14	100	0.0016	8
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	80		
0.150	39	15.0	
0.063	19		

Soil description	Brown clayey SAND.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	81.1	81.1
*<60mm values to aid description only	Silt	10.6	10.6
	Clay	8.3	8.3

Uniformity Coefficient	**D60 / D10**	47

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Jul 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

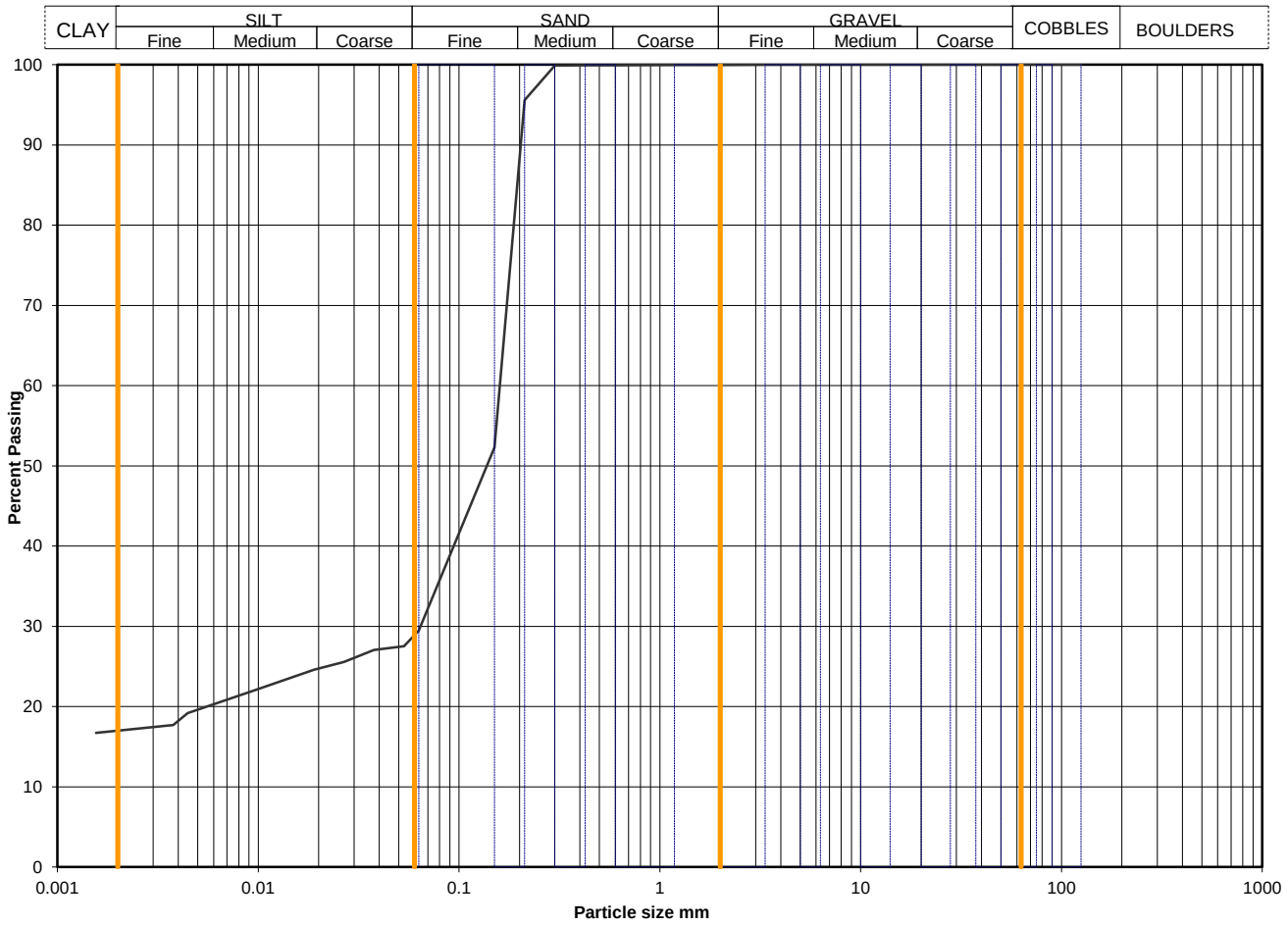
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191112124251

Hole No	ATK-CP-02
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B11
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	29
90	100	0.0532	28
75	100	0.0377	27
63	100	0.0267	26
50	100	0.0189	25
37.5	100	0.0098	22
28	100	0.0045	19
20	100	0.0038	18
14	100	0.0016	17
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	96		
0.150	52	16.7	
0.063	29		

Soil description	Brown silty SAND.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	70.5	70.5
*<60mm values to aid description only	Silt	12.5	12.5
	Clay	17.0	17.0

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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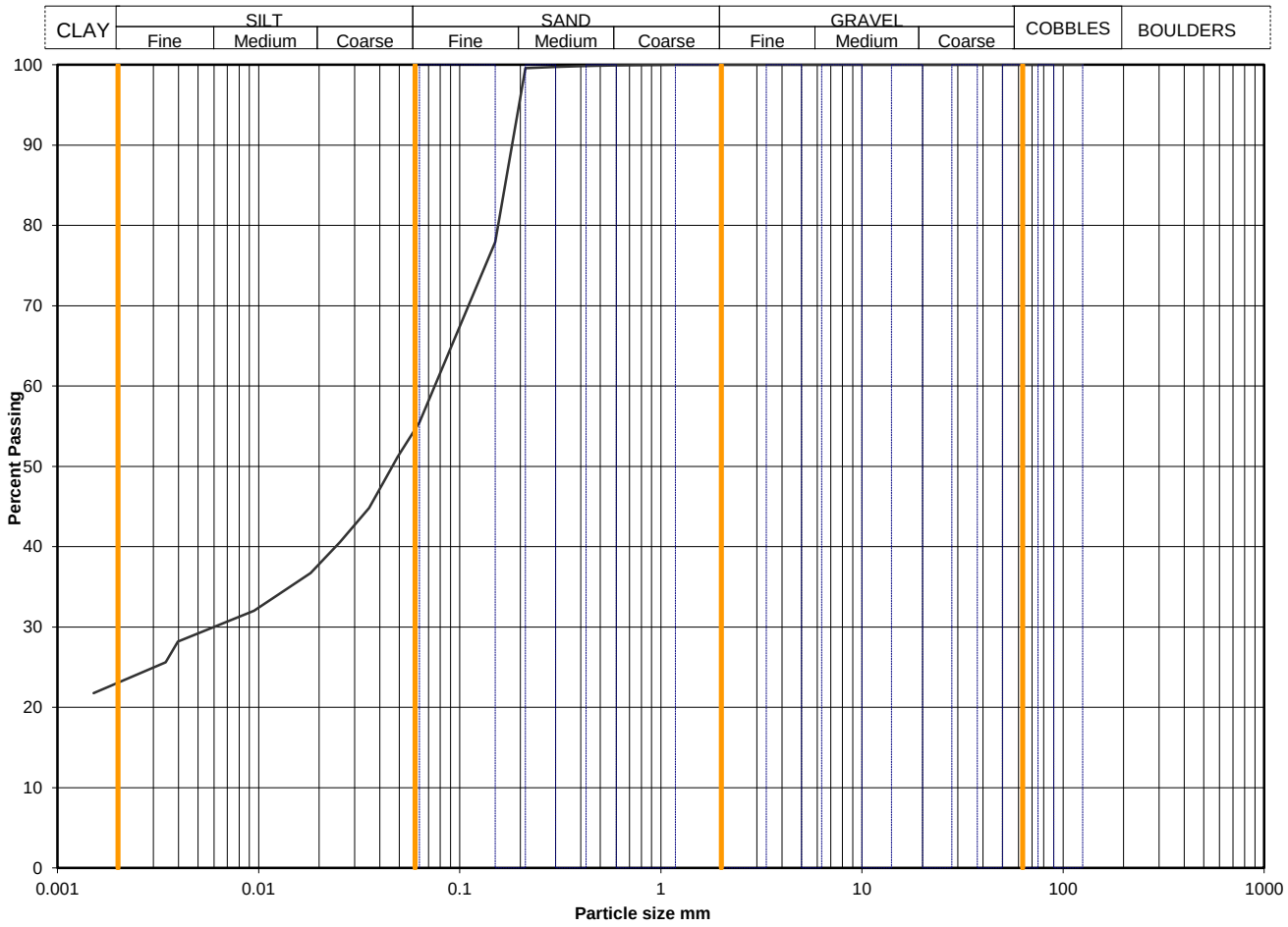
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191112124310

Hole No	ATK-CP-02
Sample Depth (m BGL)	4.00 - 4.50
Sample Type and No	B14
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	55
90	100	0.0492	51
75	100	0.0355	45
63	100	0.0254	41
50	100	0.0182	37
37.5	100	0.0095	32
28	100	0.0040	28
20	100	0.0034	26
14	100	0.0015	22
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	78	13.1	
0.063	55		

Soil description	Grey and brown sandy silty CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	44.5	44.5
*<60mm values to aid description only	Silt	32.4	32.4
	Clay	23.1	23.1

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Jul 17

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Project No A9031-19

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Figure
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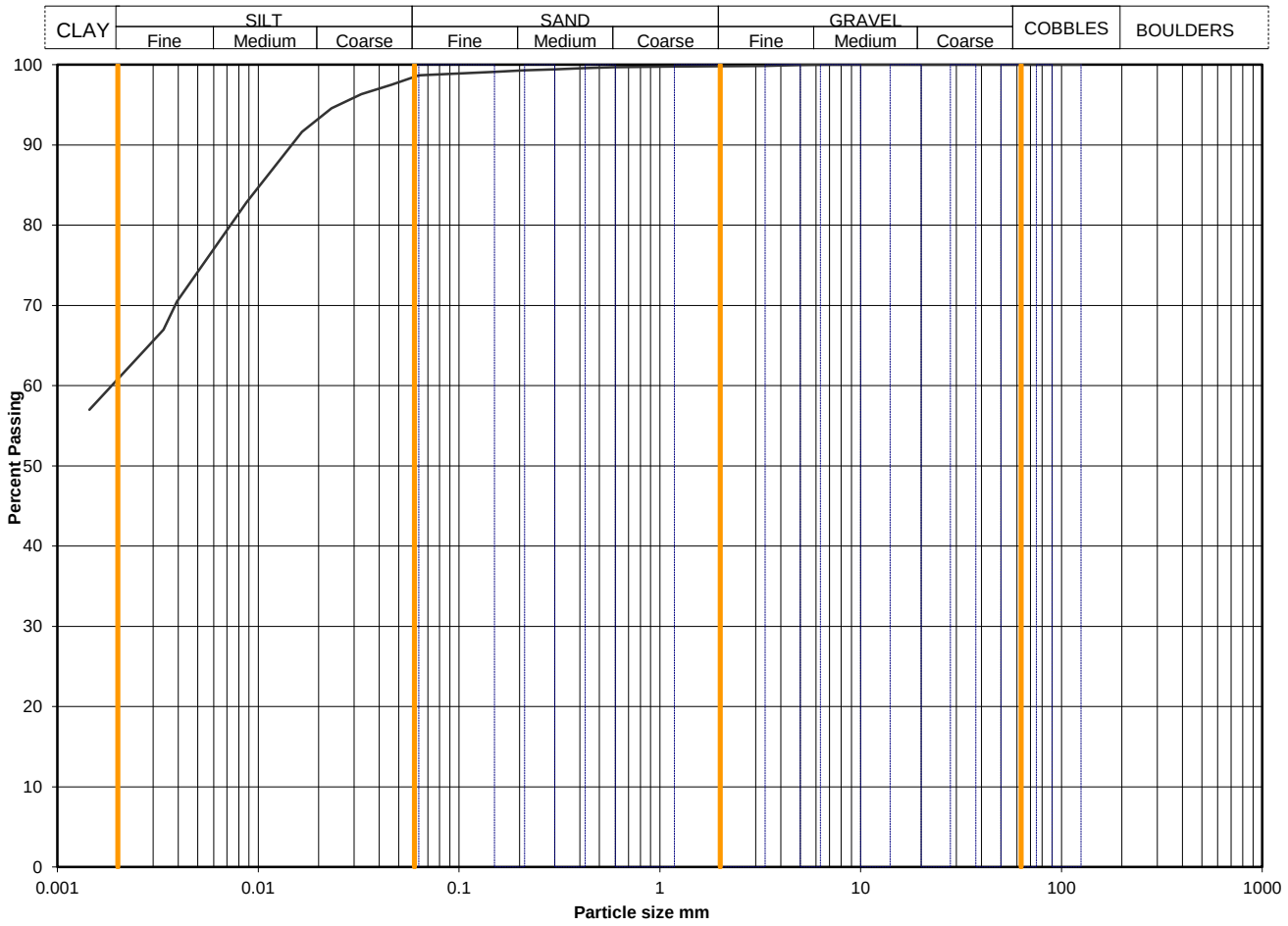
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191212034428

Hole No	ATK-CP-03
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B12
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0461	98
75	100	0.0327	96
63	100	0.0232	95
50	100	0.0165	92
37.5	100	0.0087	83
28	100	0.0039	70
20	100	0.0034	67
14	100	0.0014	57
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	0.3	
0.063	99		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.2	0.2
	Sand	1.1	1.1
*<60mm values to aid description only	Silt	37.9	37.9
	Clay	60.8	60.8

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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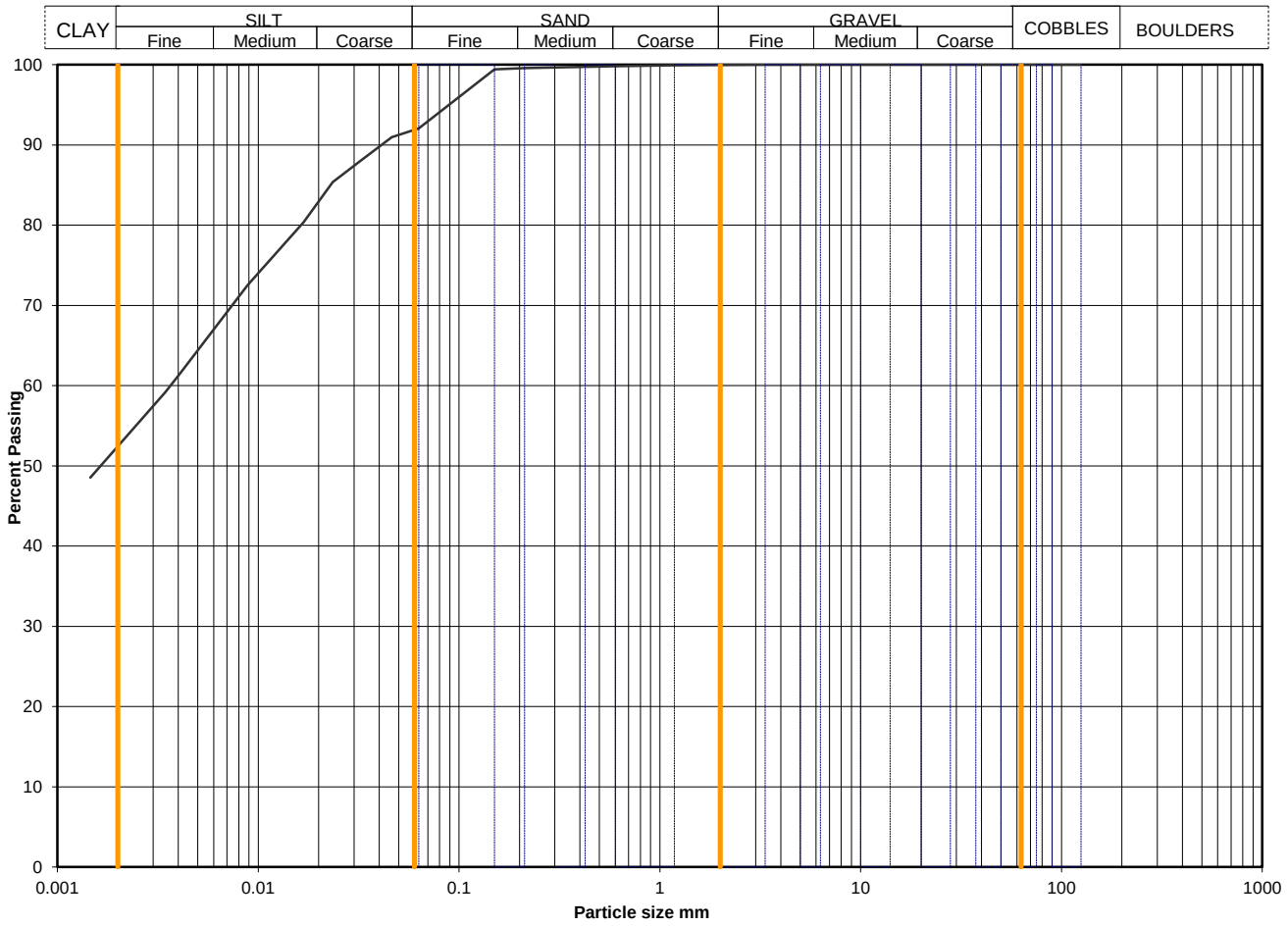
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191118090121

Hole No	ATK-CP-04
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	92
90	100	0.0463	91
75	100	0.0330	88
63	100	0.0235	85
50	100	0.0168	80
37.5	100	0.0089	73
28	100	0.0040	61
20	100	0.0034	59
14	100	0.0015	49
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	99	0.5	
0.063	92		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	8.0	8.0
*<60mm values to aid description only	Silt	39.6	39.6
	Clay	52.4	52.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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Rev 2.21
Jul 17

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1157

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Project No A9031-19

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Figure

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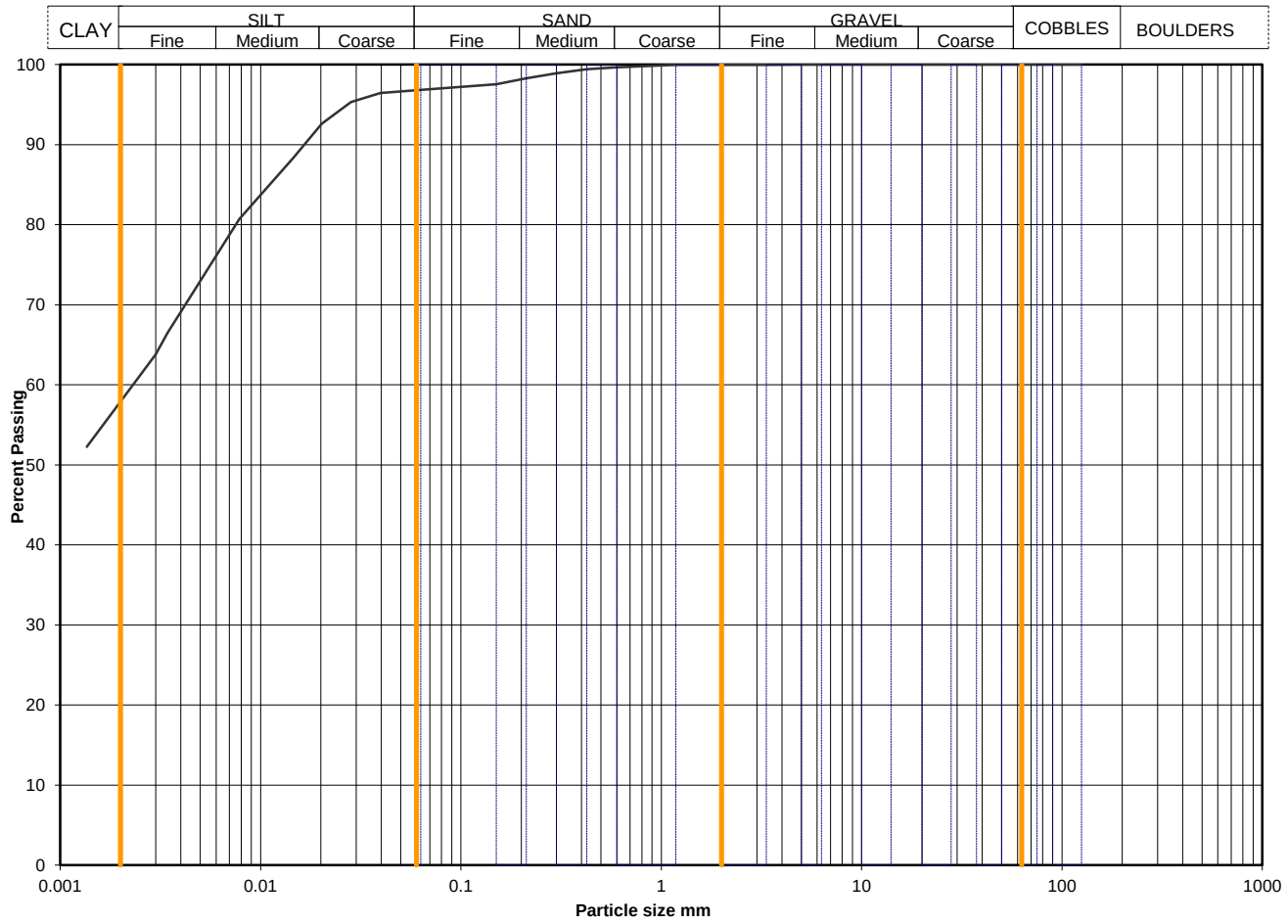
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191118090257

Hole No	ATK-CP-04
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B13
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0397	96
75	100	0.0282	95
63	100	0.0202	93
50	100	0.0146	88
37.5	100	0.0078	81
28	100	0.0034	66
20	100	0.0030	64
14	100	0.0014	52
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	98		
0.150	98	0.4	
0.063	97		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	3.2	3.2
*<60mm values to aid description only	Silt	38.9	38.9
	Clay	57.9	57.9

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

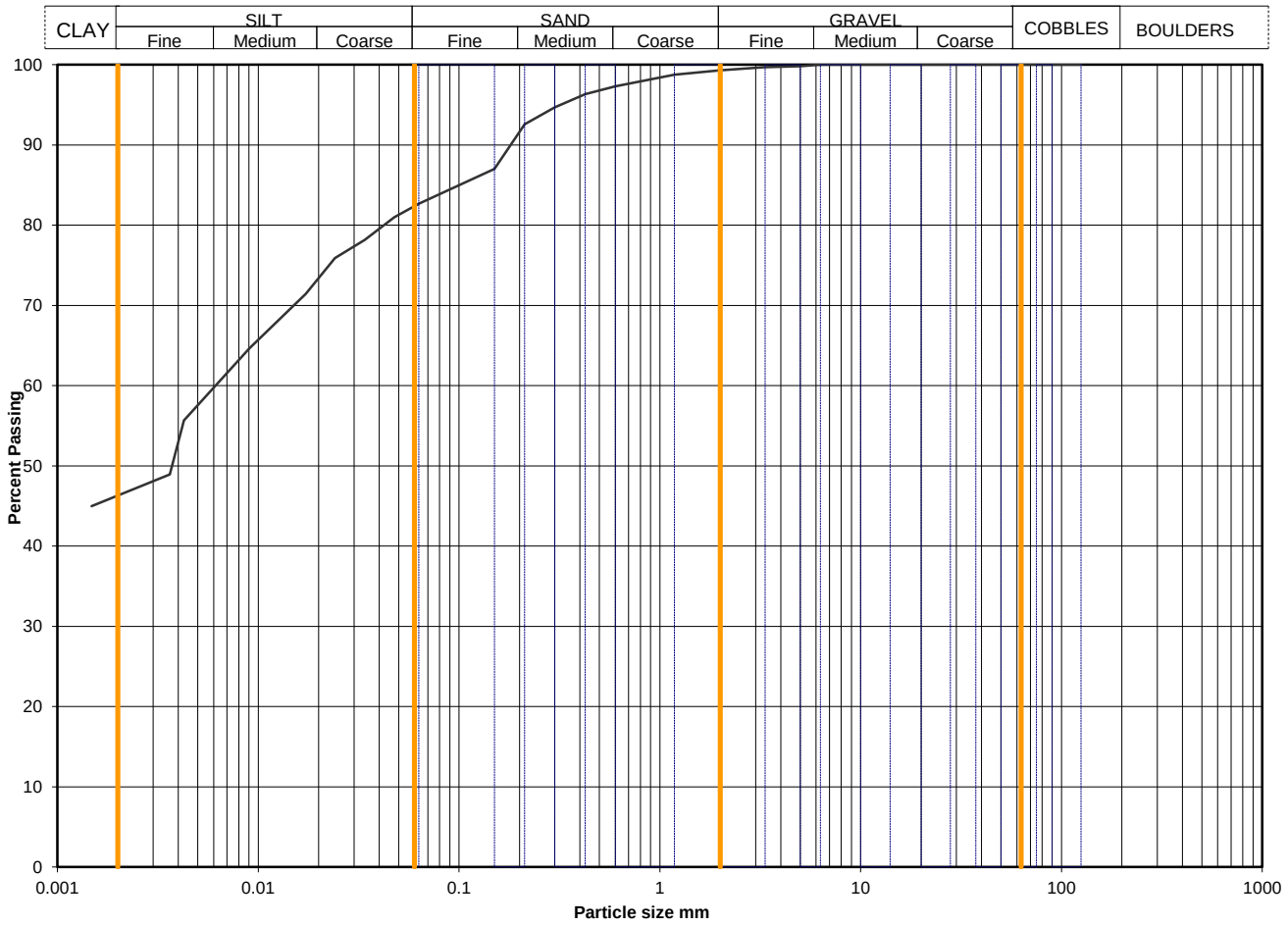
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191118090336

Hole No	ATK-CP-04
Sample Depth (m BGL)	4.50 - 5.00
Sample Type and No	B20
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	83
90	100	0.0476	81
75	100	0.0339	78
63	100	0.0241	76
50	100	0.0172	71
37.5	100	0.0090	65
28	100	0.0043	56
20	100	0.0036	49
14	100	0.0015	45
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	97		
0.425	96	2.65 assumed	
0.300	95	Dry mass of sample, kg	
0.212	93		
0.150	87	3.2	
0.063	83		

Soil description	Grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.6	0.6
	Sand	16.7	16.7
*<60mm values to aid description only	Silt	36.4	36.4
	Clay	46.3	46.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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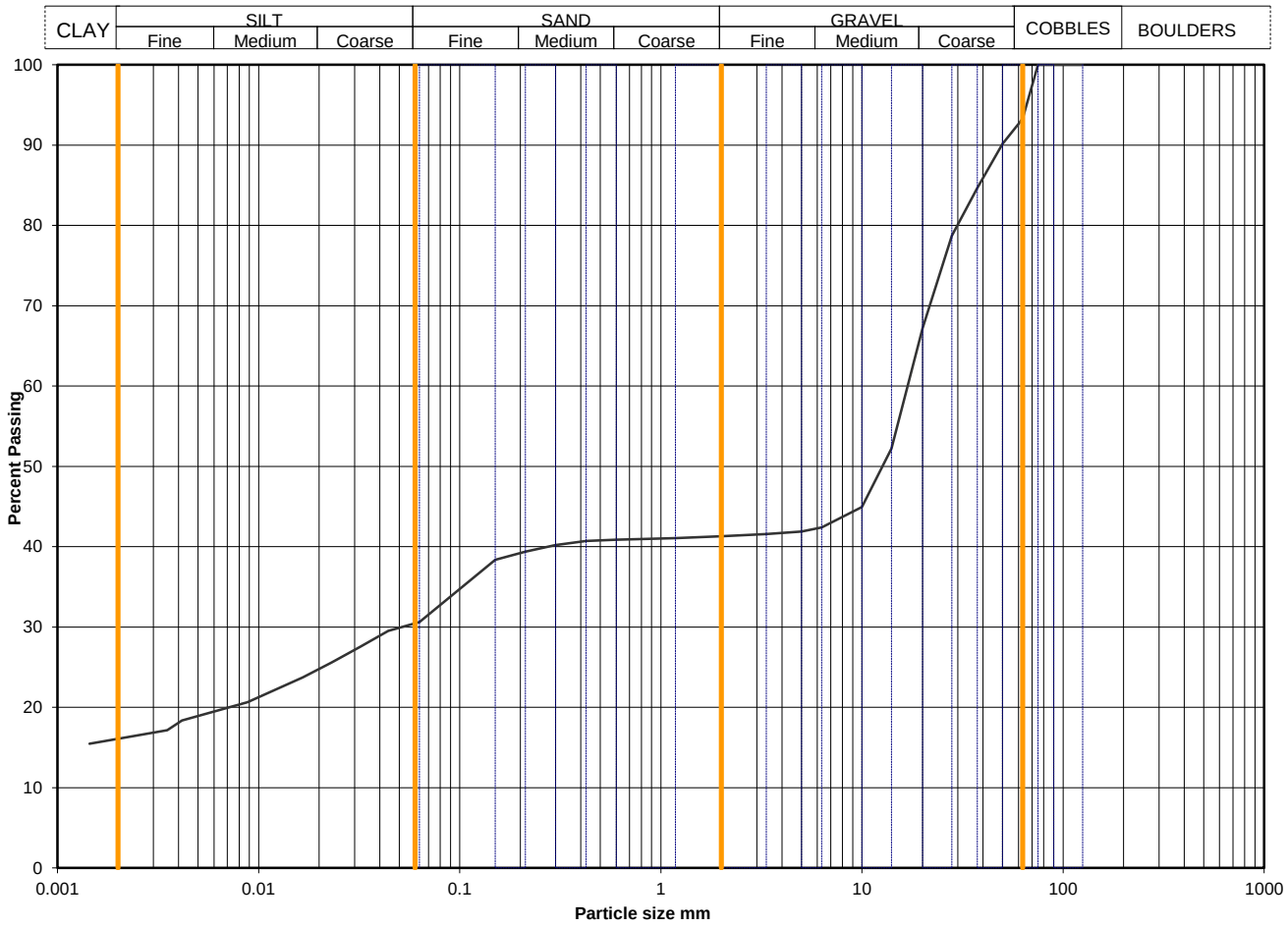
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191205122237

Hole No	ATK-CP-06
Sample Depth (m BGL)	1.00
Sample Type and No	B7
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	31
90	100	0.0441	30
75	100	0.0319	28
63	93	0.0230	26
50	90	0.0166	24
37.5	85	0.0088	21
28	79	0.0042	18
20	67	0.0035	17
14	52	0.0014	15
10	45		
6.3	42		
5.0	42		
3.35	42		
2.00	41		
1.18	41	Particle density, Mg/m3	
0.600	41		
0.425	41	2.65 assumed	
0.300	40	Dry mass of sample, kg	
0.212	39		
0.150	38	13.2	
0.063	31		

Soil description	Light brown slightly sandy gravelly CLAY with two cobbles.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	6.7	0.0
	Gravel	52.0	55.7
	Sand	10.7	11.5
*<60mm values to aid description only	Silt	14.5	15.5
	Clay	16.1	17.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

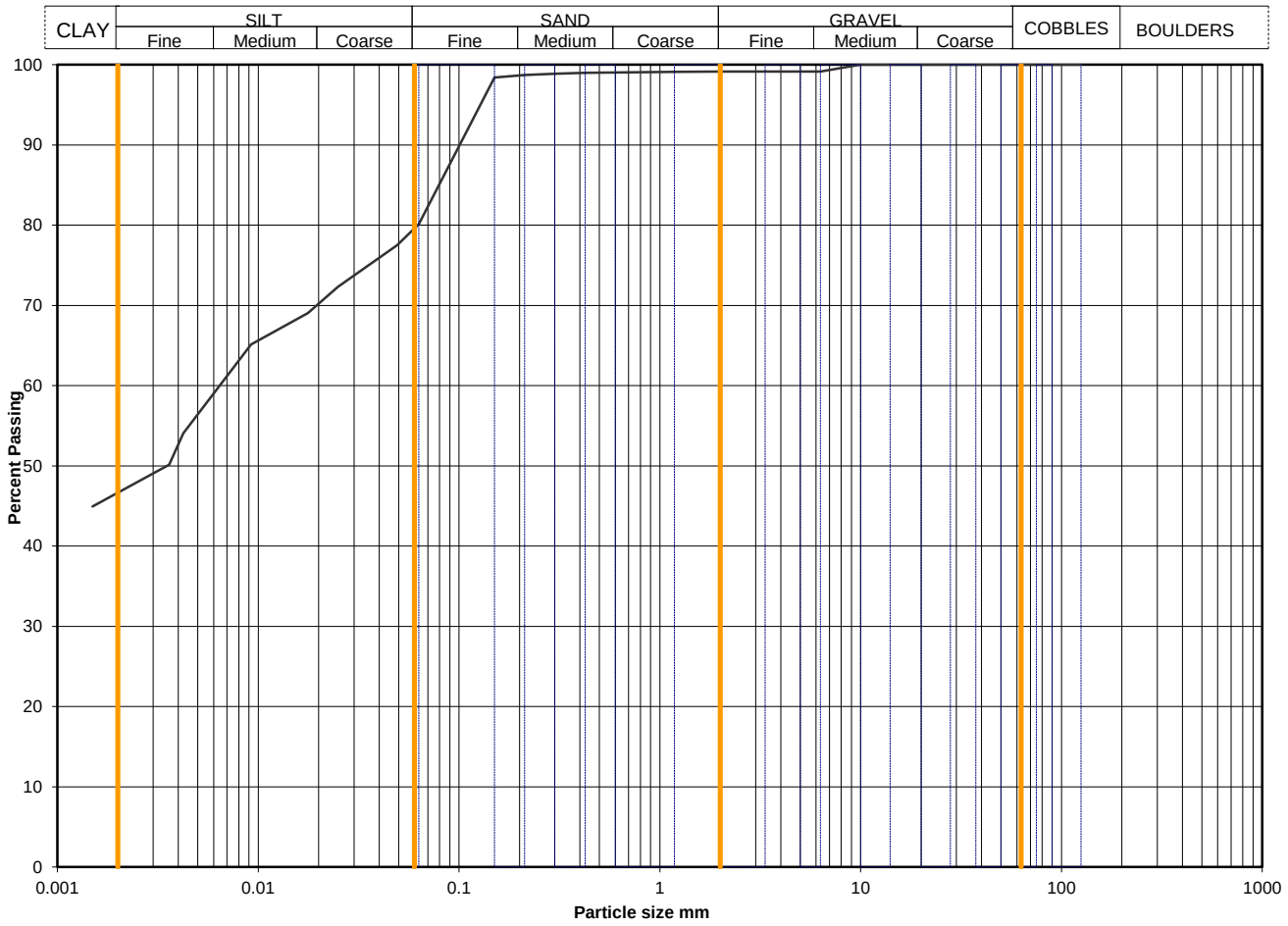
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191128092135

Hole No	ATK-CP-07A
Sample Depth (m BGL)	1.50 - 2.00
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	80
90	100	0.0493	78
75	100	0.0350	75
63	100	0.0249	72
50	100	0.0177	69
37.5	100	0.0092	65
28	100	0.0042	54
20	100	0.0036	50
14	100	0.0015	45
10	100		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	0.4	
0.063	80		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.9	0.9
	Sand	19.0	19.0
*<60mm values to aid description only	Silt	33.4	33.4
	Clay	46.7	46.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

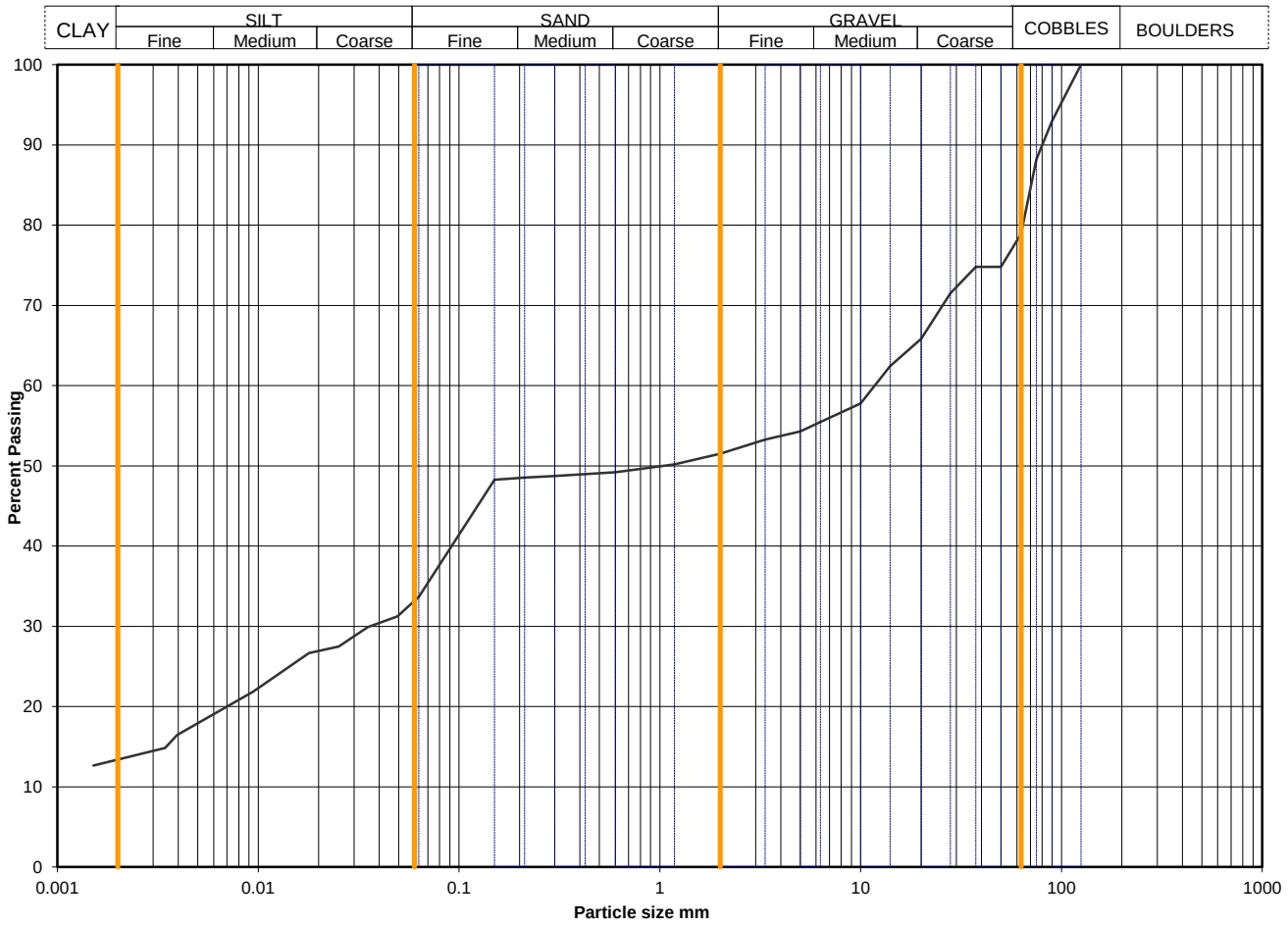
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209025238

Hole No	ATK-CP-07A
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B7
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	34
90	93	0.0495	31
75	88	0.0352	30
63	79	0.0252	27
50	75	0.0179	27
37.5	75	0.0094	22
28	72	0.0039	16
20	66	0.0034	15
14	62	0.0015	13
10	58		
6.3	55		
5.0	54		
3.35	53		
2.00	52		
1.18	50	Particle density, Mg/m3	
0.600	49	2.65 assumed	
0.425	49		
0.300	49	Dry mass of sample, kg	
0.212	49	17.5	
0.150	48		
0.063	34		

Soil description	Brown slightly sandy slightly gravelly CLAY with five cobbles.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	21.1	0.0
	Gravel	27.4	34.7
	Sand	17.8	22.6
*<60mm values to aid description only	Silt	20.3	25.7
	Clay	13.4	17.0

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

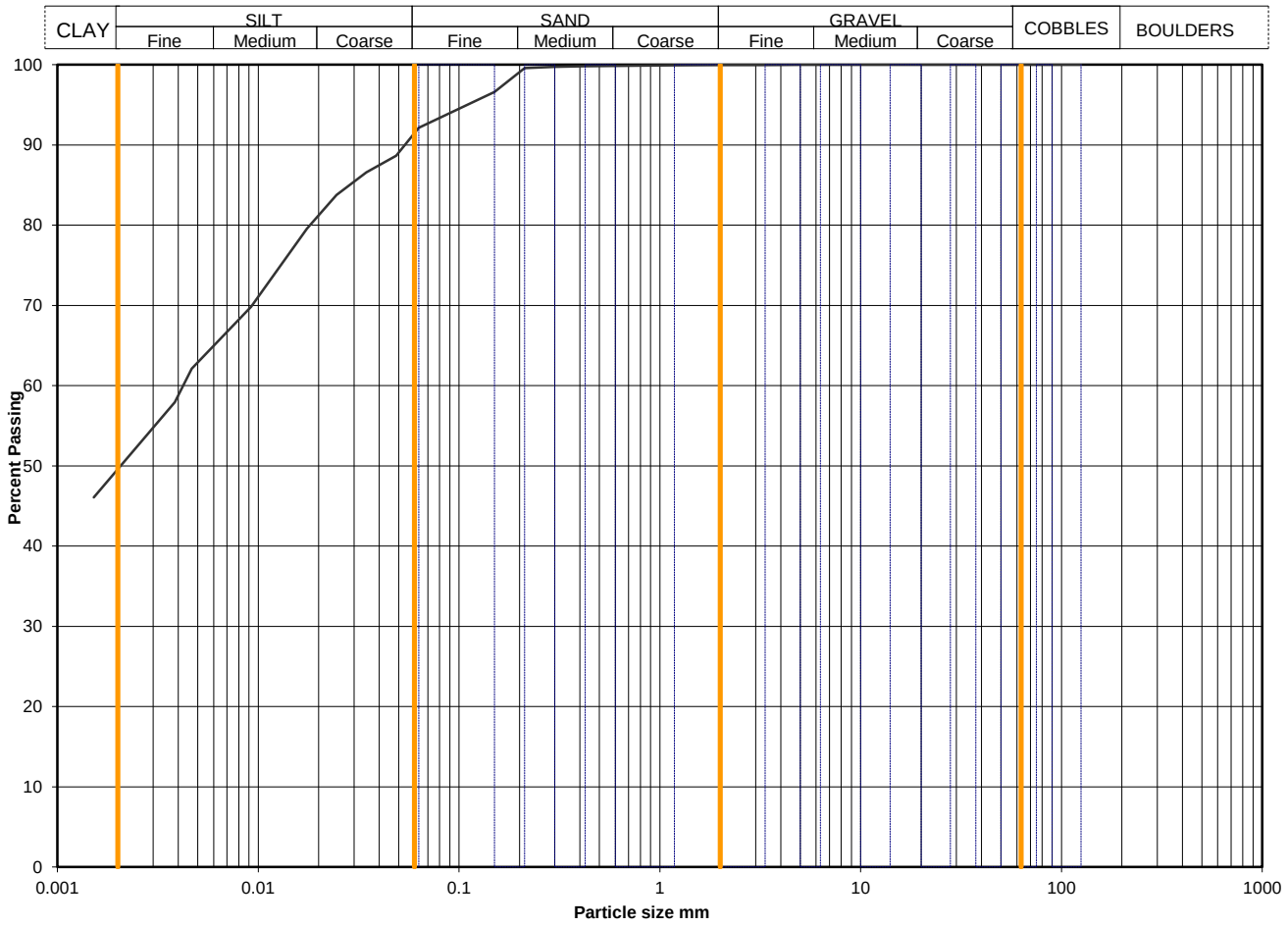
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209025731

Hole No	ATK-CP-07A
Sample Depth (m BGL)	4.50 - 5.00
Sample Type and No	D16
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	92
90	100	0.0487	89
75	100	0.0346	87
63	100	0.0246	84
50	100	0.0175	80
37.5	100	0.0092	70
28	100	0.0047	62
20	100	0.0038	58
14	100	0.0015	46
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	97	0.8	
0.063	92		

Soil description	Grey and reddish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	7.8	7.8
*<60mm values to aid description only	Silt	42.6	42.6
	Clay	49.6	49.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

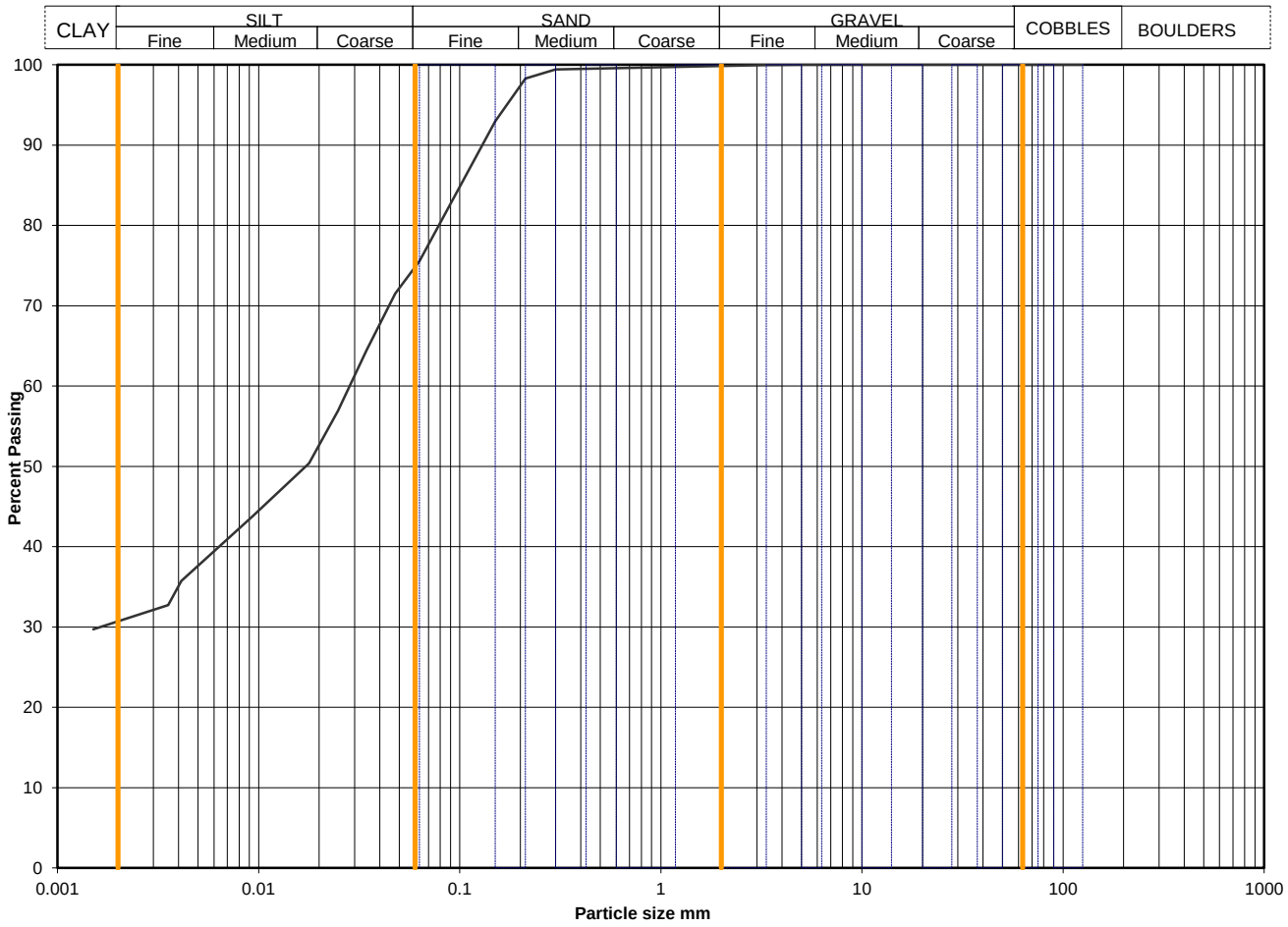
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209025855

Hole No	ATK-CP-07A
Sample Depth (m BGL)	6.00 - 6.40
Sample Type and No	UT21
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	76
90	100	0.0477	72
75	100	0.0344	64
63	100	0.0248	57
50	100	0.0178	50
37.5	100	0.0094	44
28	100	0.0041	36
20	100	0.0036	33
14	100	0.0015	30
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	98		
0.150	93	0.7	
0.063	76		

Soil description	Very stiff reddish brown mottled grey slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
*<60mm values to aid description only	Cobbles / boulders	0.0	0.0
	Gravel	0.2	0.2
	Sand	24.3	24.3
	Silt	44.8	44.8
	Clay	30.7	30.7

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

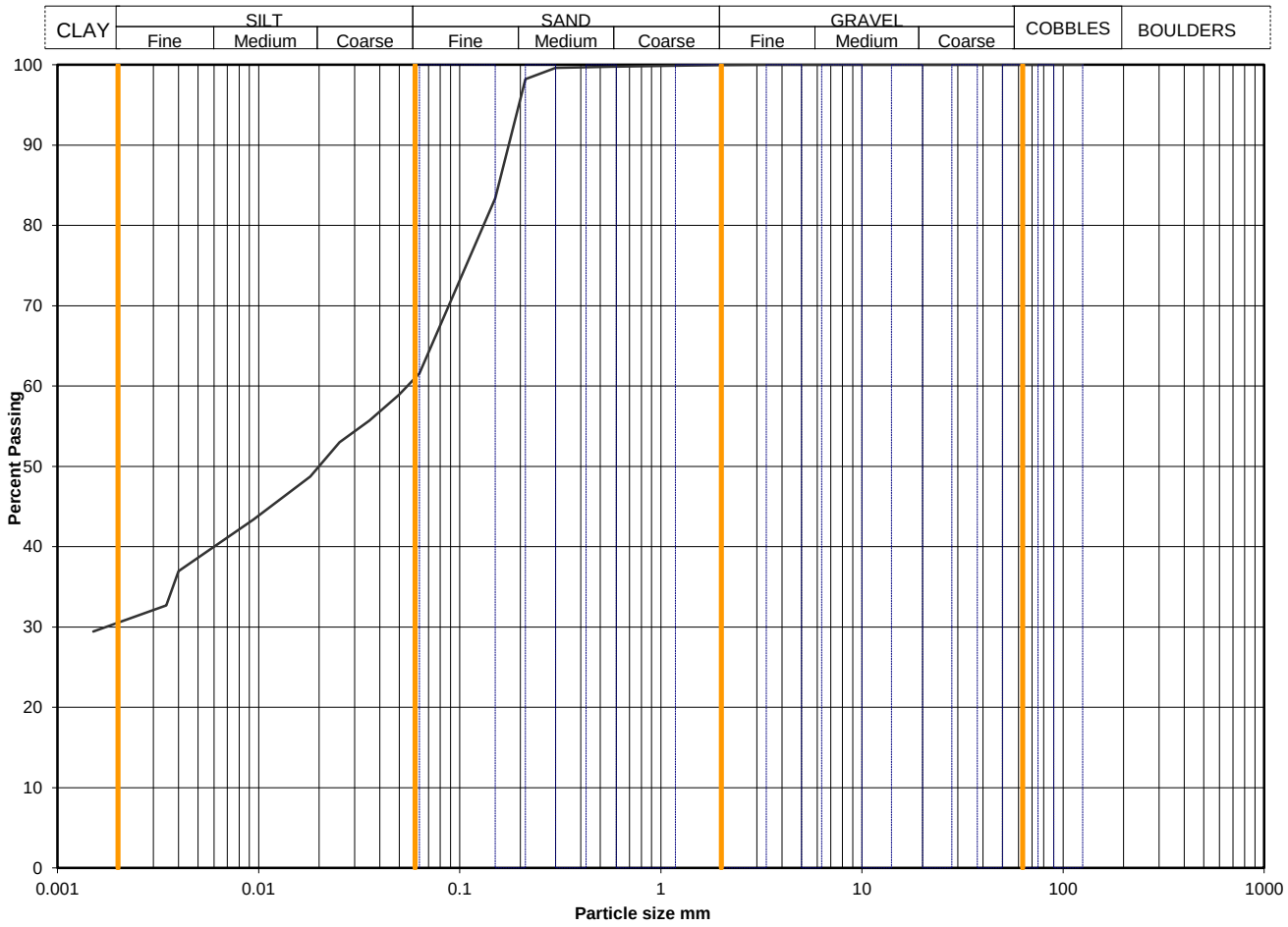
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209025920

Hole No	ATK-CP-07A
Sample Depth (m BGL)	6.50 - 7.00
Sample Type and No	B23
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	62
90	100	0.0498	59
75	100	0.0355	56
63	100	0.0253	53
50	100	0.0181	49
37.5	100	0.0094	43
28	100	0.0040	37
20	100	0.0035	33
14	100	0.0015	29
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	98		
0.150	83	0.7	
0.063	62		

Soil description	Grey and reddish brown sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	38.5	38.5
*<60mm values to aid description only	Silt	31.0	31.0
	Clay	30.5	30.5

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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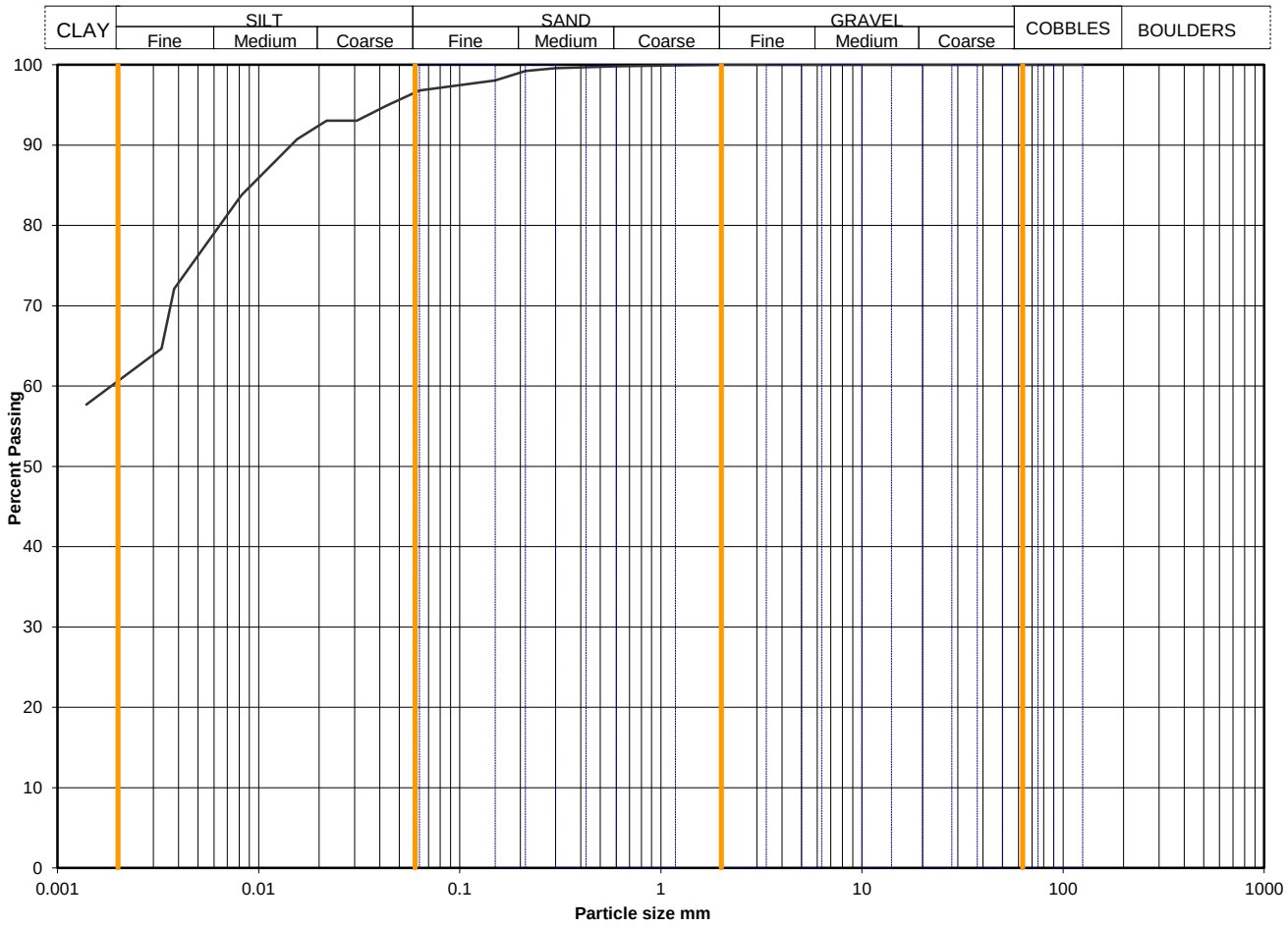
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209030030

Hole No	ATK-CP-07A
Sample Depth (m BGL)	8.00 - 8.35
Sample Type and No	UT28
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0433	95
75	100	0.0308	93
63	100	0.0218	93
50	100	0.0156	91
37.5	100	0.0082	84
28	100	0.0038	72
20	100	0.0033	65
14	100	0.0014	58
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	99		
0.150	98	0.5	
0.063	97		

Soil description	Very stiff grey mottled reddish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	3.2	3.2
*<60mm values to aid description only	Silt	36.2	36.2
	Clay	60.6	60.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

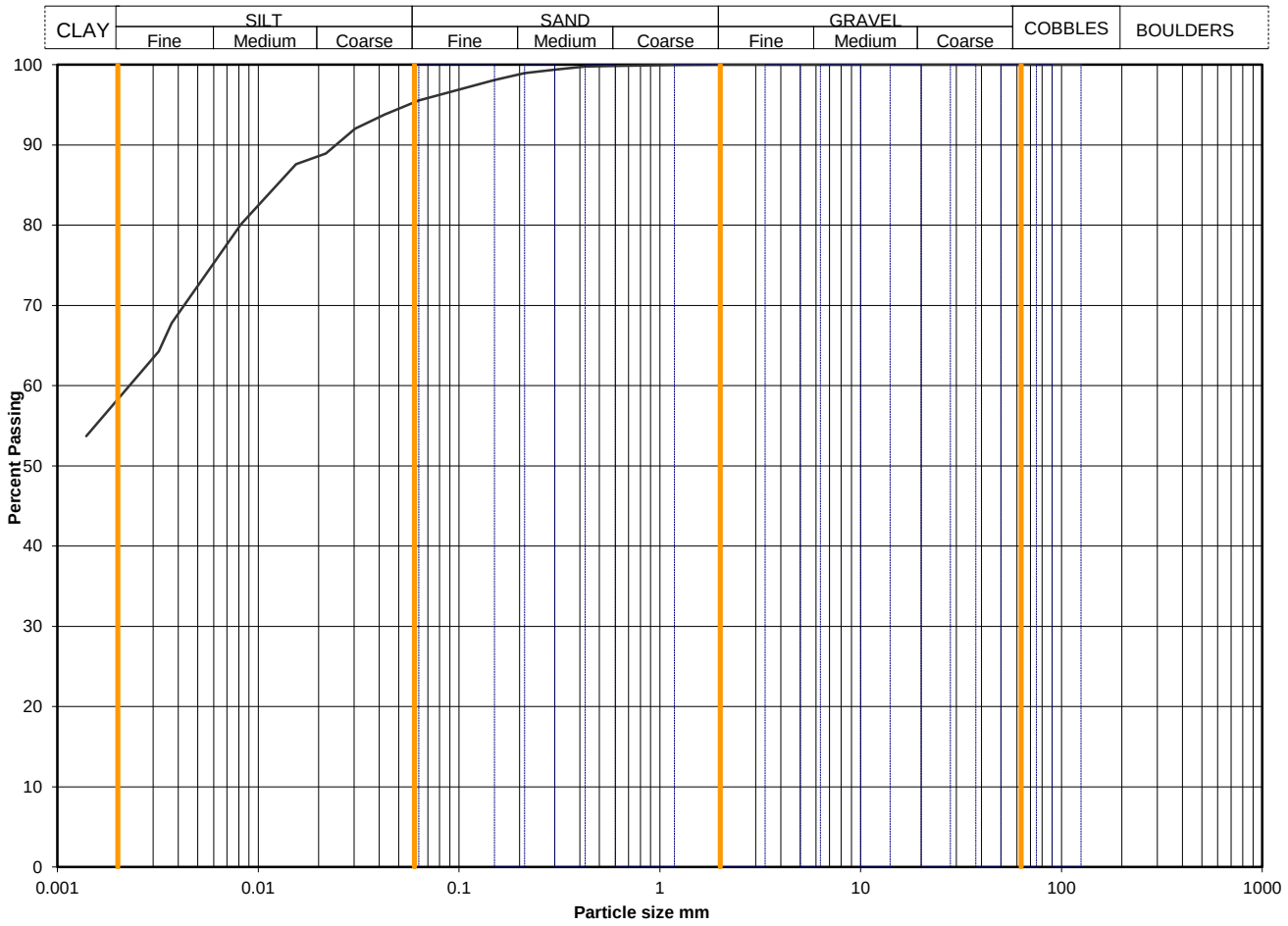
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209030213

Hole No	ATK-CP-07A
Sample Depth (m BGL)	8.50 - 9.00
Sample Type and No	B30
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	96
90	100	0.0426	94
75	100	0.0304	92
63	100	0.0217	89
50	100	0.0154	88
37.5	100	0.0082	80
28	100	0.0037	68
20	100	0.0032	64
14	100	0.0014	54
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	0.6	
0.063	96		

Soil description	Grey and reddish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	4.5	4.5
*<60mm values to aid description only	Silt	37.2	37.2
	Clay	58.3	58.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

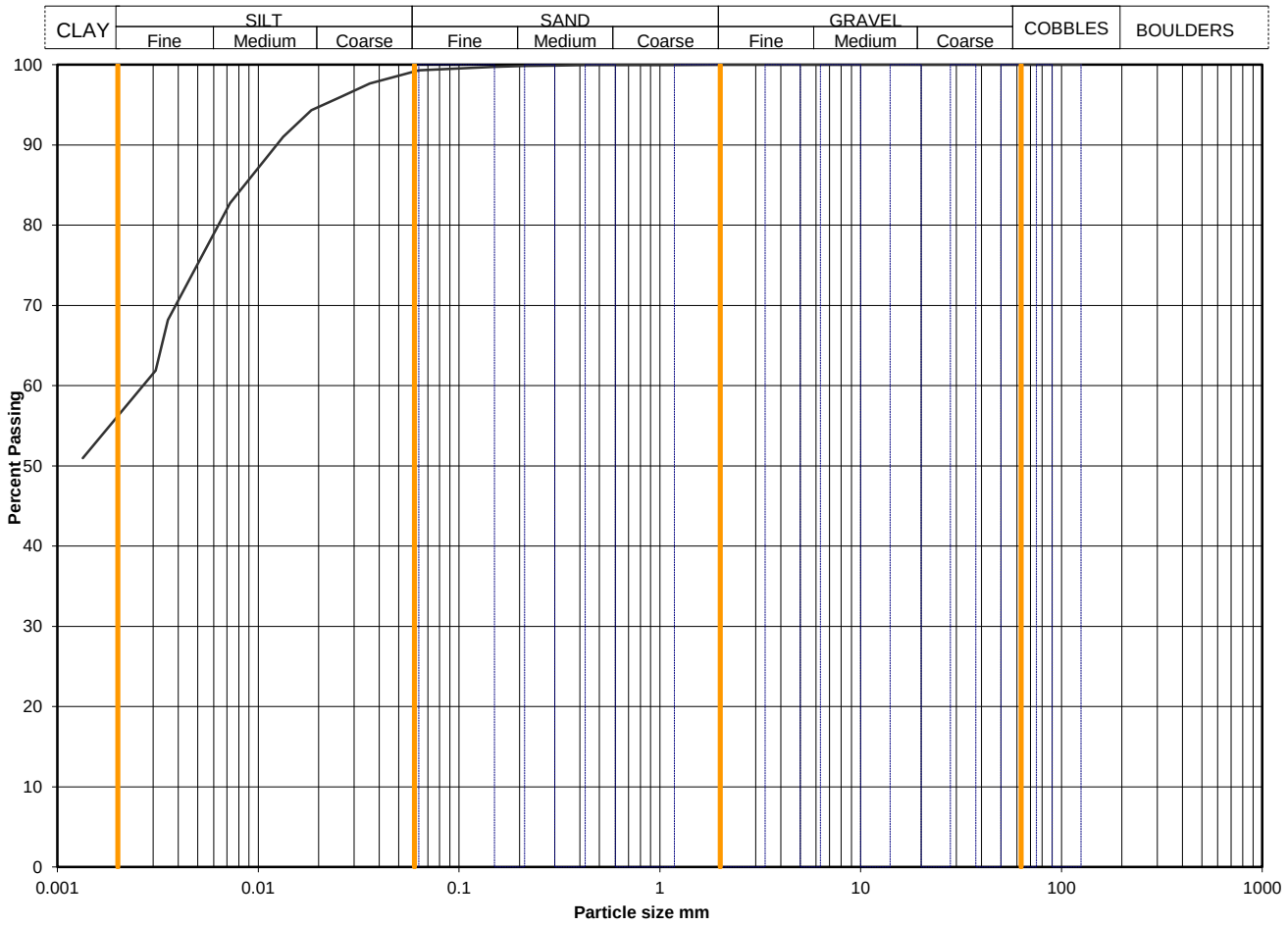
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191209030543

Hole No	ATK-CP-07A
Sample Depth (m BGL)	10.00 - 10.35
Sample Type and No	UT35
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0359	98
75	100	0.0257	96
63	100	0.0184	94
50	100	0.0133	91
37.5	100	0.0073	83
28	100	0.0035	68
20	100	0.0031	62
14	100	0.0013	51
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	100	0.7	
0.063	99		

Soil description	Very stiff reddish brown mottled grey and brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
*<60mm values to aid description only	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	0.7	0.7
	Silt	43.1	43.1
	Clay	56.2	56.2

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

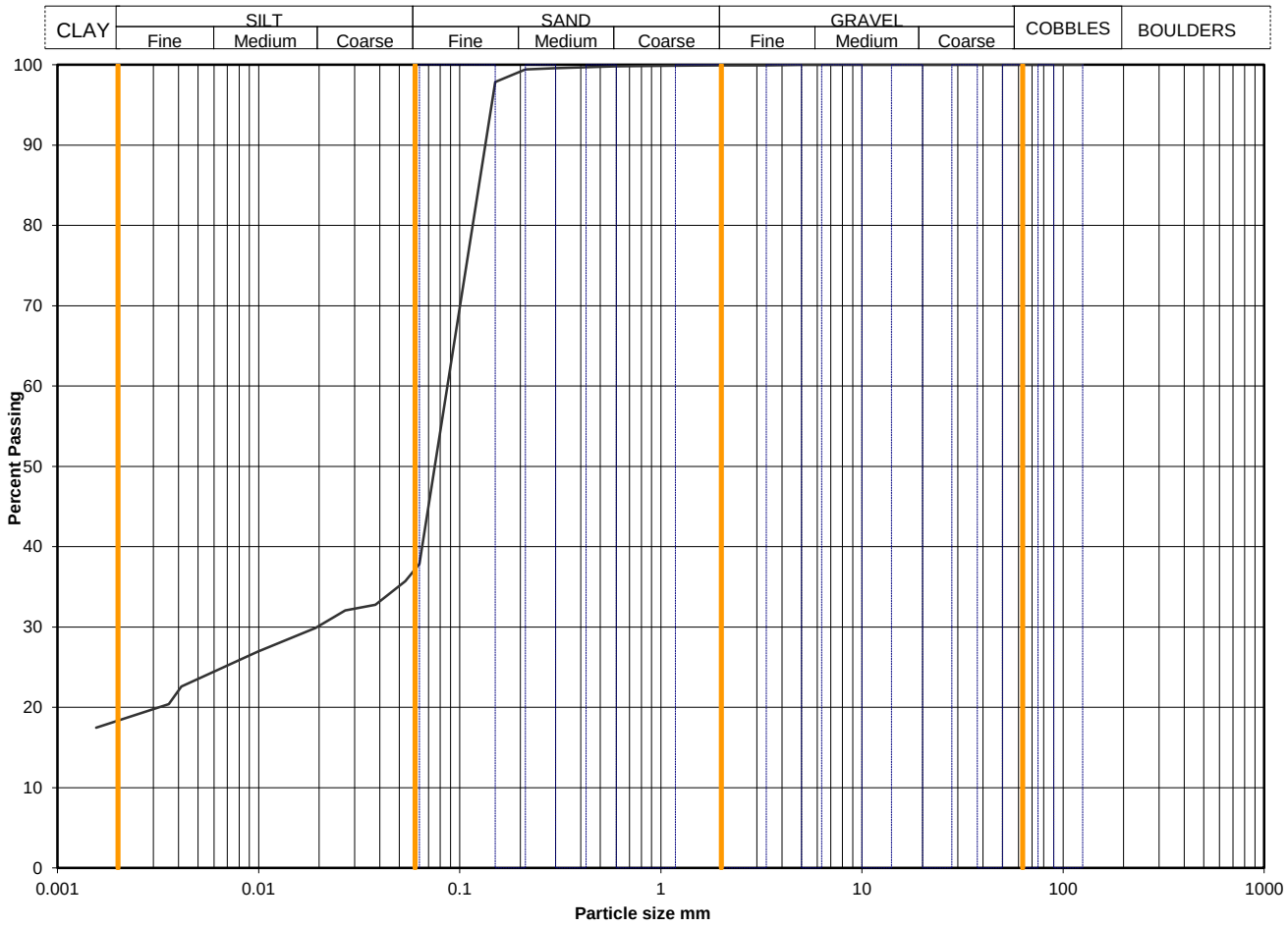
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191126041753

Hole No	ATK-CP-08
Sample Depth (m BGL)	0.50 - 1.00
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	38
90	100	0.0536	36
75	100	0.0381	33
63	100	0.0270	32
50	100	0.0191	30
37.5	100	0.0099	27
28	100	0.0041	23
20	100	0.0036	20
14	100	0.0016	17
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	99		
0.150	98	0.6	
0.063	38		

Soil description	Grey and brown sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	62.1	62.1
*<60mm values to aid description only	Silt	19.5	19.5
	Clay	18.4	18.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

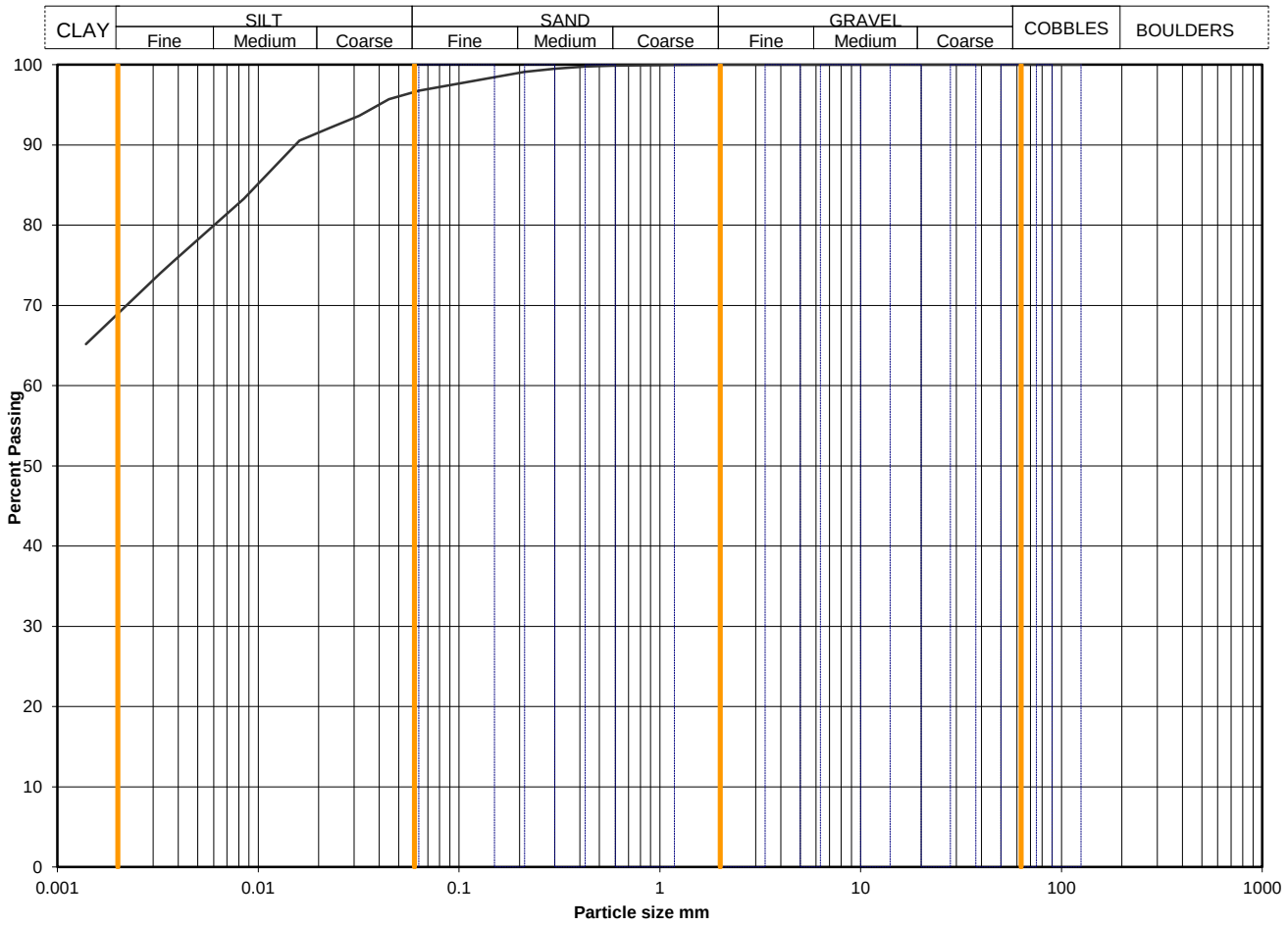
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191126042408

Hole No	ATK-CP-08
Sample Depth (m BGL)	4.65 - 5.20
Sample Type and No	B17
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0447	96
75	100	0.0318	94
63	100	0.0226	92
50	100	0.0161	91
37.5	100	0.0085	83
28	100	0.0038	76
20	100	0.0032	74
14	100	0.0014	65
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	99		
0.150	98	0.6	
0.063	97		

Soil description	Grey and reddish brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
*<60mm values to aid description only	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	3.2	3.2
	Silt	27.8	27.8
	Clay	69.0	69.0

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

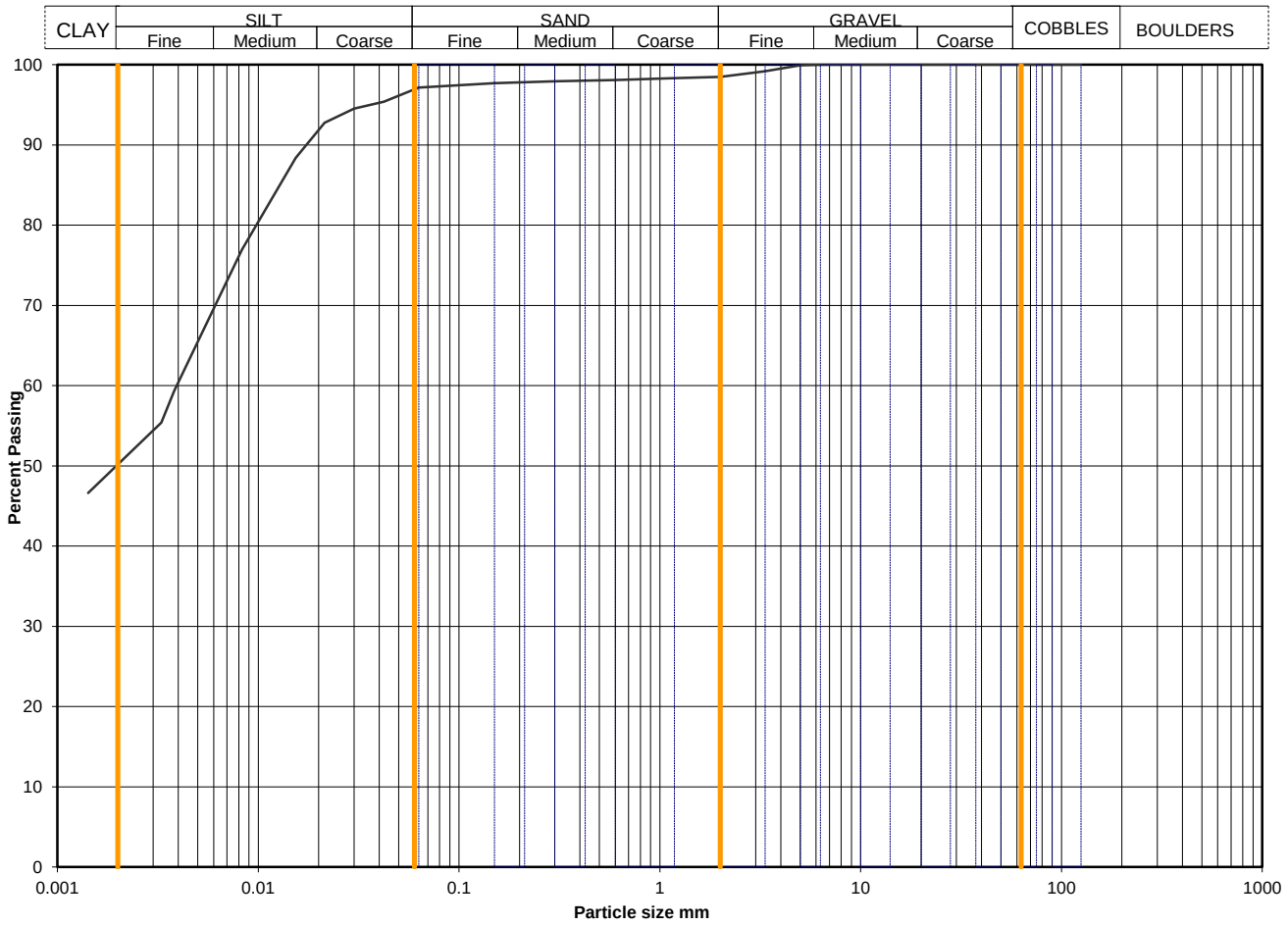
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191126042844

Hole No	ATK-CP-08
Sample Depth (m BGL)	6.50 - 7.20
Sample Type and No	B24
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0423	95
75	100	0.0300	95
63	100	0.0214	93
50	100	0.0154	88
37.5	100	0.0083	77
28	100	0.0038	59
20	100	0.0033	55
14	100	0.0014	47
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	99		
1.18	98	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	98	0.5	
0.063	97		

Soil description	Grey and reddish brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.5	1.5
	Sand	1.3	1.3
*<60mm values to aid description only	Silt	47.0	47.0
	Clay	50.2	50.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

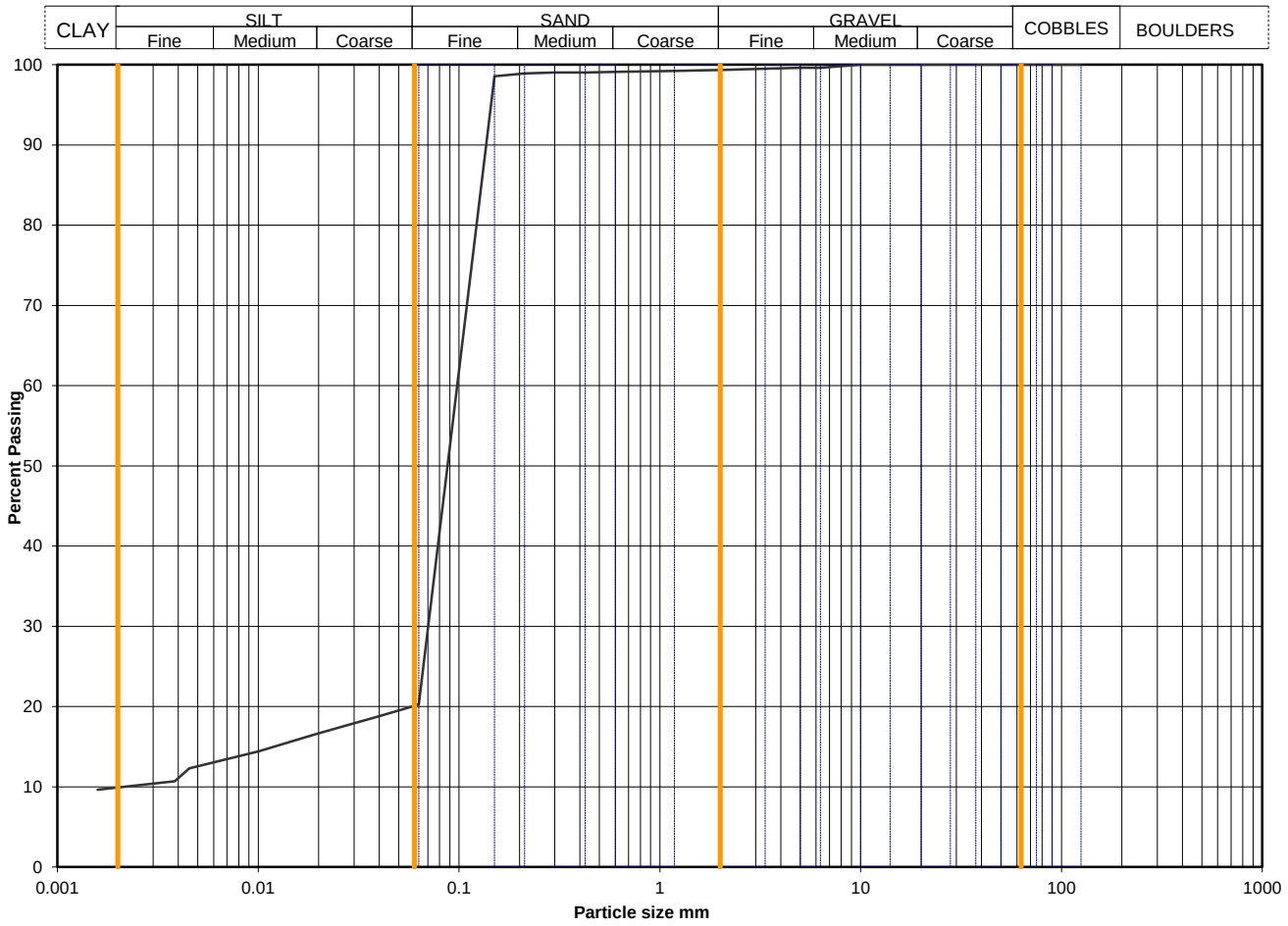
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191129105647

Hole No	ATK-CP-09
Sample Depth (m BGL)	1.65 - 2.20
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	20
90	100	0.0544	20
75	100	0.0385	19
63	100	0.0273	18
50	100	0.0193	17
37.5	100	0.0100	14
28	100	0.0045	12
20	100	0.0038	11
14	100	0.0016	10
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	0.6	
0.063	20		

Soil description	Brown slightly gravelly very clayey SAND.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.6	0.6
	Sand	79.1	79.1
*<60mm values to aid description only	Silt	10.4	10.4
	Clay	9.9	9.9

Uniformity Coefficient	D60 / D10	45

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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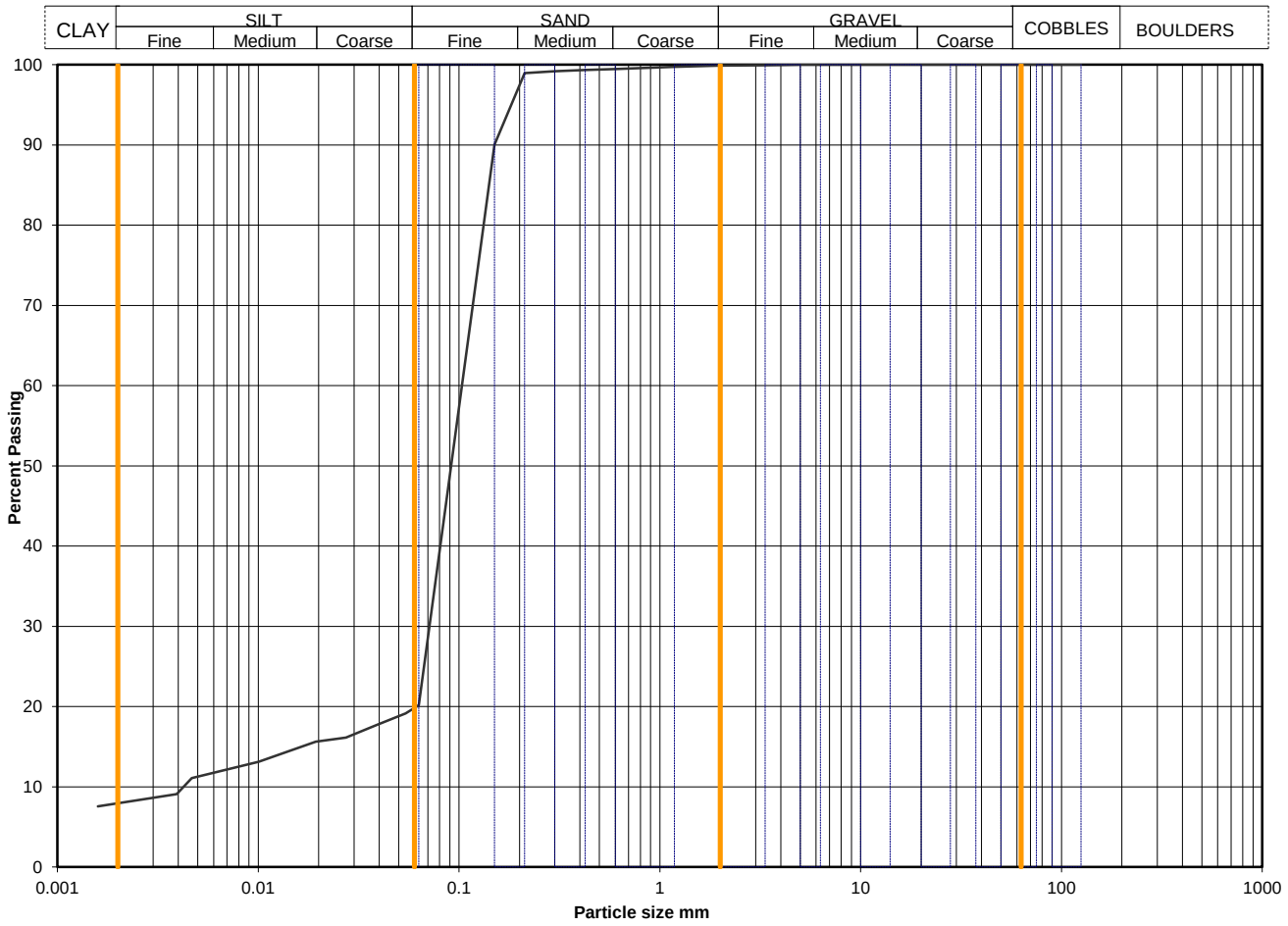
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191129105757

Hole No	ATK-CP-09
Sample Depth (m BGL)	2.20 - 2.65
Sample Type and No	B10
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	20
90	100	0.0543	19
75	100	0.0385	18
63	100	0.0273	16
50	100	0.0193	16
37.5	100	0.0100	13
28	100	0.0047	11
20	100	0.0039	9
14	100	0.0016	8
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	90	0.7	
0.063	20		

Soil description	Brown clayey SAND.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.2	0.2
	Sand	79.7	79.7
*<60mm values to aid description only	Silt	12.2	12.2
	Clay	7.9	7.9

Uniformity Coefficient	**D60 / D10**	24

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

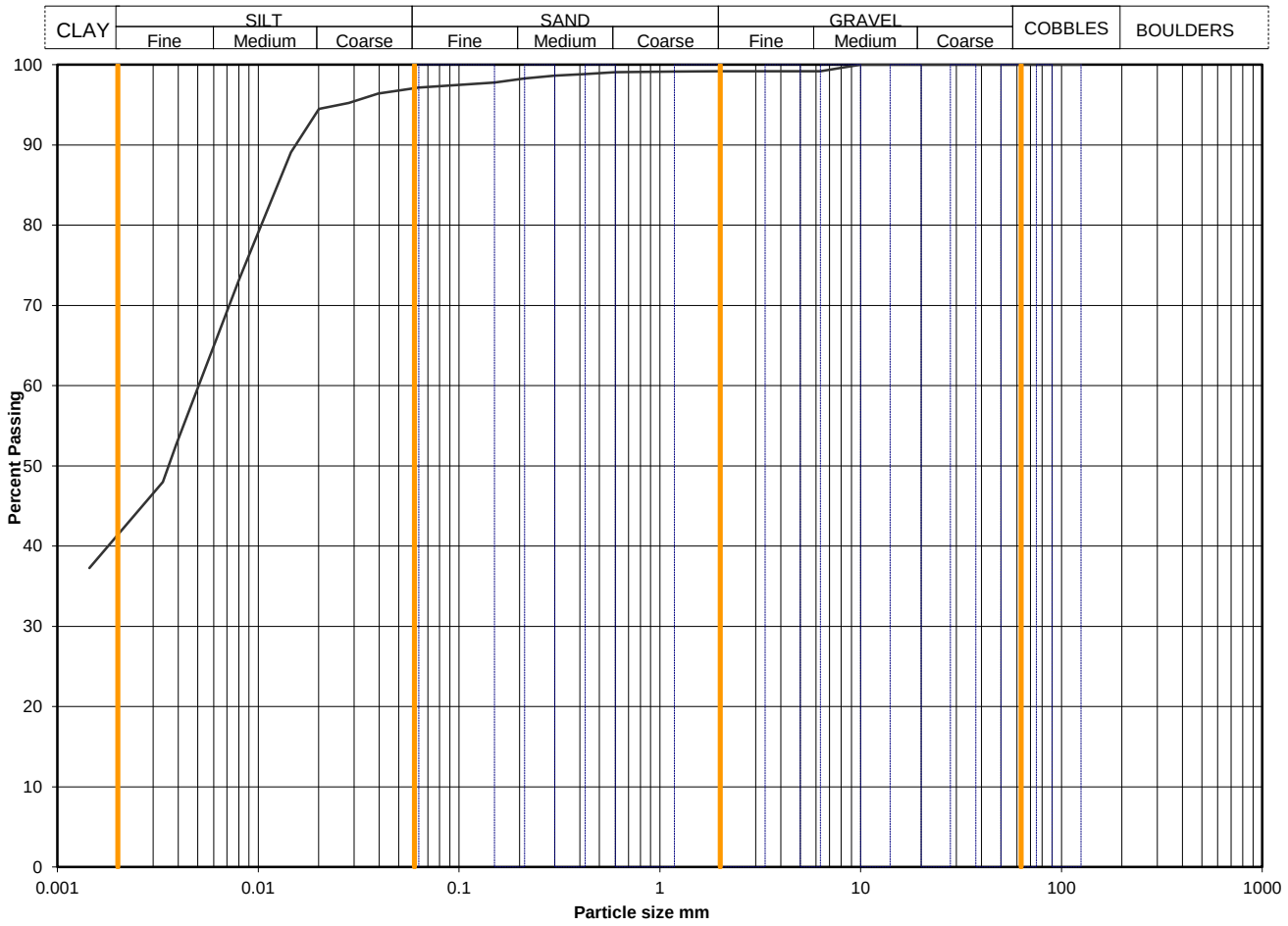
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191129110324

Hole No	ATK-CP-09
Sample Depth (m BGL)	3.50 - 4.20
Sample Type and No	B15
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0397	96
75	100	0.0282	95
63	100	0.0200	94
50	100	0.0146	89
37.5	100	0.0081	73
28	100	0.0039	53
20	100	0.0034	48
14	100	0.0014	37
10	100		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	98		
0.150	98	0.6	
0.063	97		

Soil description	Grey and reddish brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.8	0.8
	Sand	2.0	2.0
*<60mm values to aid description only	Silt	55.8	55.8
	Clay	41.4	41.4

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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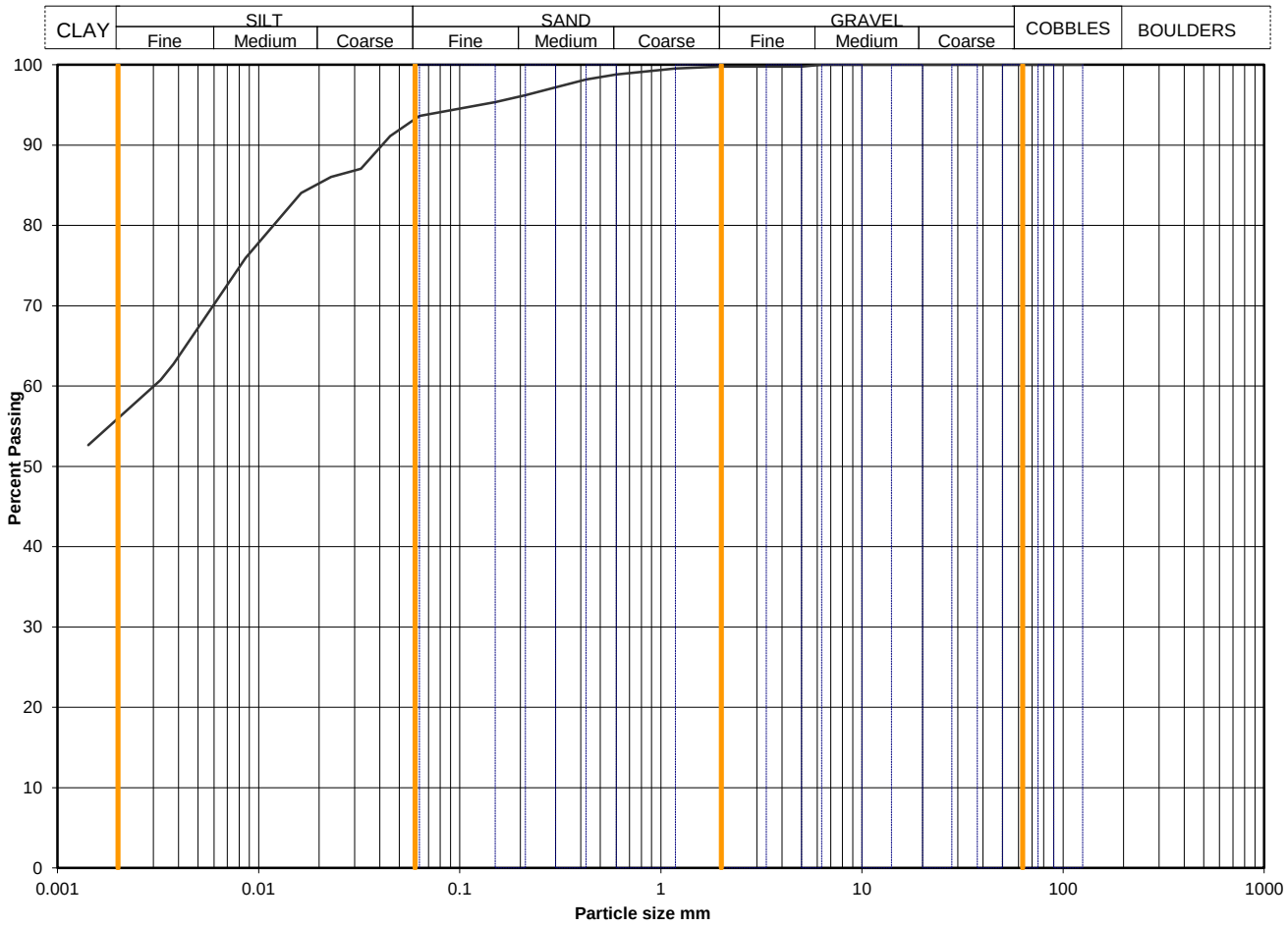
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191129110553

Hole No	ATK-CP-09
Sample Depth (m BGL)	5.20 - 5.65
Sample Type and No	B20
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	94
90	100	0.0451	91
75	100	0.0323	87
63	100	0.0229	86
50	100	0.0163	84
37.5	100	0.0086	76
28	100	0.0038	63
20	100	0.0033	61
14	100	0.0014	53
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	98	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	96		
0.150	95	0.5	
0.063	94		

Soil description	Grey and reddish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.1	0.1
	Sand	6.2	6.2
*<60mm values to aid description only	Silt	37.7	37.7
	Clay	56.0	56.0

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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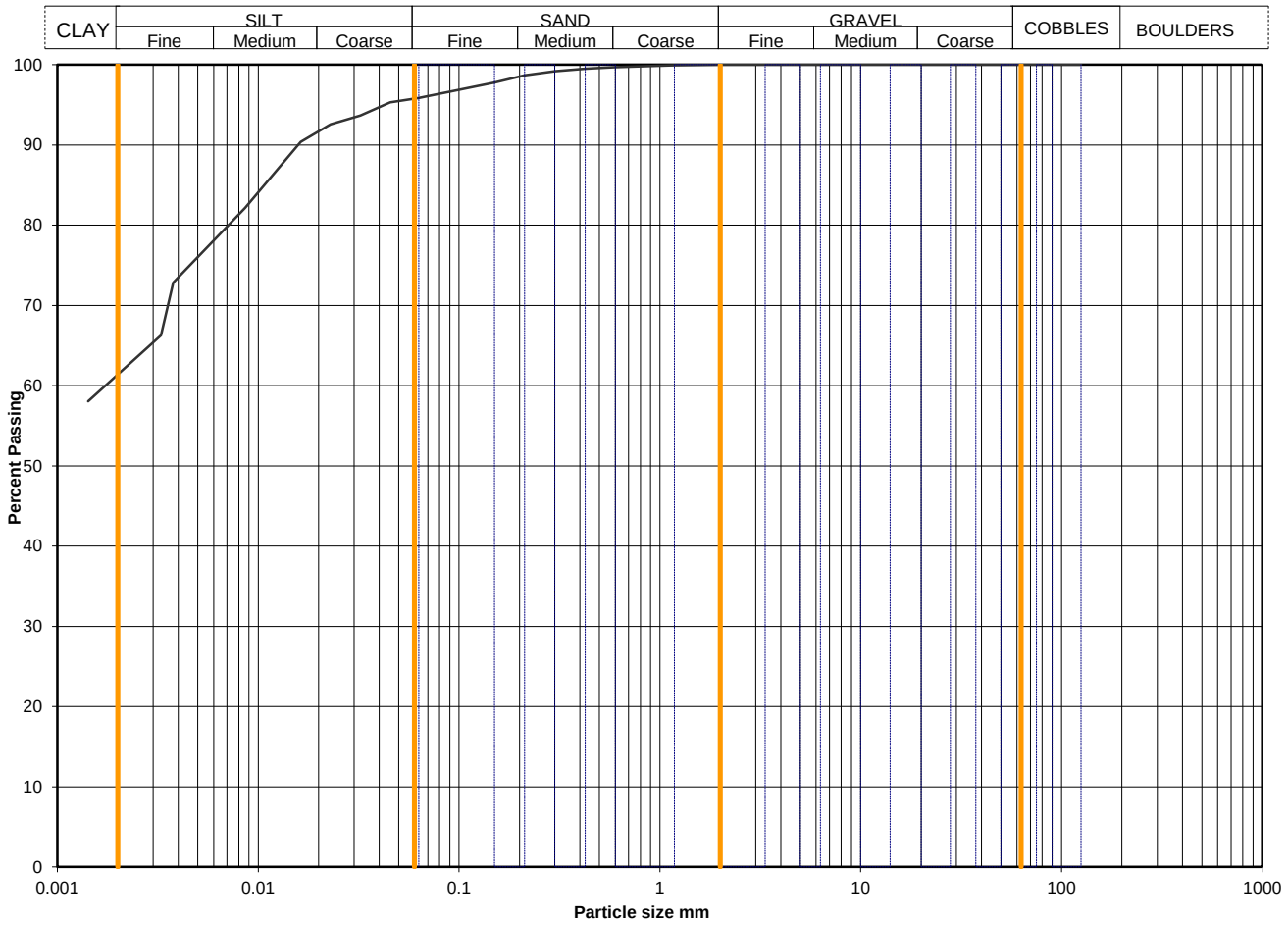
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191129111213

Hole No	ATK-CP-09
Sample Depth (m BGL)	8.20 - 8.65
Sample Type and No	B30
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	96
90	100	0.0455	95
75	100	0.0323	94
63	100	0.0229	93
50	100	0.0163	90
37.5	100	0.0086	82
28	100	0.0038	73
20	100	0.0033	66
14	100	0.0014	58
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	0.6	
0.063	96		

Soil description	Grey and reddish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	4.2	4.2
*<60mm values to aid description only	Silt	34.4	34.4
	Clay	61.4	61.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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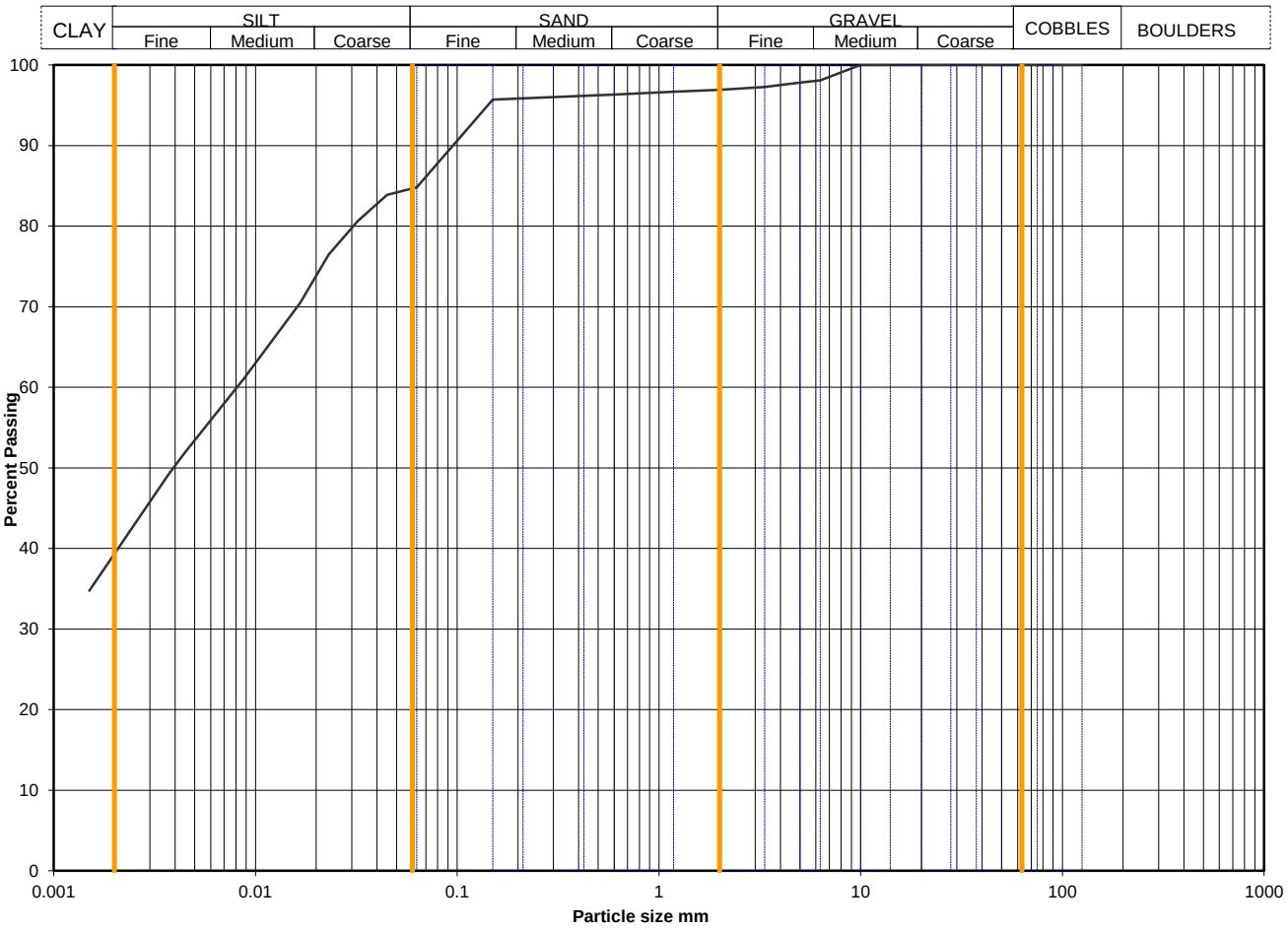
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191122011737

Hole No	ATK-CP-10
Sample Depth (m BGL)	4.50 - 5.00
Sample Type and No	B17
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	85
90	100	0.0450	84
75	100	0.0322	81
63	100	0.0231	76
50	100	0.0166	70
37.5	100	0.0088	61
28	100	0.0045	52
20	100	0.0037	49
14	100	0.0015	35
10	100		
6.3	98		
5.0	98		
3.35	97		
2.00	97		
1.18	97	Particle density, Mg/m3	
0.600	96		
0.425	96	2.65 assumed	
0.300	96	Dry mass of sample, kg	
0.212	96		
0.150	96	0.5	
0.063	85		

Soil description	Brown and dark grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	3.0	3.0
	Sand	12.1	12.1
*<60mm values to aid description only	Silt	45.5	45.5
	Clay	39.4	39.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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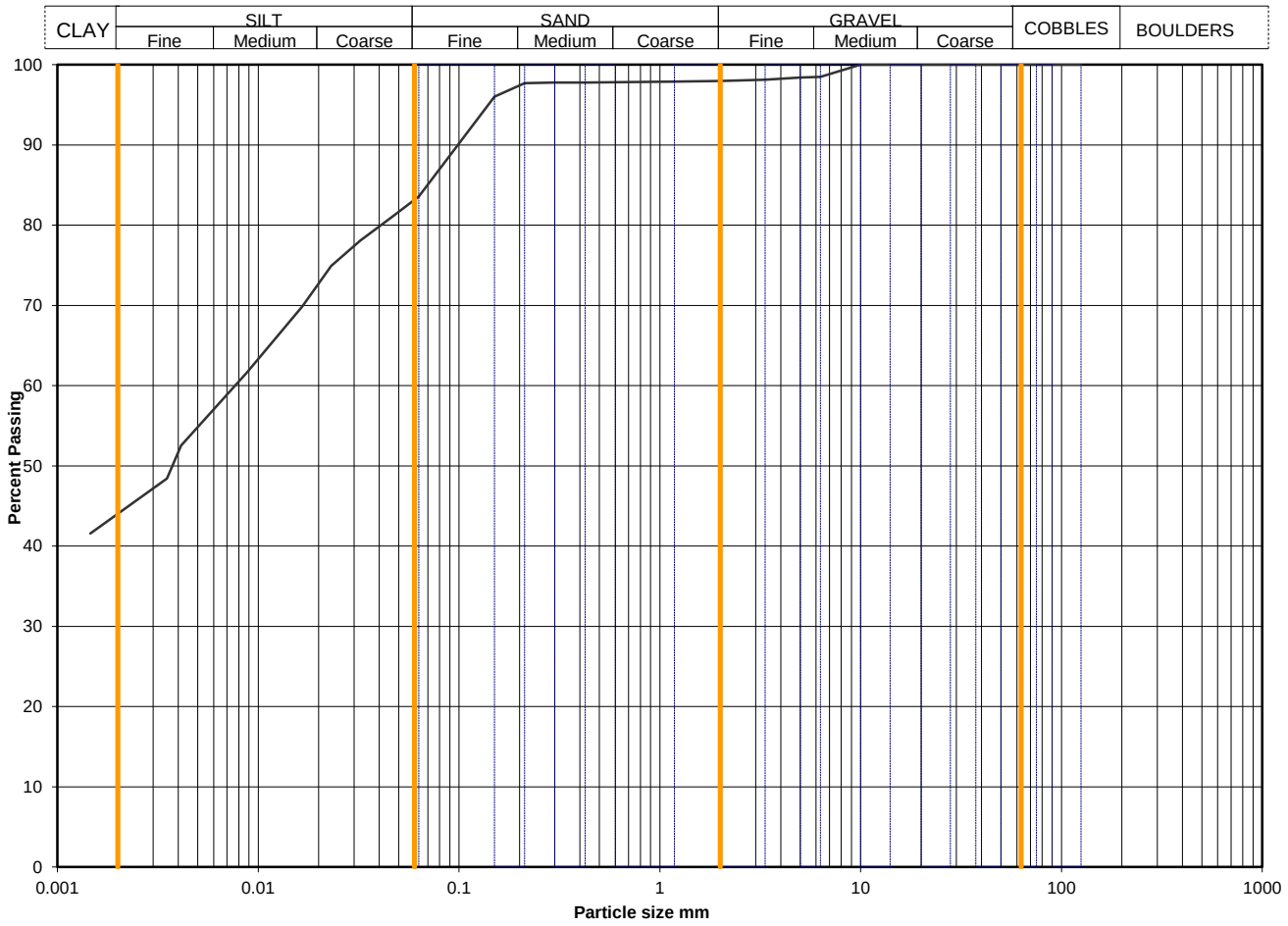
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191122013441

Hole No	ATK-CP-10
Sample Depth (m BGL)	6.50 - 7.00
Sample Type and No	B24
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	84
90	100	0.0453	81
75	100	0.0323	78
63	100	0.0231	75
50	100	0.0166	70
37.5	100	0.0088	62
28	100	0.0041	53
20	100	0.0035	48
14	100	0.0015	42
10	100		
6.3	98		
5.0	98		
3.35	98		
2.00	98		
1.18	98	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	96	0.5	
0.063	84		

Soil description	Dark grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	2.0	2.0
	Sand	14.4	14.4
*<60mm values to aid description only	Silt	39.6	39.6
	Clay	44.0	44.0

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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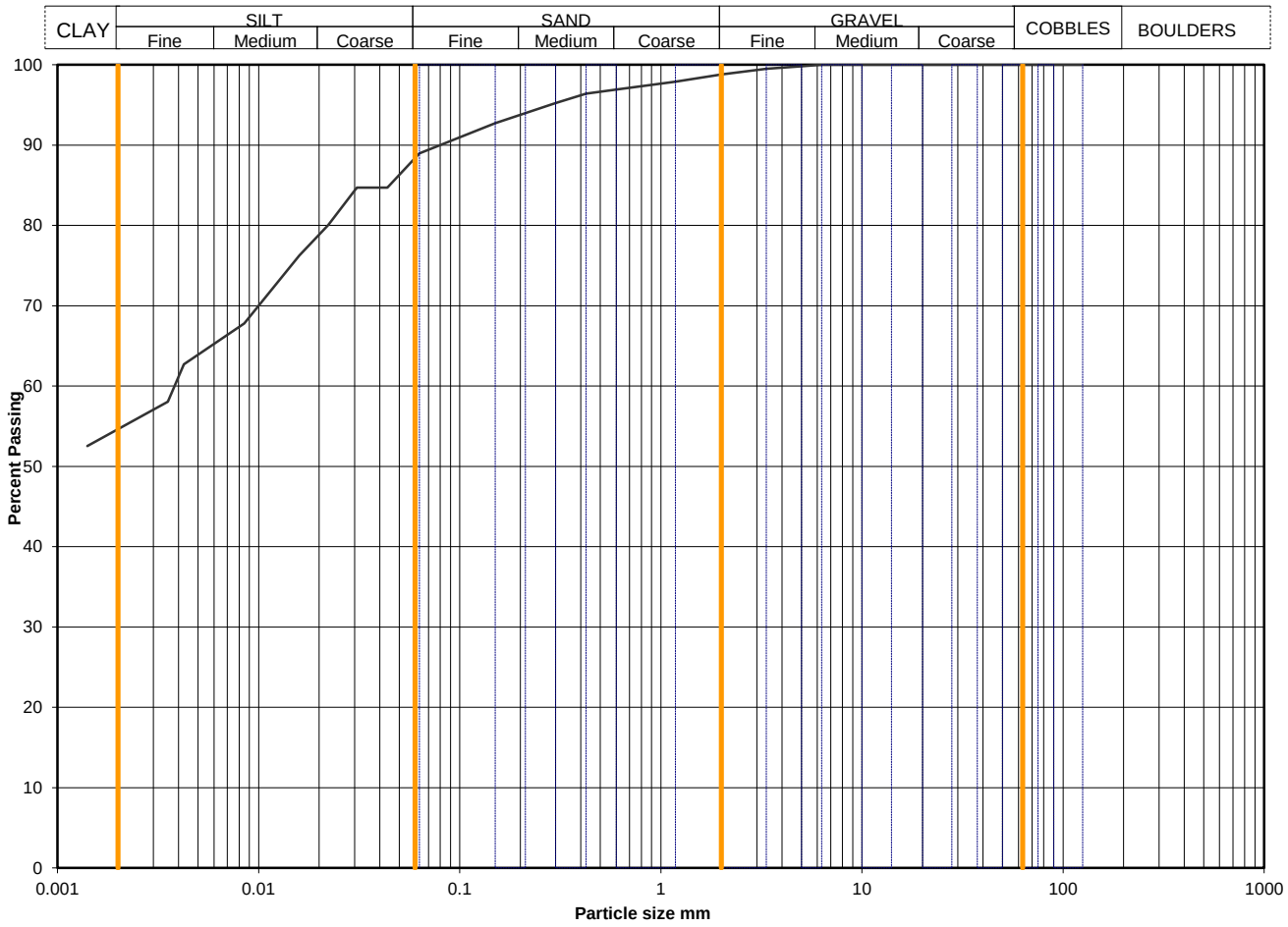
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191219104933

Hole No	ATK-CP-11
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	89
90	100	0.0436	85
75	100	0.0308	85
63	100	0.0222	80
50	100	0.0159	76
37.5	100	0.0085	68
28	100	0.0042	63
20	100	0.0035	58
14	100	0.0014	53
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	99		
1.18	98	Particle density, Mg/m3	
0.600	97		
0.425	96	2.65 assumed	
0.300	95	Dry mass of sample, kg	
0.212	94		
0.150	93	5.1	
0.063	89		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.2	1.2
	Sand	9.9	9.9
*<60mm values to aid description only	Silt	34.3	34.3
	Clay	54.6	54.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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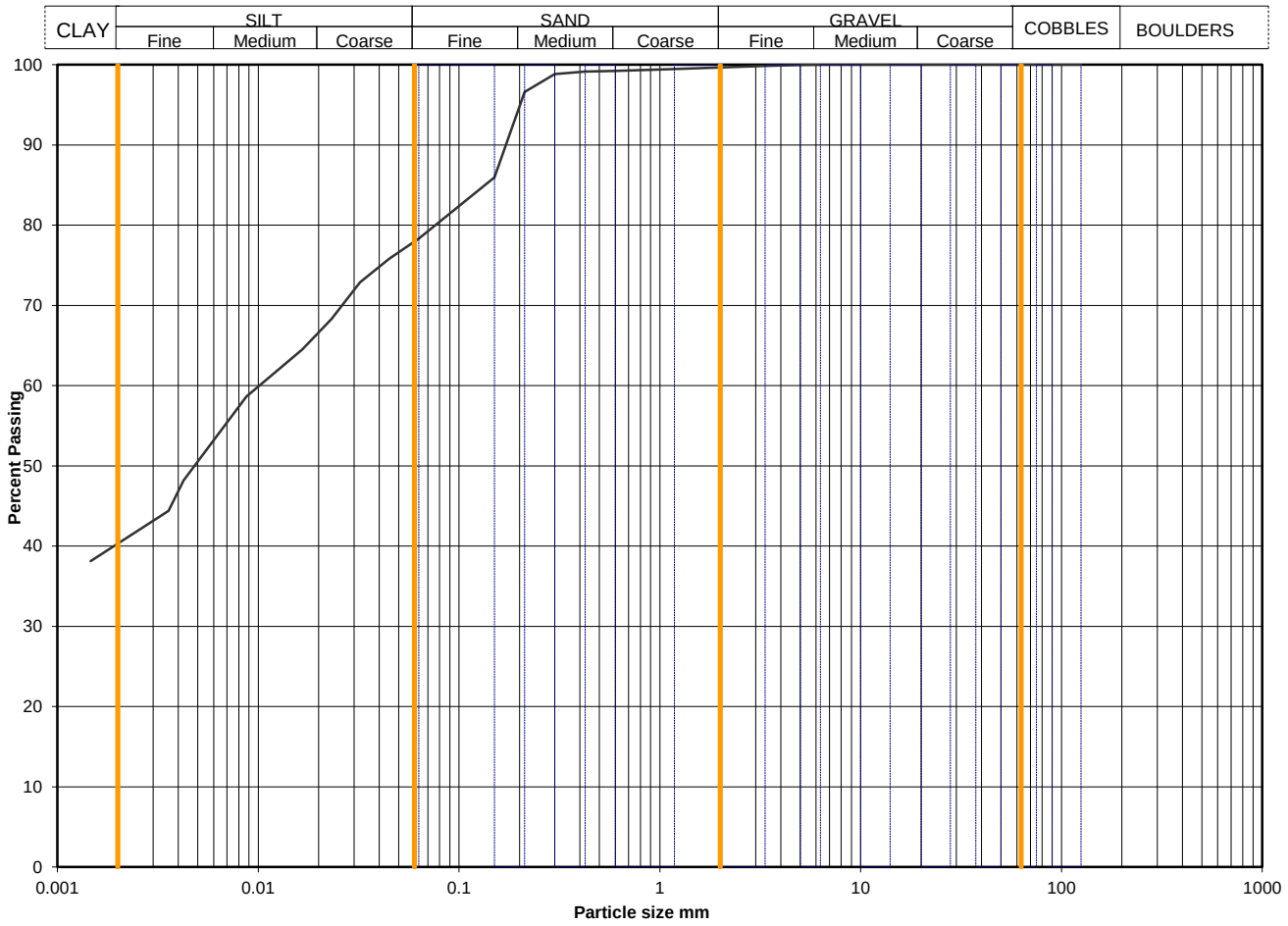
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191219105135

Hole No	ATK-CP-11
Sample Depth (m BGL)	5.00 - 5.50
Sample Type and No	B24
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	78
90	100	0.0450	76
75	100	0.0322	73
63	100	0.0231	68
50	100	0.0166	65
37.5	100	0.0087	59
28	100	0.0042	48
20	100	0.0036	44
14	100	0.0015	38
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	97		
0.150	86	5.2	
0.063	78		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.4	0.4
	Sand	21.3	21.3
*<60mm values to aid description only	Silt	38.0	38.0
	Clay	40.3	40.3

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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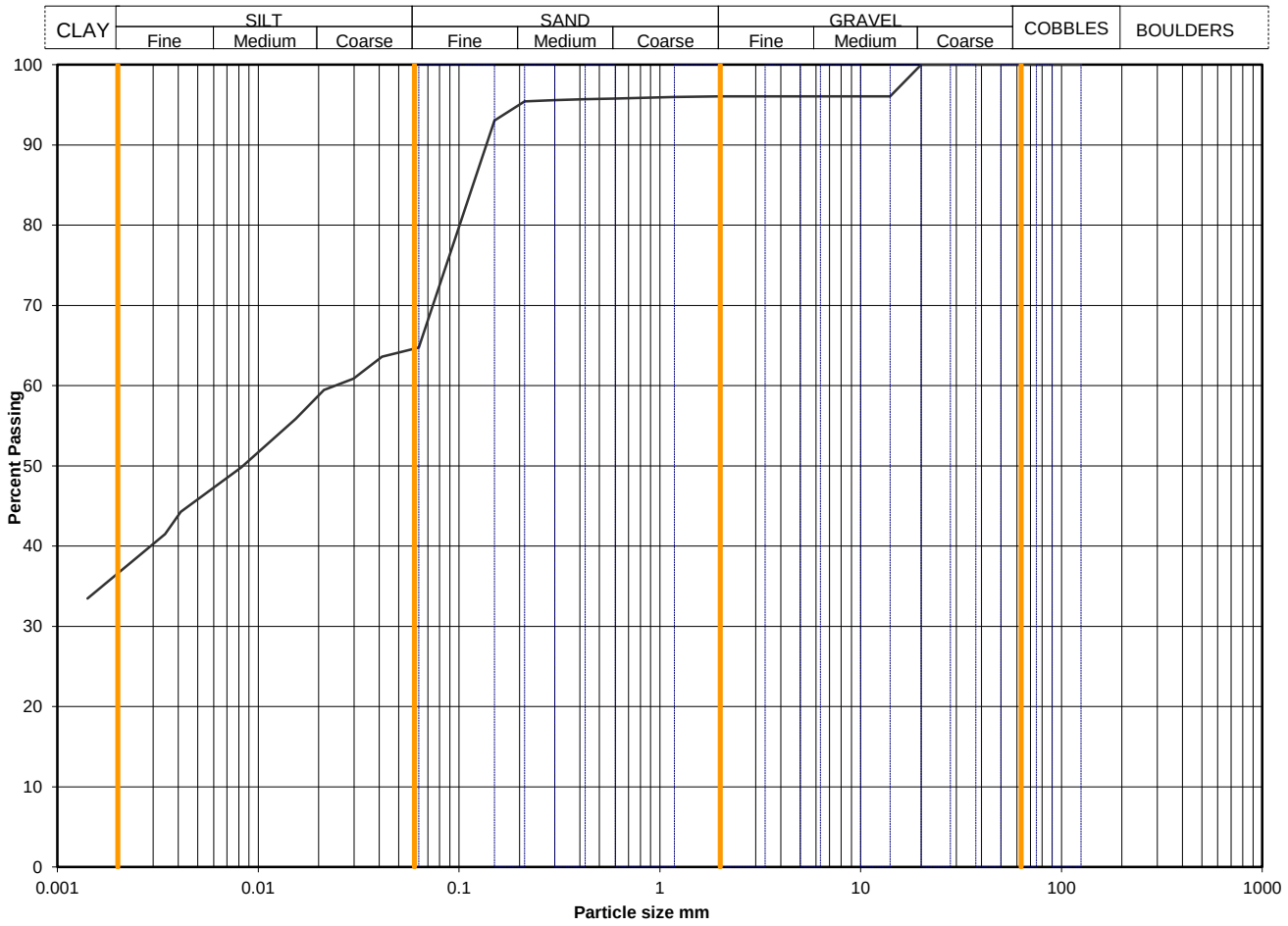
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191121112258

Hole No	ATK-CP-12
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B6
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	65
90	100	0.0413	64
75	100	0.0298	61
63	100	0.0212	59
50	100	0.0154	56
37.5	100	0.0082	50
28	100	0.0041	44
20	100	0.0034	41
14	96	0.0014	33
10	96		
6.3	96		
5.0	96		
3.35	96		
2.00	96		
1.18	96	Particle density, Mg/m3	
0.600	96		
0.425	96	2.65 assumed	
0.300	96	Dry mass of sample, kg	
0.212	95		
0.150	93	0.4	
0.063	65		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	4.0	4.0
	Sand	31.3	31.3
*<60mm values to aid description only	Silt	28.1	28.1
	Clay	36.6	36.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

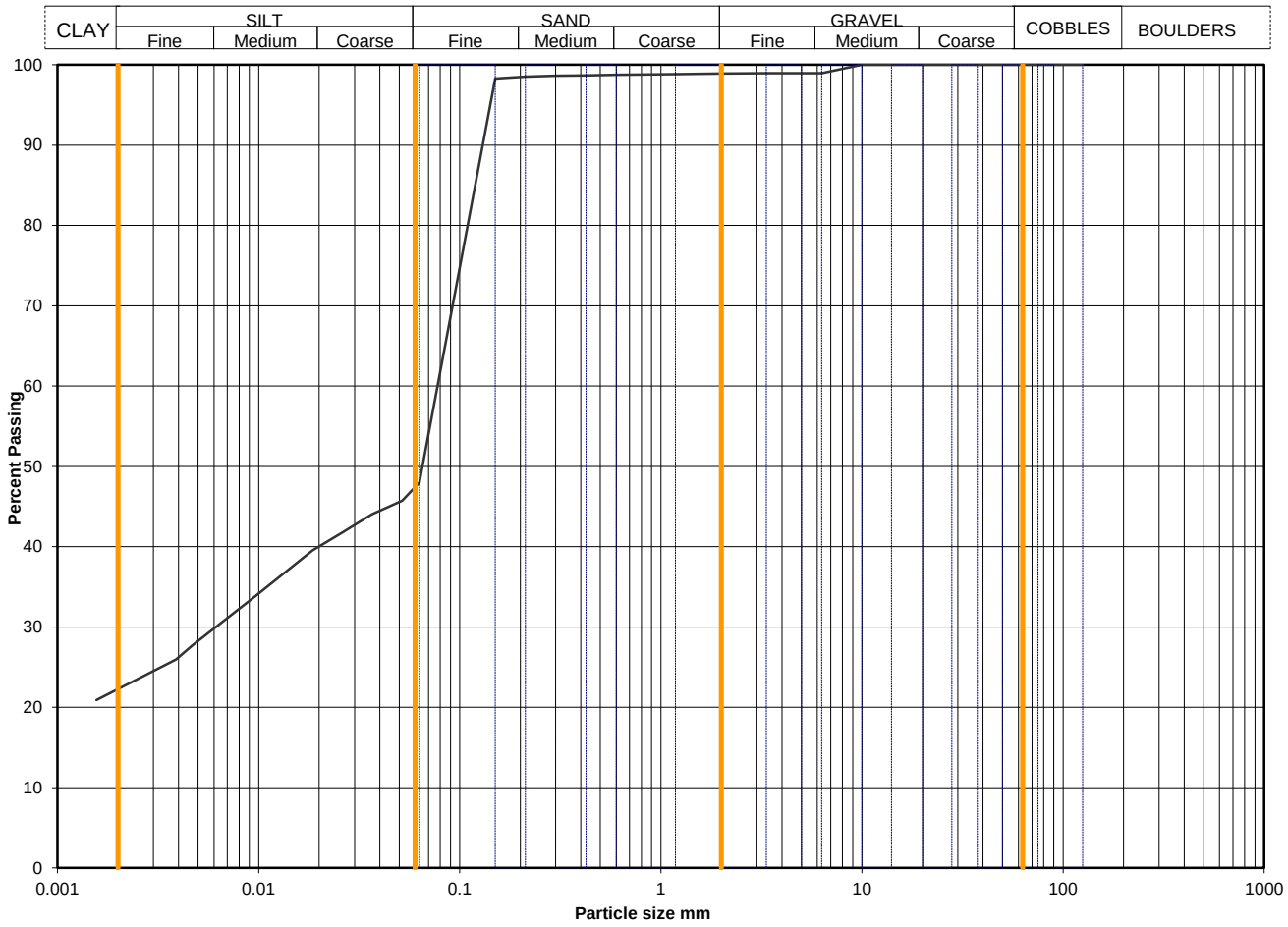
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191121112406

Hole No	ATK-CP-12
Sample Depth (m BGL)	4.00 - 4.50
Sample Type and No	B16
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	48
90	100	0.0517	46
75	100	0.0367	44
63	100	0.0261	42
50	100	0.0185	40
37.5	100	0.0097	34
28	100	0.0047	28
20	100	0.0039	26
14	100	0.0016	21
10	100		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	0.6	
0.063	48		

Soil description	Dark grey sandy silty CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.1	1.1
	Sand	50.9	50.9
*<60mm values to aid description only	Silt	25.7	25.7
	Clay	22.3	22.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

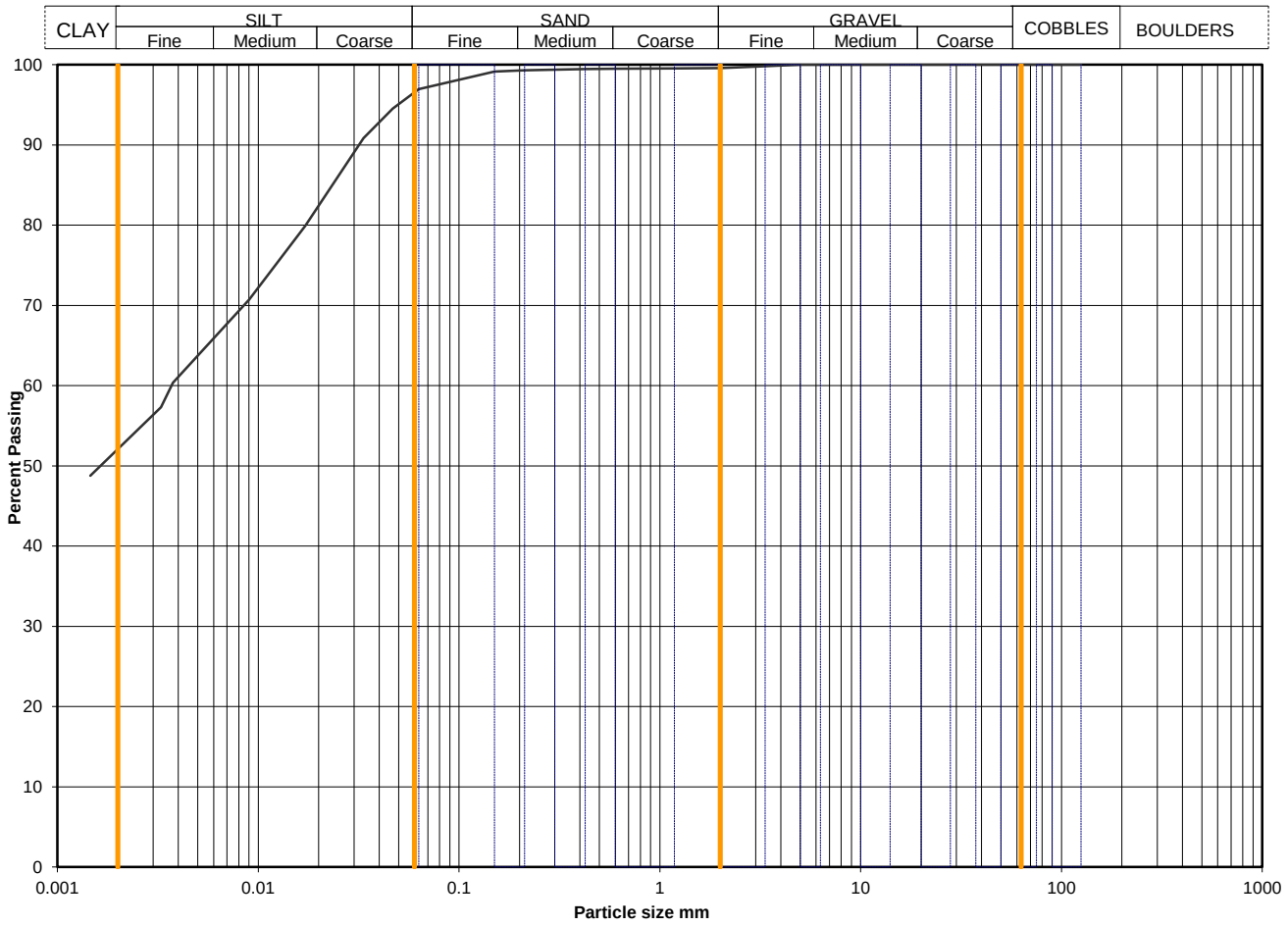
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191121112453

Hole No	ATK-CP-12
Sample Depth (m BGL)	6.00 - 6.50
Sample Type and No	B24
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0468	95
75	100	0.0334	91
63	100	0.0239	85
50	100	0.0171	80
37.5	100	0.0090	71
28	100	0.0038	60
20	100	0.0033	57
14	100	0.0015	49
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	0.6	
0.063	97		

Soil description	Grey and reddish brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.5	0.5
	Sand	2.6	2.6
*<60mm values to aid description only	Silt	44.8	44.8
	Clay	52.1	52.1

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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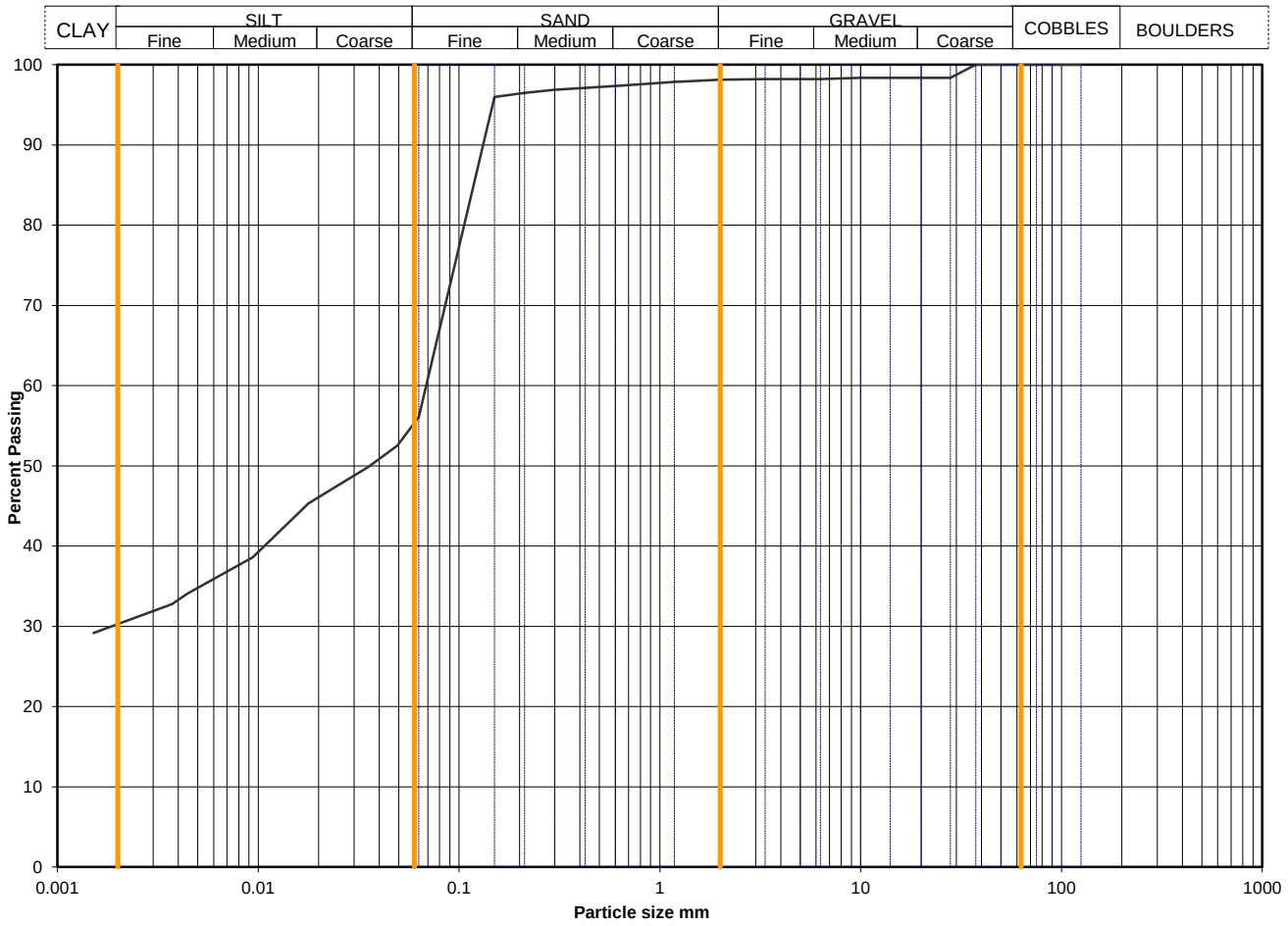
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127033721

Hole No	ATK-CP-13A
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B12
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	56
90	100	0.0494	53
75	100	0.0352	50
63	100	0.0251	48
50	100	0.0178	45
37.5	100	0.0094	39
28	98	0.0045	34
20	98	0.0037	33
14	98	0.0015	29
10	98		
6.3	98		
5.0	98		
3.35	98		
2.00	98		
1.18	98	Particle density, Mg/m3	
0.600	97		
0.425	97	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	96		
0.150	96	3.4	
0.063	56		

Soil description	Brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.9	1.9
	Sand	42.0	42.0
*<60mm values to aid description only	Silt	25.8	25.8
	Clay	30.3	30.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

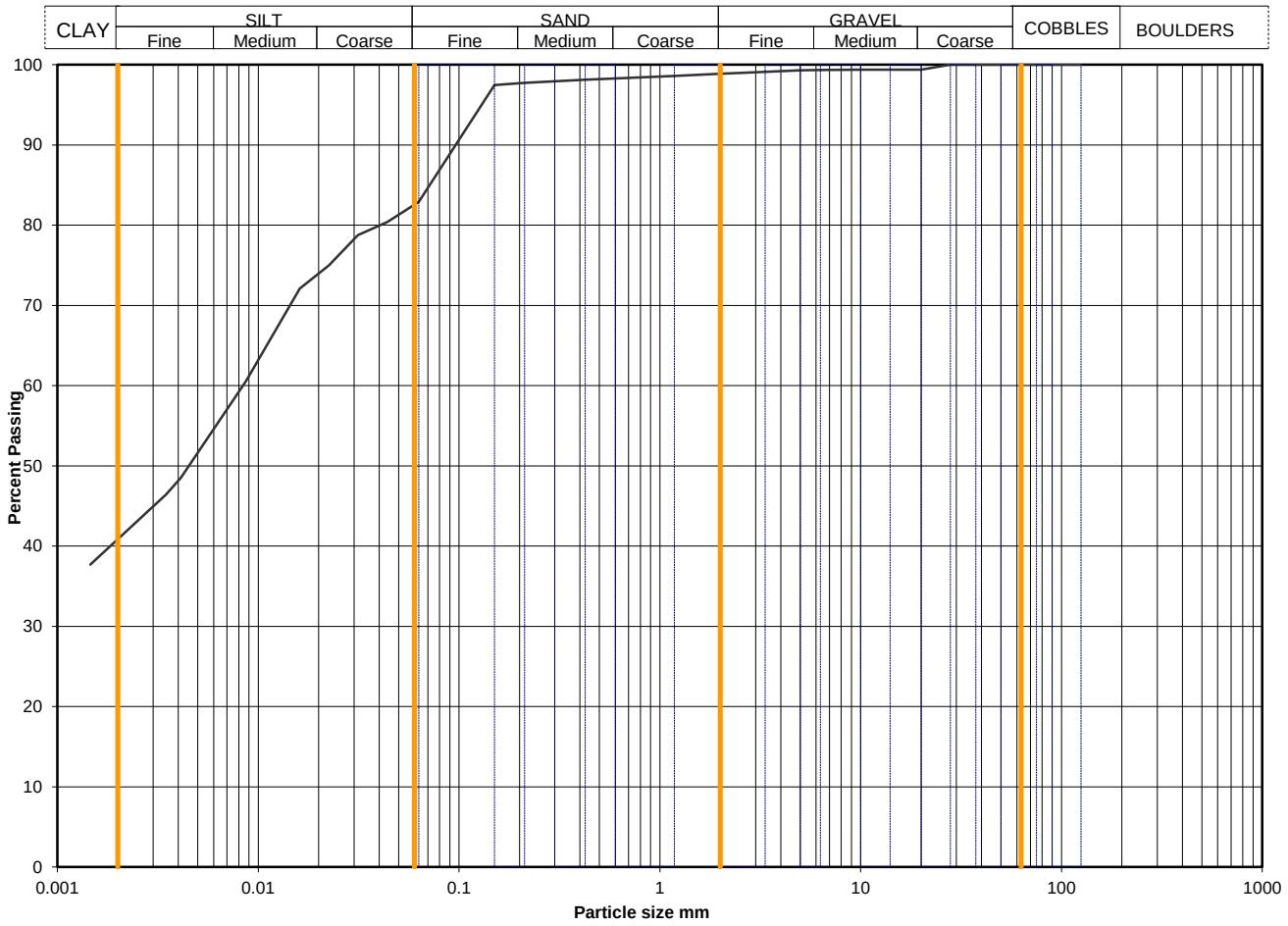
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127033803

Hole No	ATK-CP-13A
Sample Depth (m BGL)	4.50 - 5.00
Sample Type and No	B21
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	83
90	100	0.0441	80
75	100	0.0314	79
63	100	0.0225	75
50	100	0.0161	72
37.5	100	0.0087	61
28	100	0.0041	48
20	99	0.0035	46
14	99	0.0015	38
10	99		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	97	10.4	
0.063	83		

Soil description	Grey and reddish brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.1	1.1
	Sand	16.0	16.0
*<60mm values to aid description only	Silt	42.0	42.0
	Clay	40.9	40.9

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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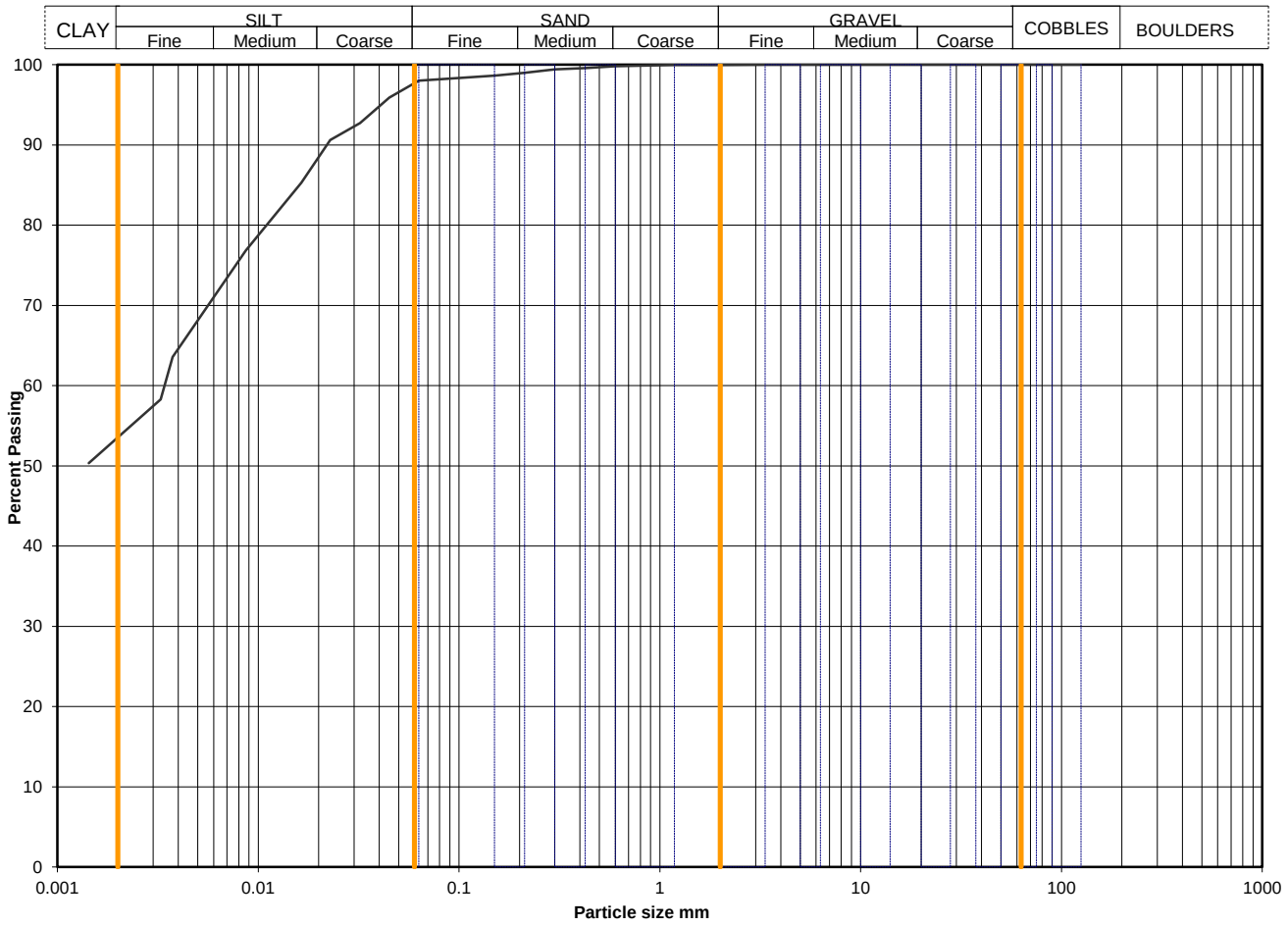
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191218101937

Hole No	ATK-CP-14
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B9
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0450	96
75	100	0.0321	93
63	100	0.0229	91
50	100	0.0164	85
37.5	100	0.0087	77
28	100	0.0038	64
20	100	0.0033	58
14	100	0.0014	50
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	0.4	
0.063	98		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	2.0	2.0
*<60mm values to aid description only	Silt	44.5	44.5
	Clay	53.5	53.5

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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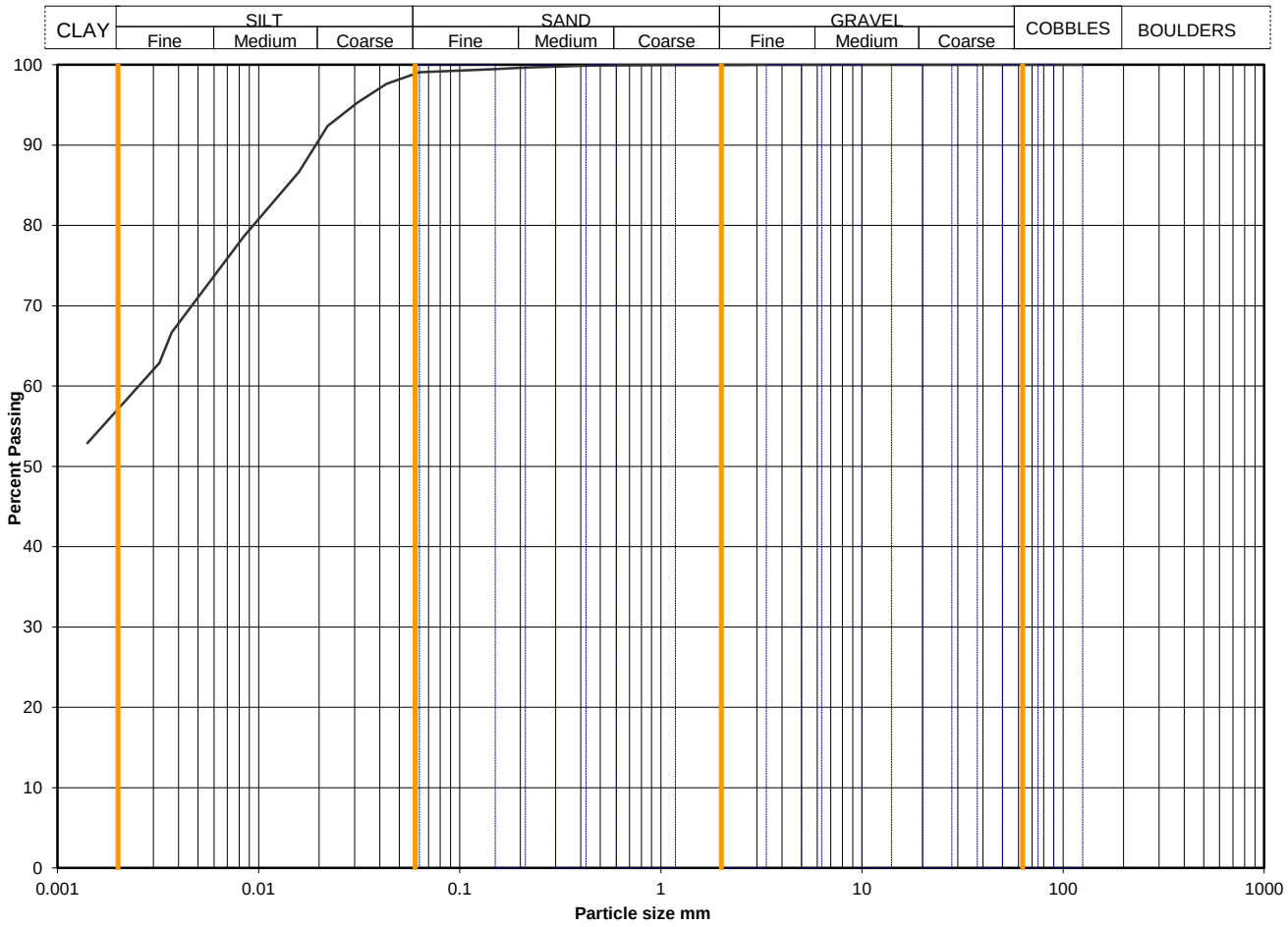
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191212110228

Hole No	ATK-CP-15
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0433	98
75	100	0.0308	95
63	100	0.0220	92
50	100	0.0159	87
37.5	100	0.0084	79
28	100	0.0037	67
20	100	0.0032	63
14	100	0.0014	53
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	99	0.3	
0.063	99		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	1.0	1.0
*<60mm values to aid description only	Silt	41.9	41.9
	Clay	57.1	57.1

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

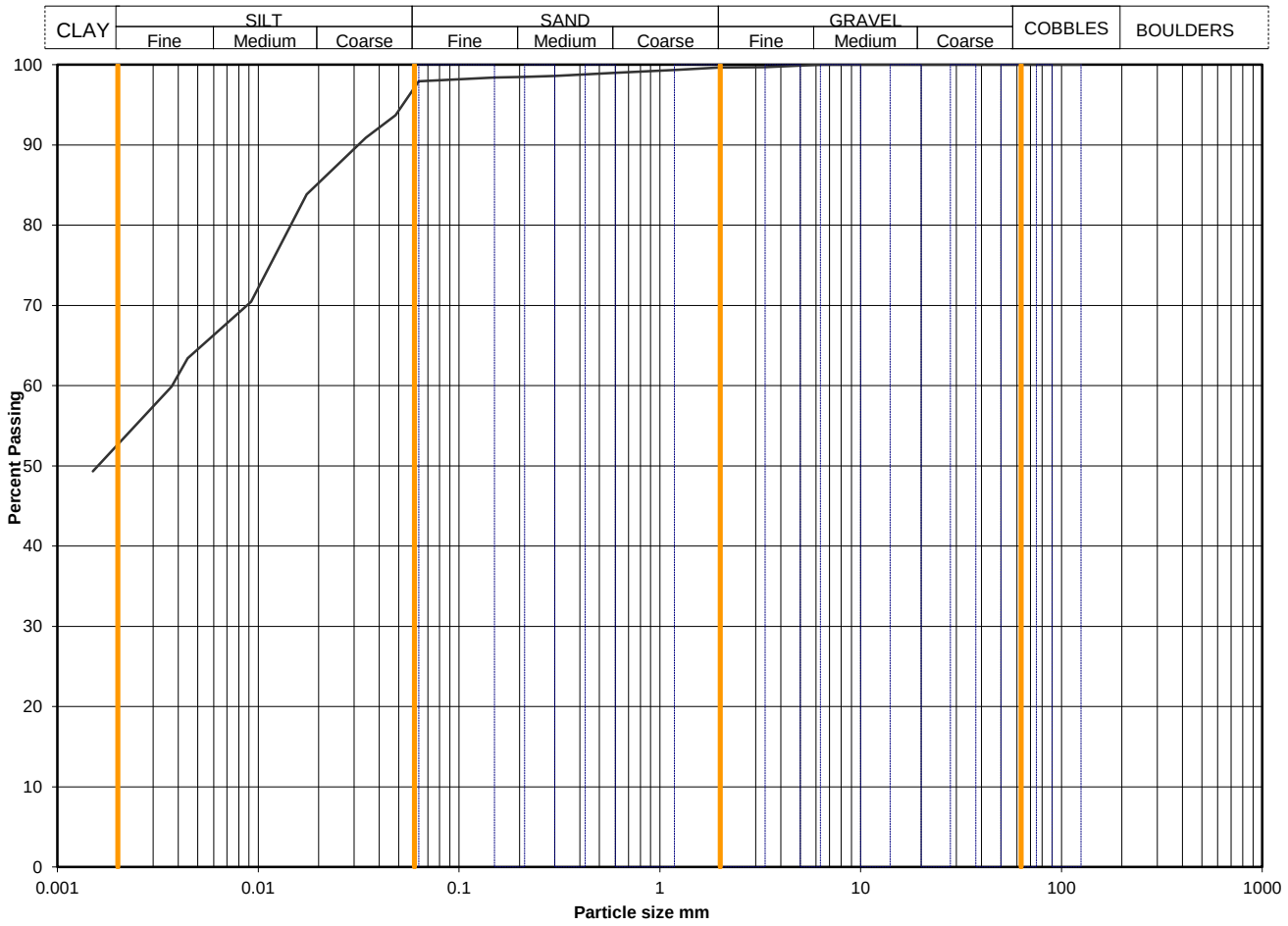
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191212110418

Hole No	ATK-CP-15
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B11
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0483	94
75	100	0.0344	91
63	100	0.0245	87
50	100	0.0174	84
37.5	100	0.0092	70
28	100	0.0044	63
20	100	0.0037	60
14	100	0.0015	49
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	98		
0.150	98	0.4	
0.063	98		

Soil description	Grey and brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.3	0.3
	Sand	1.7	1.7
*<60mm values to aid description only	Silt	45.3	45.3
	Clay	52.7	52.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

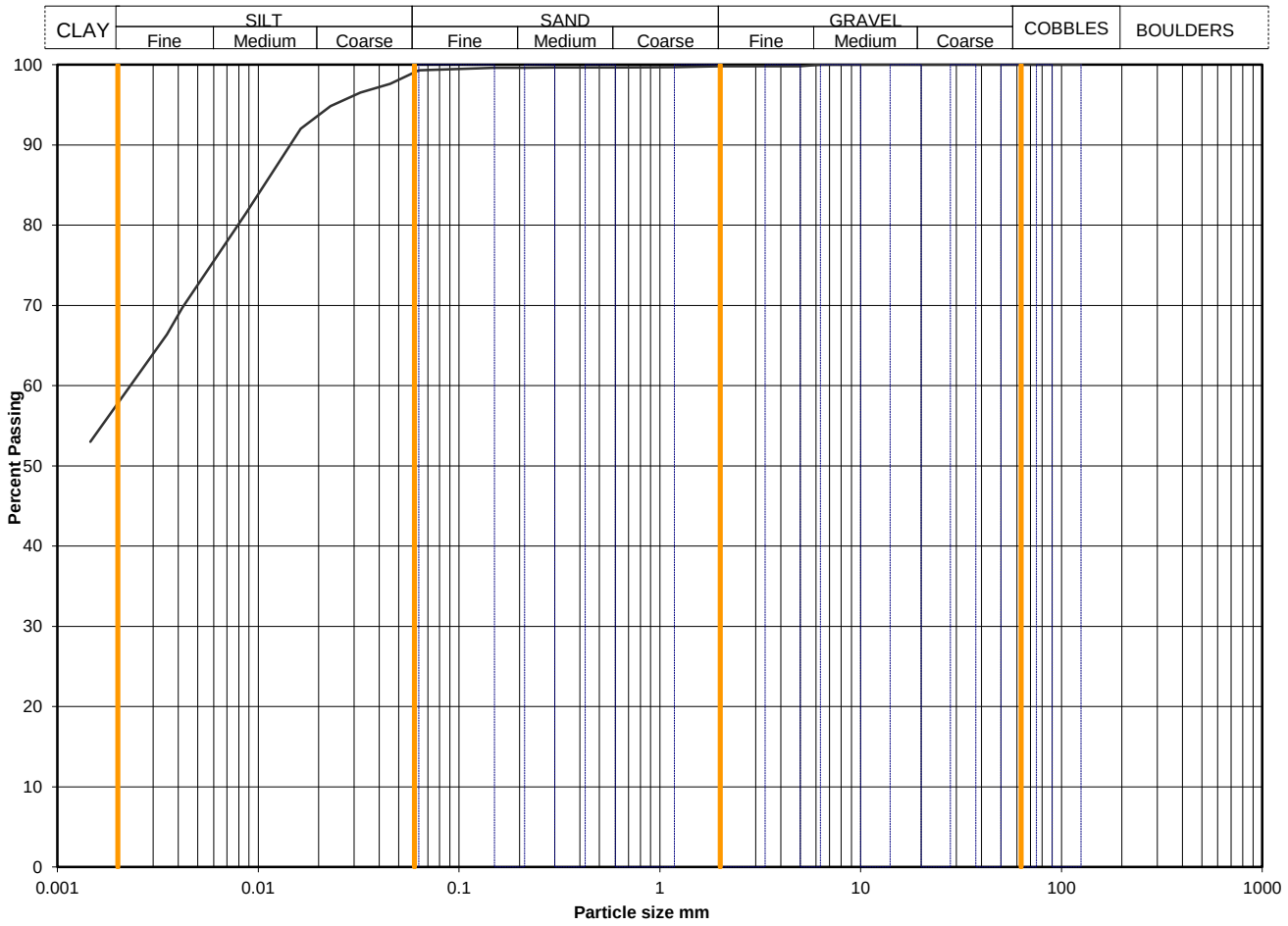
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204052617

Hole No	ATK-CP-15
Sample Depth (m BGL)	6.00 - 6.50
Sample Type and No	B26
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0454	98
75	100	0.0322	97
63	100	0.0229	95
50	100	0.0163	92
37.5	100	0.0087	81
28	100	0.0042	70
20	100	0.0035	66
14	100	0.0015	53
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	100	0.3	
0.063	99		

Soil description	Dark greyish brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.2	0.2
	Sand	0.5	0.5
*<60mm values to aid description only	Silt	41.5	41.5
	Clay	57.8	57.8

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

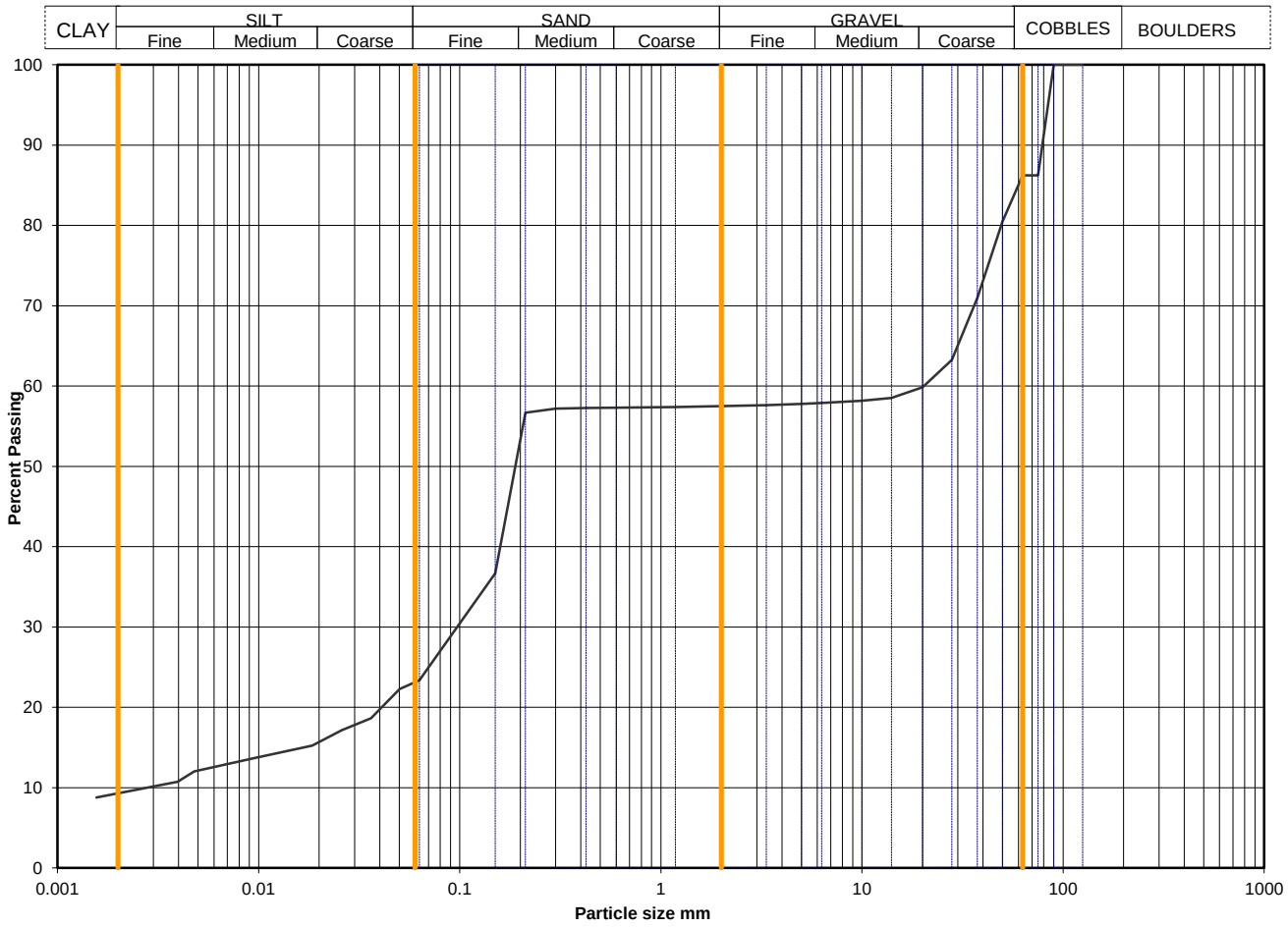
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191219115944

Hole No	ATK-CP-16
Sample Depth (m BGL)	1.70 - 2.00
Sample Type and No	B3a
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	23
90	100	0.0502	22
75	86	0.0363	19
63	86	0.0259	17
50	80	0.0185	15
37.5	71	0.0096	14
28	63	0.0048	12
20	60	0.0040	11
14	59	0.0016	9
10	58		
6.3	58		
5.0	58		
3.35	58		
2.00	57		
1.18	57	Particle density, Mg/m3	
0.600	57		
0.425	57	2.65 assumed	
0.300	57	Dry mass of sample, kg	
0.212	57		
0.150	37	7.1	
0.063	23		

Soil description	Brown sandy very clayey GRAVEL with one cobble.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	13.8	0.0
	Gravel	28.7	33.3
	Sand	34.1	39.6
*<60mm values to aid description only	Silt	14.1	16.4
	Clay	9.3	10.8

Uniformity Coefficient	**D60 / D10**	7252

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

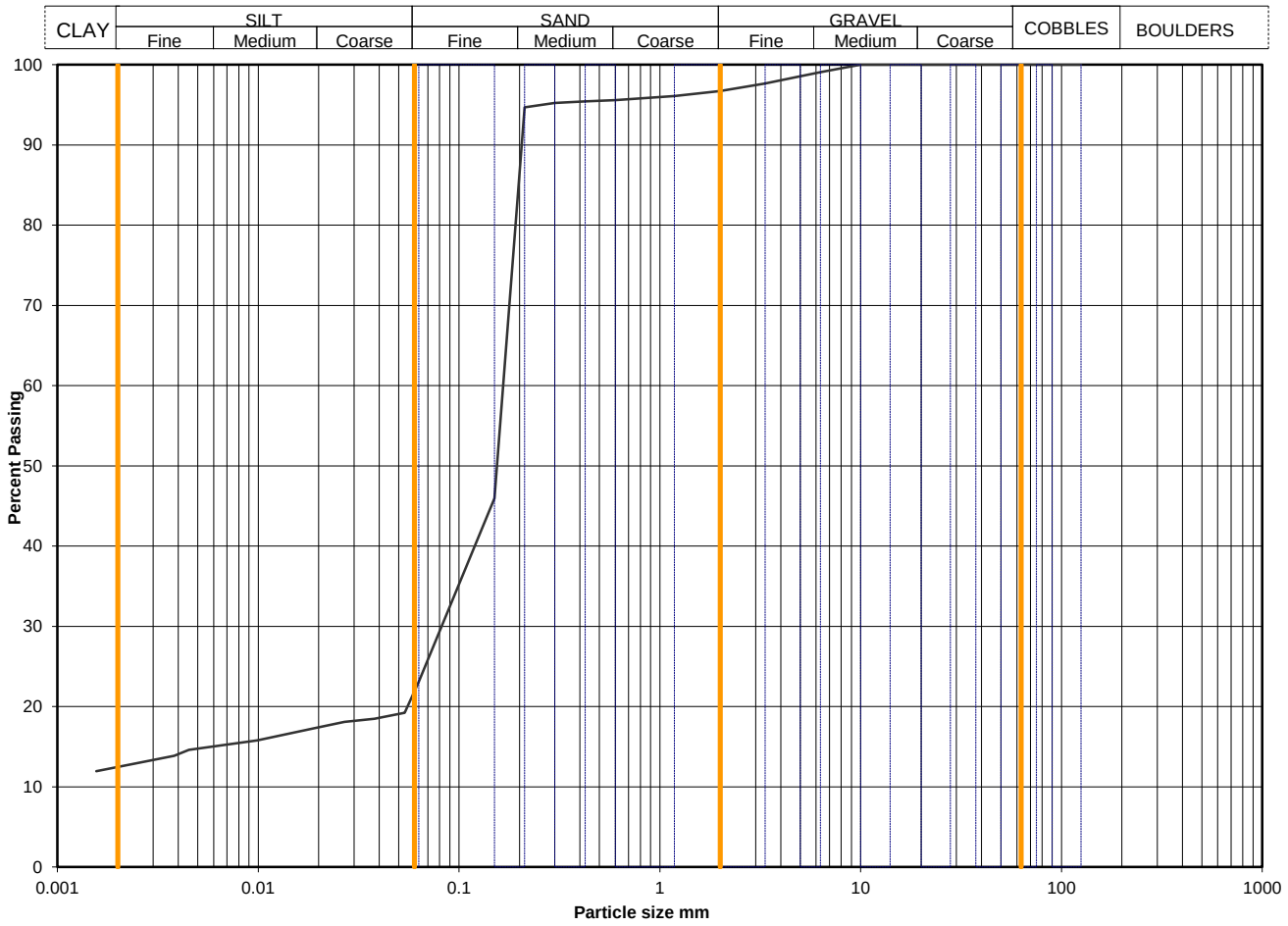
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114123624

Hole No	ATK-RC-02
Sample Depth (m BGL)	1.70 - 2.00
Sample Type and No	B9
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	23
90	100	0.0536	19
75	100	0.0380	18
63	100	0.0269	18
50	100	0.0191	17
37.5	100	0.0099	16
28	100	0.0045	15
20	100	0.0038	14
14	100	0.0016	12
10	100		
6.3	99		
5.0	99		
3.35	98		
2.00	97		
1.18	96	Particle density, Mg/m3	
0.600	96		
0.425	95	2.65 assumed	
0.300	95	Dry mass of sample, kg	
0.212	95		
0.150	46	7.2	
0.063	23		

Soil description	Brown slightly gravelly silty SAND.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	3.3	3.3
	Sand	73.6	73.6
*<60mm values to aid description only	Silt	10.6	10.6
	Clay	12.5	12.5

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
PSD

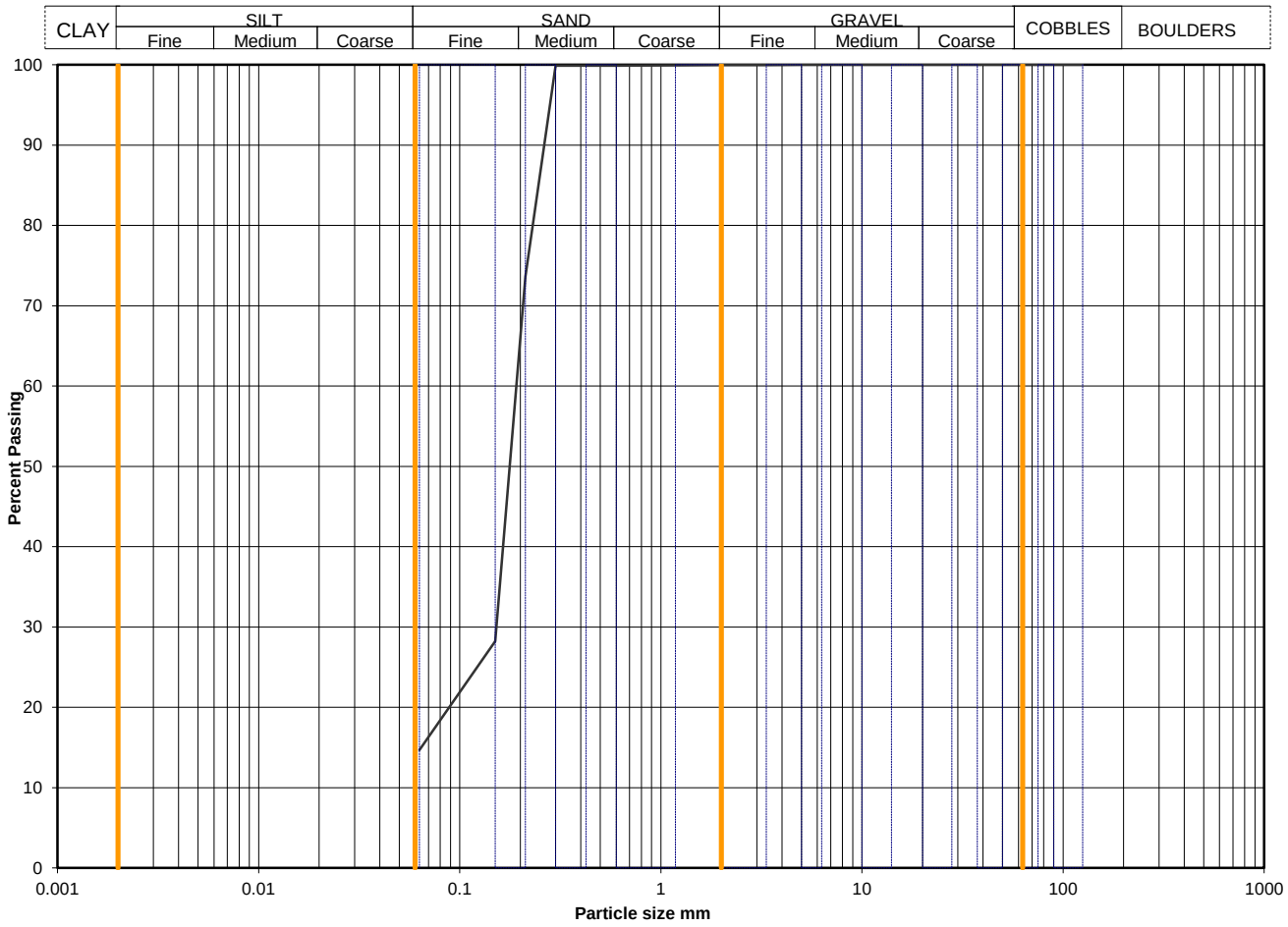
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114123636

Hole No	ATK-RC-02
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B12
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100		
0.300	100	Dry mass of sample, kg	
0.212	74		
0.150	28	3.1	
0.063	15		

Soil description	Brown clayey SAND.
Preparation / Pretreatment	Sieve: pre dried,
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	85.3	85.3
*<60mm values to aid description only	Silt	silt+clay =	
	Clay	14.7	14.7

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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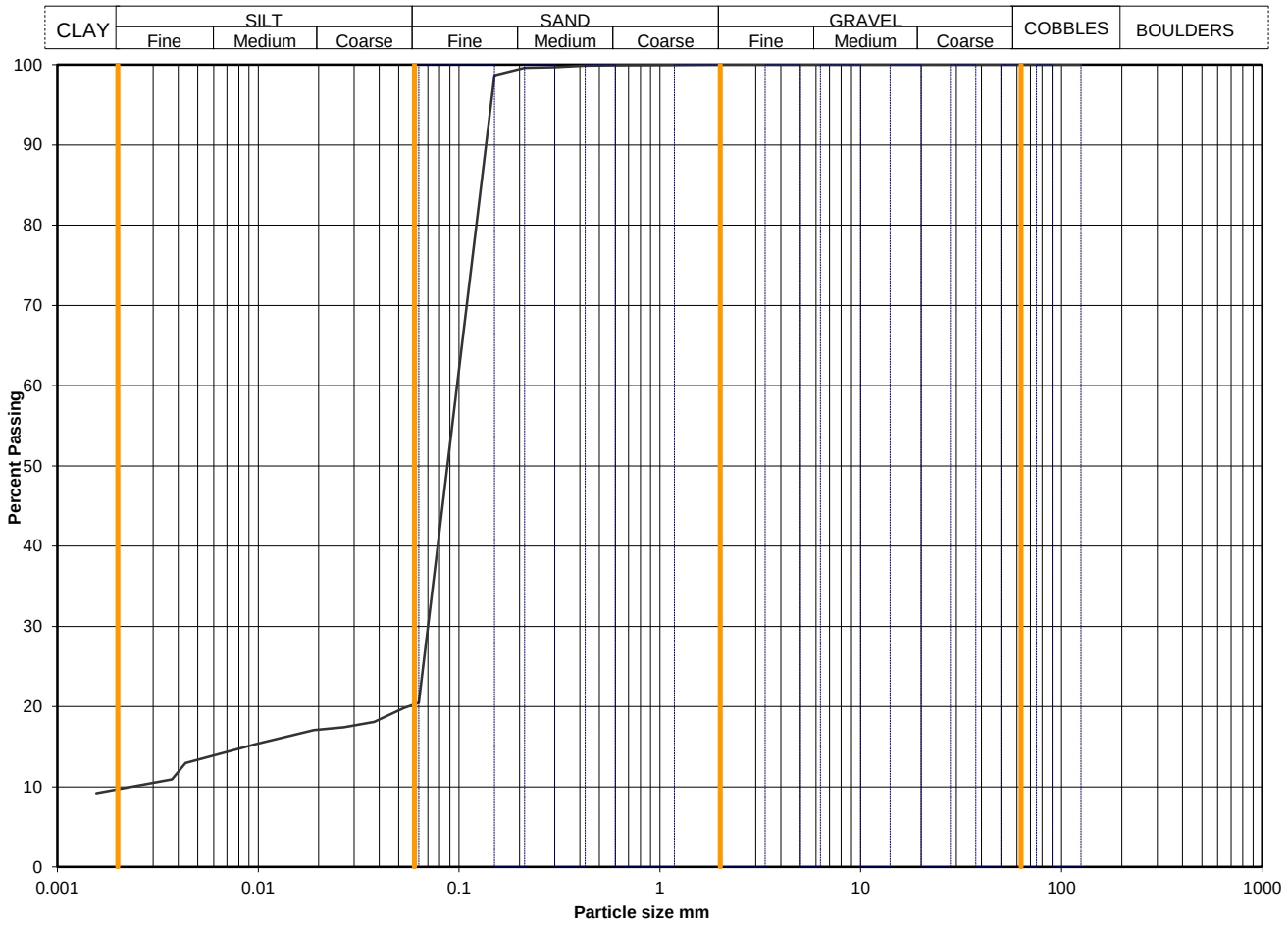
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114123653

Hole No	ATK-RC-02
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B16
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	20
90	100	0.0531	20
75	100	0.0378	18
63	100	0.0268	17
50	100	0.0189	17
37.5	100	0.0098	15
28	100	0.0043	13
20	100	0.0037	11
14	100	0.0016	9
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	99	1.8	
0.063	20		

Soil description	Brown clayey SAND.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	79.5	79.5
*<60mm values to aid description only	Silt	10.8	10.8
	Clay	9.7	9.7

Uniformity Coefficient	**D60 / D10**	42

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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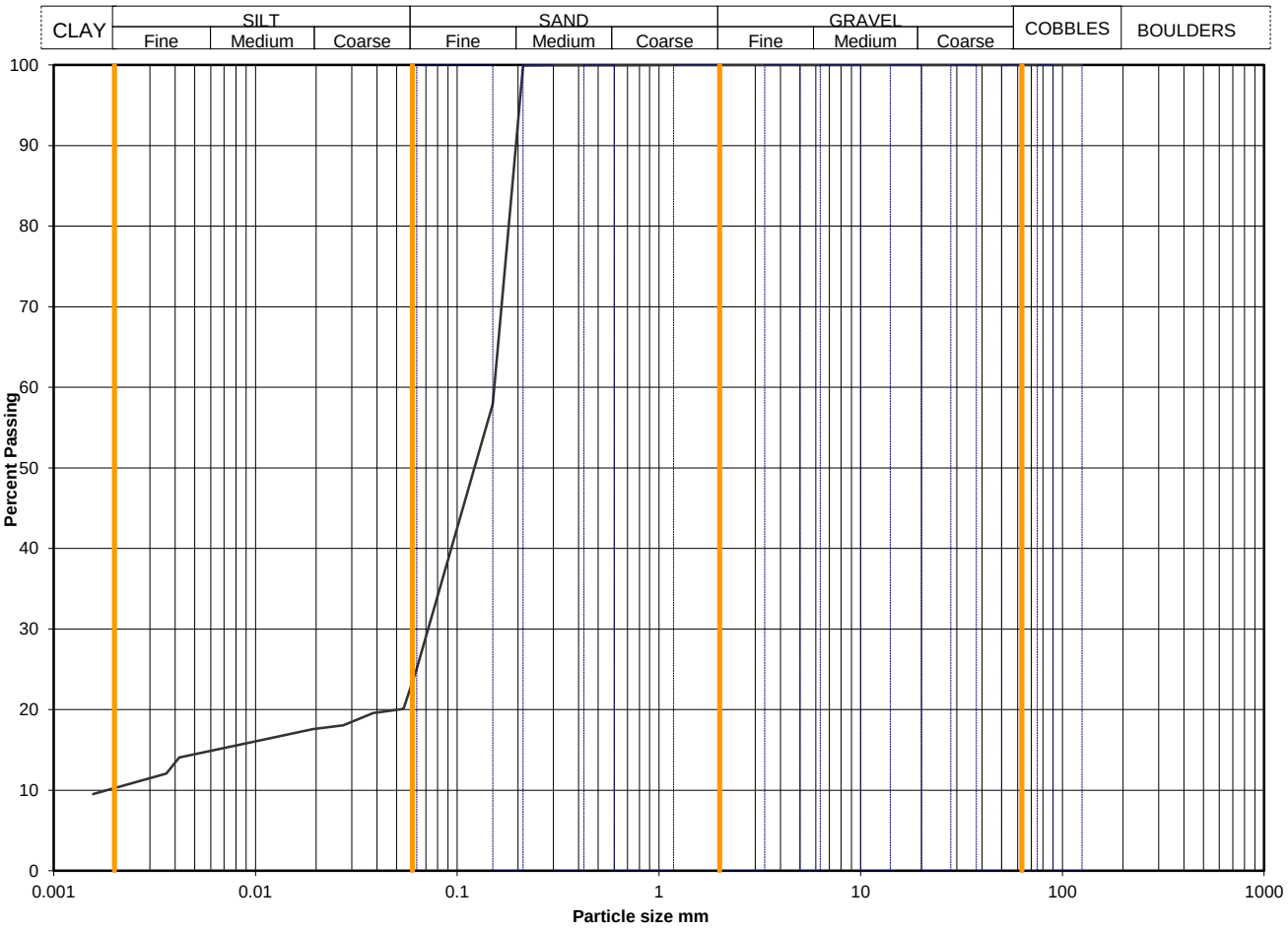
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114123710

Hole No	ATK-RC-02
Sample Depth (m BGL)	4.00 - 4.50
Sample Type and No	B20
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	25
90	100	0.0542	20
75	100	0.0384	20
63	100	0.0272	18
50	100	0.0193	18
37.5	100	0.0100	16
28	100	0.0042	14
20	100	0.0036	12
14	100	0.0016	10
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	58	8.8	
0.063	25		

Soil description	Brown very clayey SAND.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	74.9	74.9
*<60mm values to aid description only	Silt	14.8	14.8
	Clay	10.3	10.3

Uniformity Coefficient	**D60 / D10**	83

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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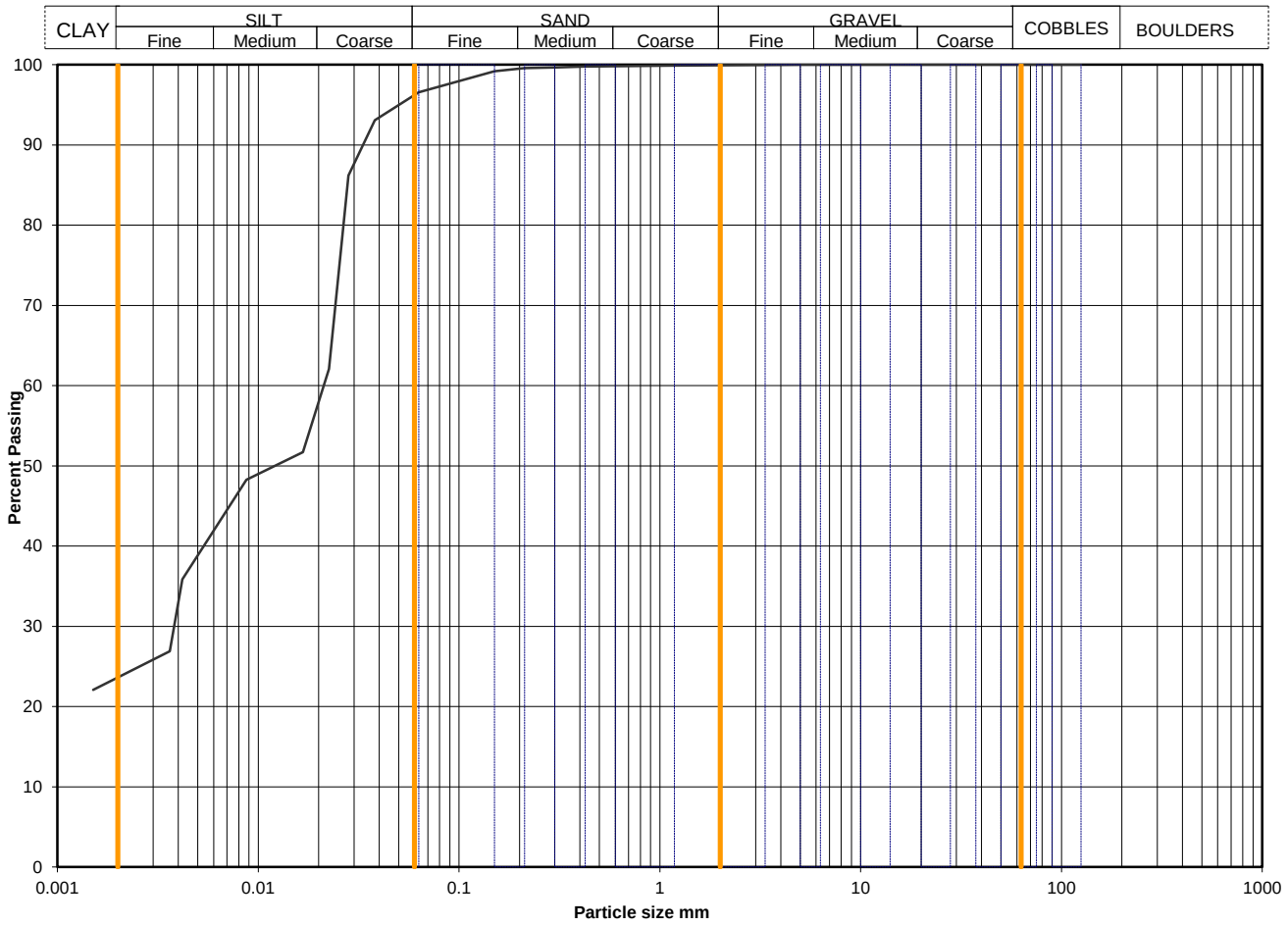
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114114654

Hole No	ATK-TP-01
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0381	93
75	100	0.0281	86
63	100	0.0225	62
50	100	0.0167	52
37.5	100	0.0087	48
28	100	0.0042	36
20	100	0.0036	27
14	100	0.0015	22
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	99	9.5	
0.063	97		

Soil description	Brown slightly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.1	0.1
	Sand	3.4	3.4
*<60mm values to aid description only	Silt	72.9	72.9
	Clay	23.6	23.6

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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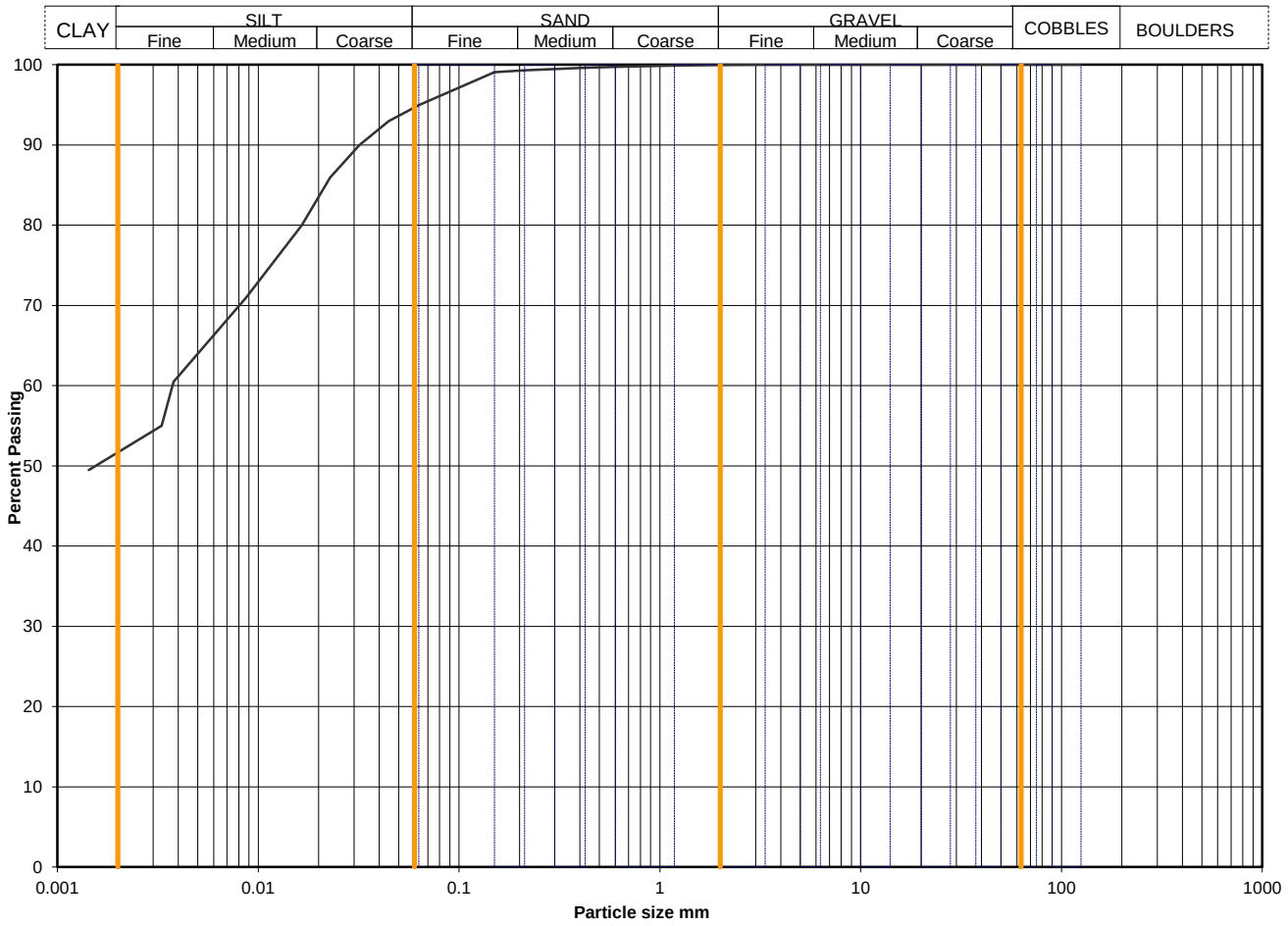
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191114114711

Hole No	ATK-TP-01
Sample Depth (m BGL)	2.80 - 2.90
Sample Type and No	B12
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	95
90	100	0.0446	93
75	100	0.0319	90
63	100	0.0228	86
50	100	0.0164	80
37.5	100	0.0087	71
28	100	0.0038	60
20	100	0.0033	55
14	100	0.0014	49
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	6.9	
0.063	95		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	5.0	5.0
*<60mm values to aid description only	Silt	43.3	43.3
	Clay	51.7	51.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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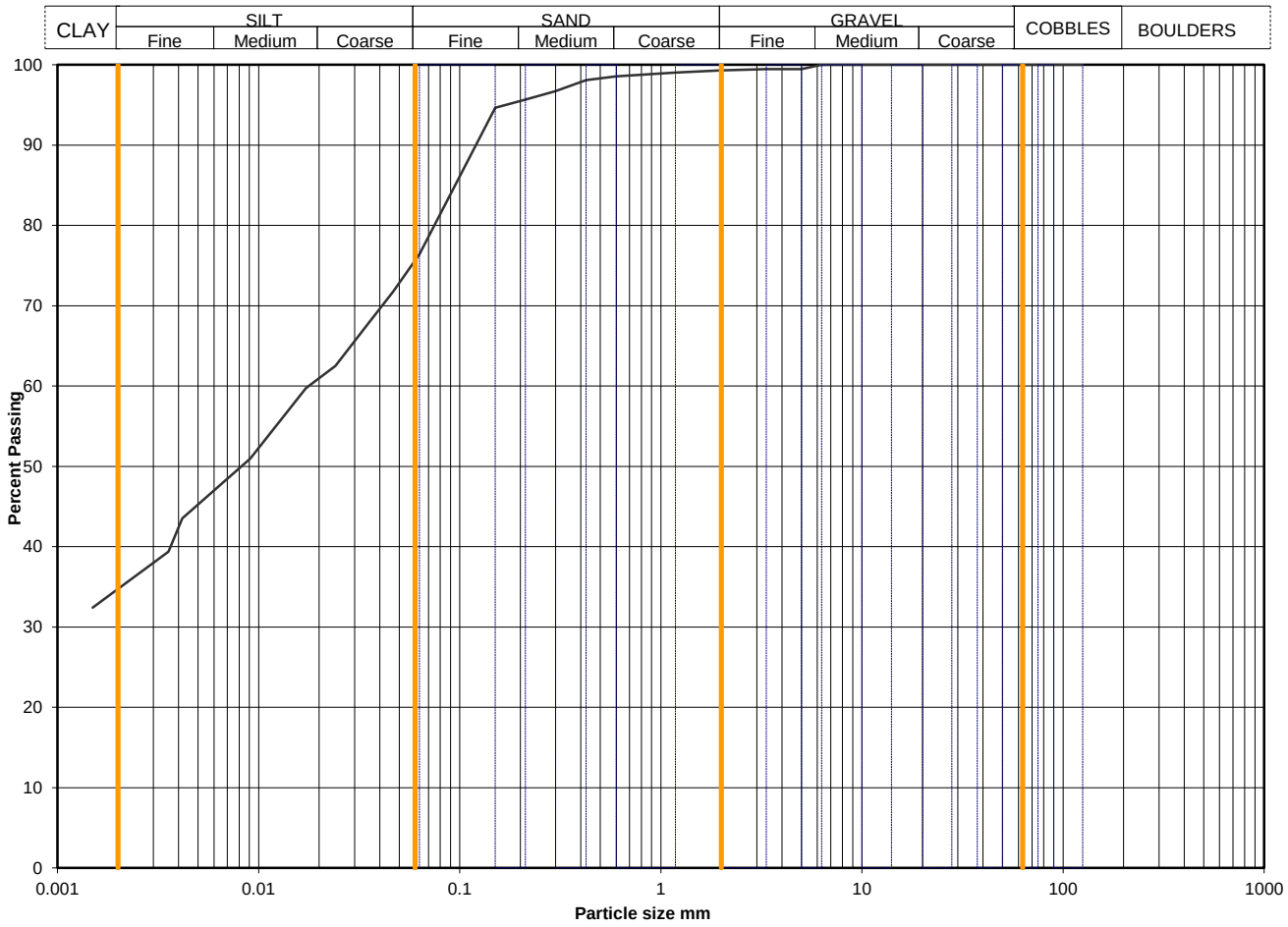
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191113101637

Hole No	ATK-TP-02
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	76
90	100	0.0468	72
75	100	0.0336	67
63	100	0.0241	63
50	100	0.0172	60
37.5	100	0.0091	51
28	100	0.0042	44
20	100	0.0036	39
14	100	0.0015	32
10	100		
6.3	100		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	98	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	96		
0.150	95	0.4	
0.063	76		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.7	0.7
	Sand	22.9	22.9
*<60mm values to aid description only	Silt	41.7	41.7
	Clay	34.7	34.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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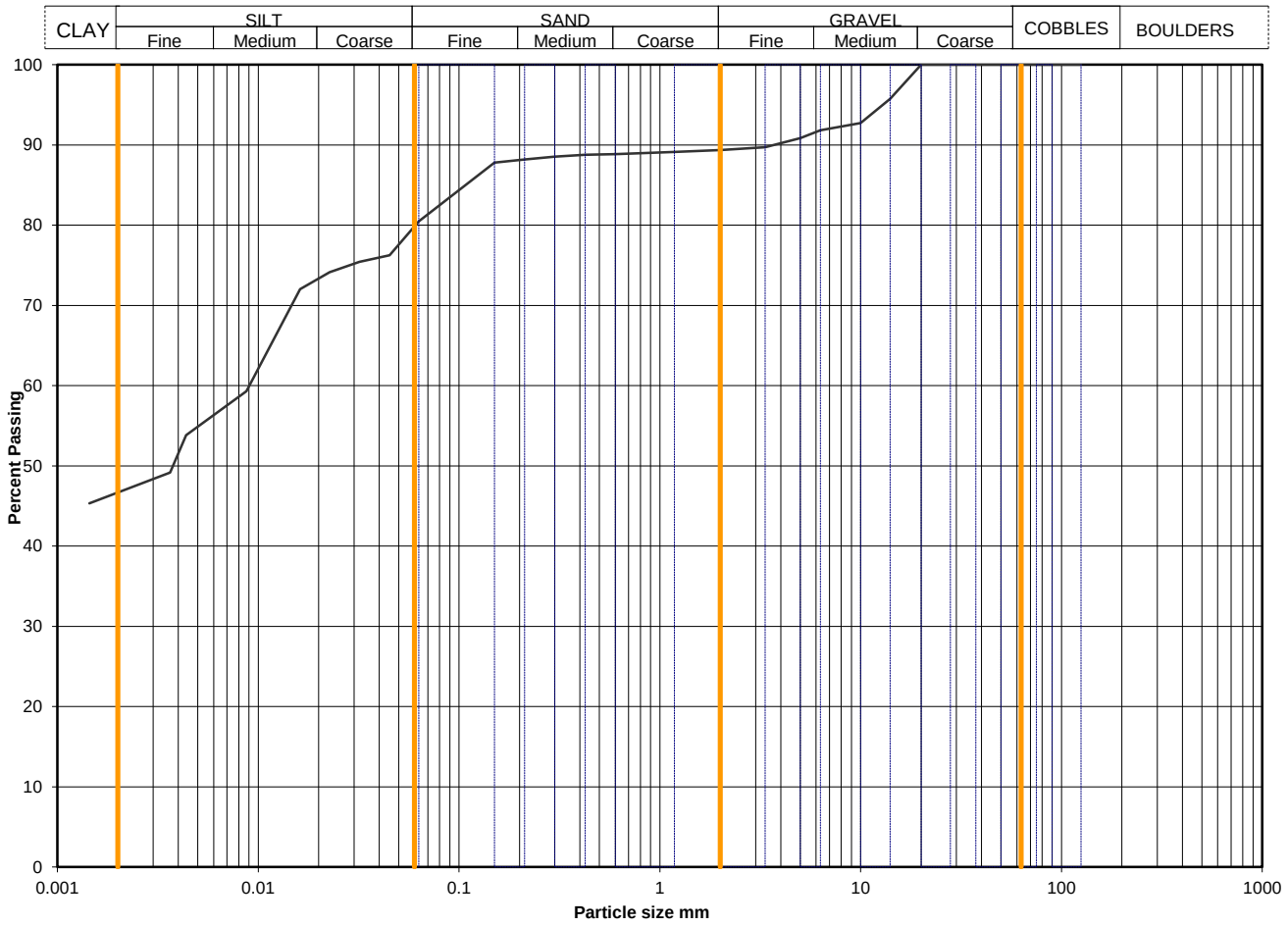
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191115080831

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.50 - 0.60
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	80
90	100	0.0451	76
75	100	0.0320	75
63	100	0.0227	74
50	100	0.0162	72
37.5	100	0.0087	59
28	100	0.0044	54
20	100	0.0036	49
14	96	0.0014	45
10	93		
6.3	92		
5.0	91		
3.35	90		
2.00	89		
1.18	89	Particle density, Mg/m3	
0.600	89		
0.425	89	2.65 assumed	
0.300	89	Dry mass of sample, kg	
0.212	88		
0.150	88	13.2	
0.063	80		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	10.6	10.6
	Sand	8.9	8.9
*<60mm values to aid description only	Silt	33.8	33.8
	Clay	46.7	46.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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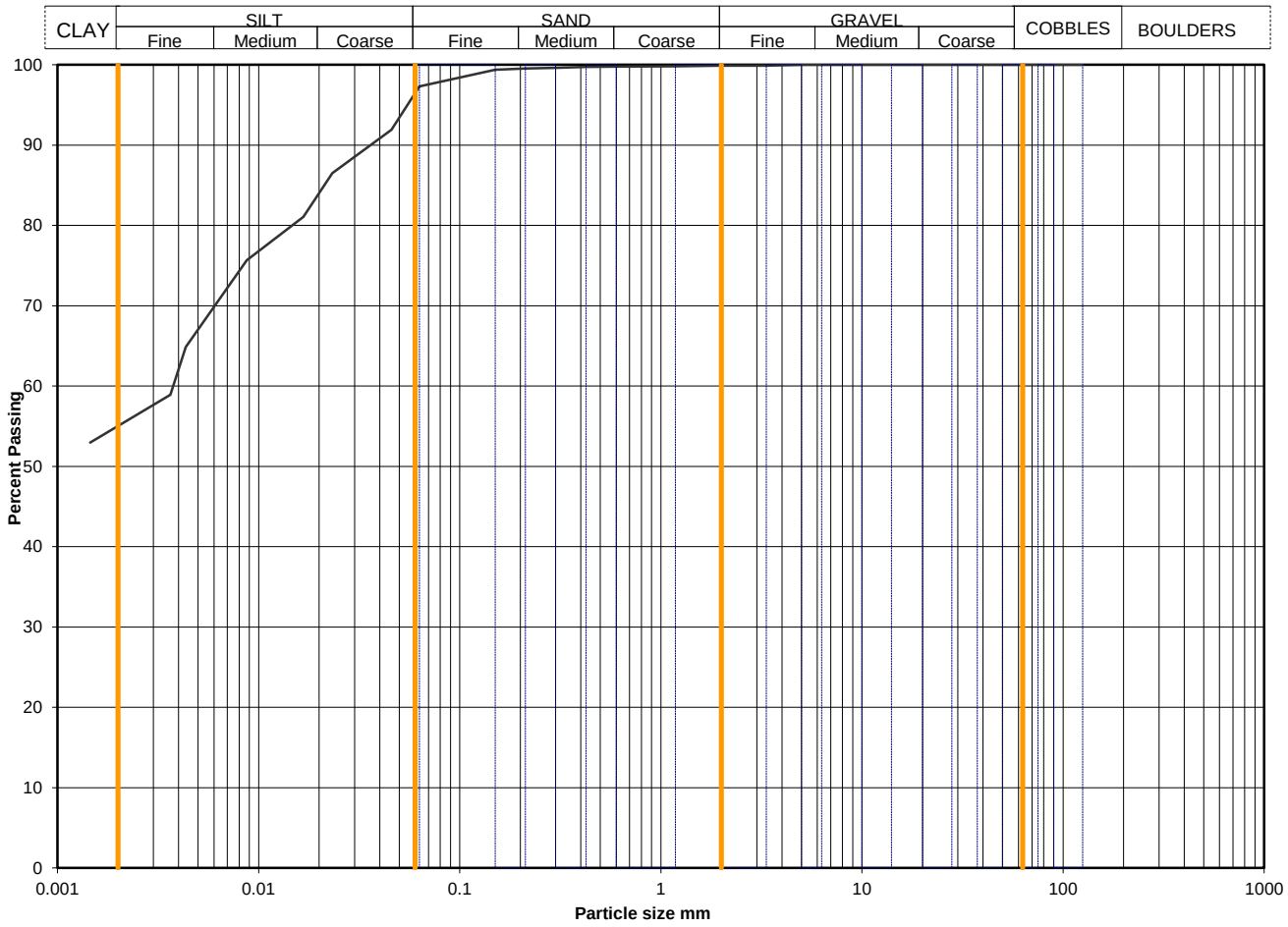
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191115080841

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0458	92
75	100	0.0326	89
63	100	0.0232	86
50	100	0.0167	81
37.5	100	0.0087	76
28	100	0.0043	65
20	100	0.0036	59
14	100	0.0015	53
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	99	7.3	
0.063	97		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.1	0.1
	Sand	2.6	2.6
*<60mm values to aid description only	Silt	42.3	42.3
	Clay	55.0	55.0

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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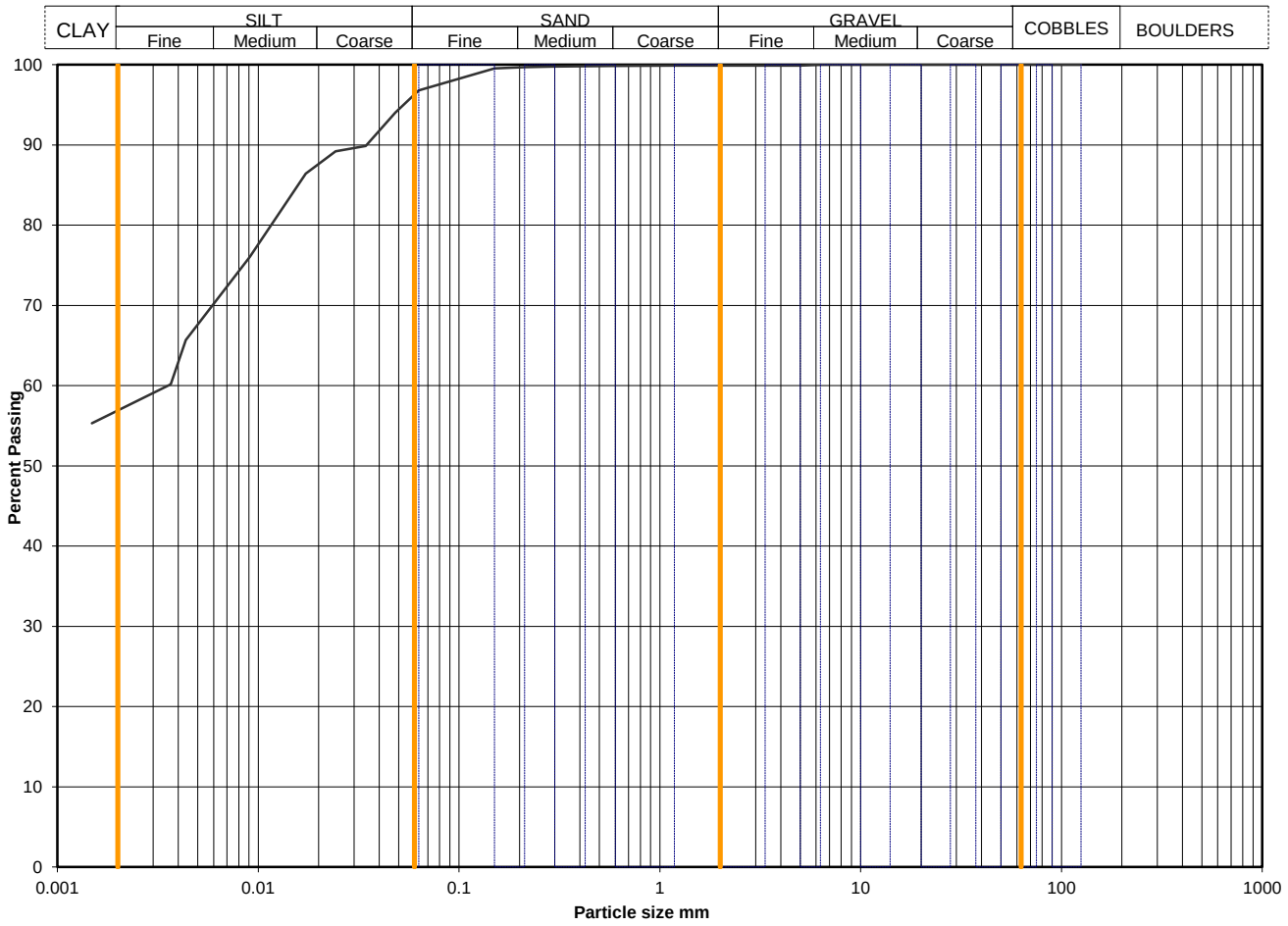
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191115080900

Hole No	ATK-TP-03
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B11
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	97
90	100	0.0481	94
75	100	0.0343	90
63	100	0.0243	89
50	100	0.0173	86
37.5	100	0.0091	76
28	100	0.0044	66
20	100	0.0037	60
14	100	0.0015	55
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	100	8.4	
0.063	97		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.1	0.1
	Sand	3.1	3.1
*<60mm values to aid description only	Silt	39.9	39.9
	Clay	56.9	56.9

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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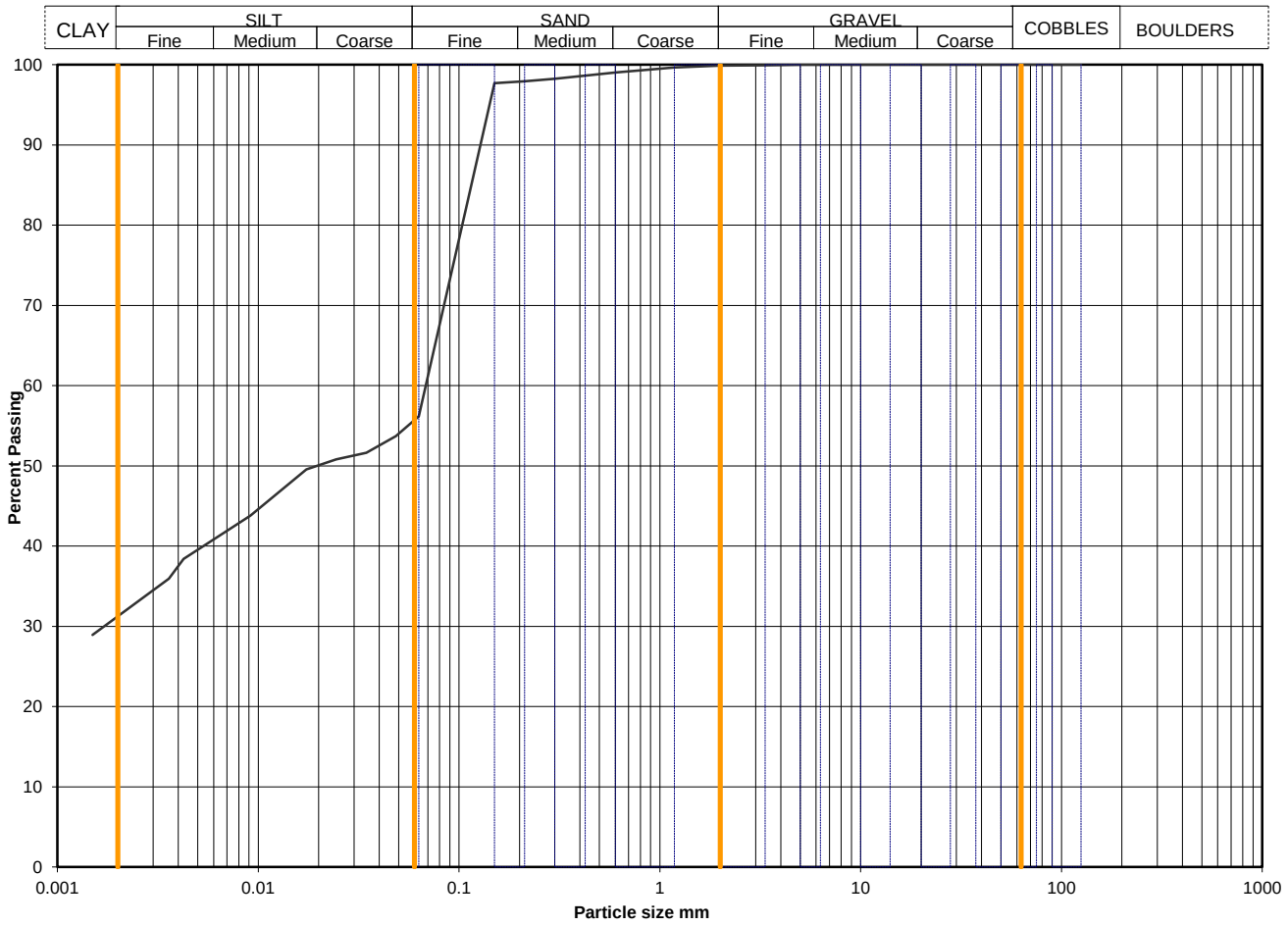
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127041409

Hole No	ATK-TP-04
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B5
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	56
90	100	0.0485	54
75	100	0.0345	52
63	100	0.0245	51
50	100	0.0174	50
37.5	100	0.0091	44
28	100	0.0042	38
20	100	0.0036	36
14	100	0.0015	29
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	98	10.1	
0.063	56		

Soil description	Brown sandy CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.2	0.2
	Sand	43.7	43.7
*<60mm values to aid description only	Silt	24.9	24.9
	Clay	31.2	31.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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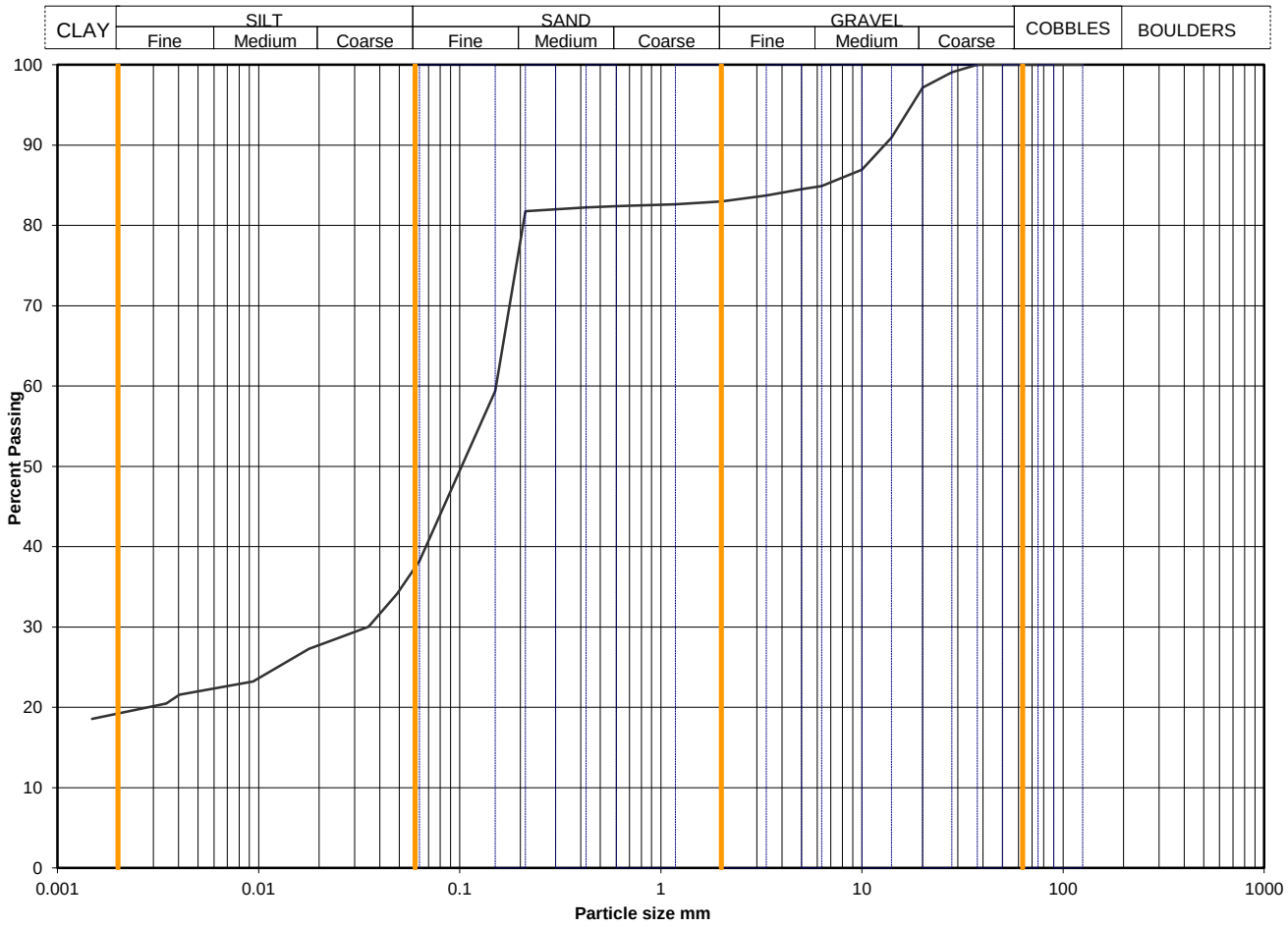
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127042148

Hole No	ATK-TP-05
Sample Depth (m BGL)	0.40 - 0.50
Sample Type and No	B3
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	38
90	100	0.0489	34
75	100	0.0352	30
63	100	0.0251	29
50	100	0.0178	27
37.5	100	0.0094	23
28	99	0.0040	22
20	97	0.0035	20
14	91	0.0015	19
10	87		
6.3	85		
5.0	85		
3.35	84		
2.00	83		
1.18	83	Particle density, Mg/m3	
0.600	82		
0.425	82	2.65 assumed	
0.300	82	Dry mass of sample, kg	
0.212	82		
0.150	59	11.2	
0.063	38		

Soil description	Brown slightly gravelly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	17.0	17.0
	Sand	44.8	44.8
*<60mm values to aid description only	Silt	19.0	19.0
	Clay	19.2	19.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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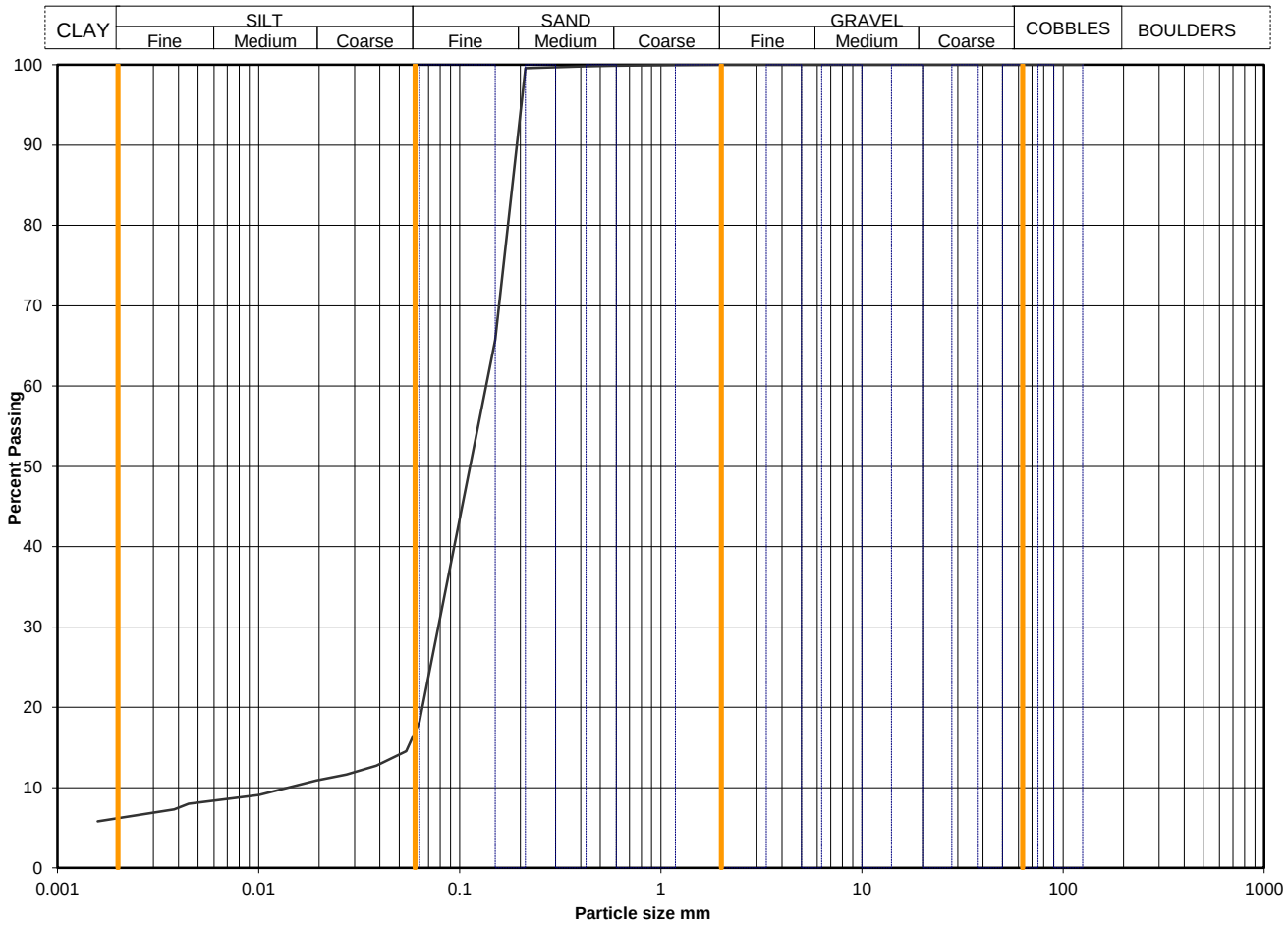
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127042207

Hole No	ATK-TP-05
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	18
90	100	0.0542	15
75	100	0.0385	13
63	100	0.0273	12
50	100	0.0194	11
37.5	100	0.0101	9
28	100	0.0045	8
20	100	0.0038	7
14	100	0.0016	6
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	66	11.4	
0.063	18		

Soil description	Brown clayey SAND.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	81.8	81.8
*<60mm values to aid description only	Silt	12.0	12.0
	Clay	6.2	6.2

Uniformity Coefficient	**D60 / D10**	10

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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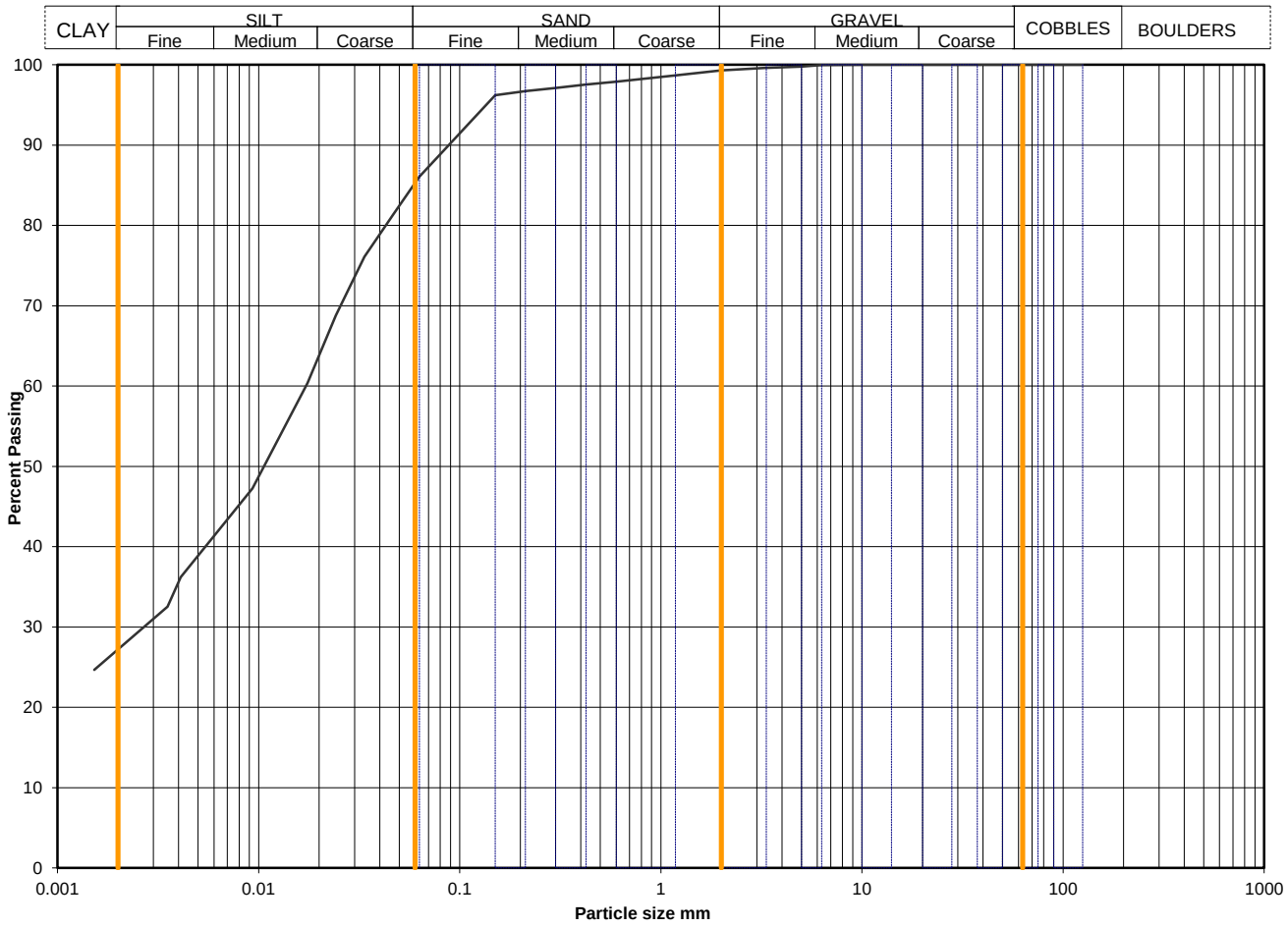
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191211040013

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.30 - 0.80
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	86
90	100	0.0468	81
75	100	0.0336	76
63	100	0.0242	69
50	100	0.0175	60
37.5	100	0.0093	47
28	100	0.0041	36
20	100	0.0035	33
14	100	0.0015	25
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	97		
0.150	96	15.8	
0.063	86		

Soil description	Brown slightly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.7	0.7
	Sand	13.2	13.2
*<60mm values to aid description only	Silt	58.9	58.9
	Clay	27.2	27.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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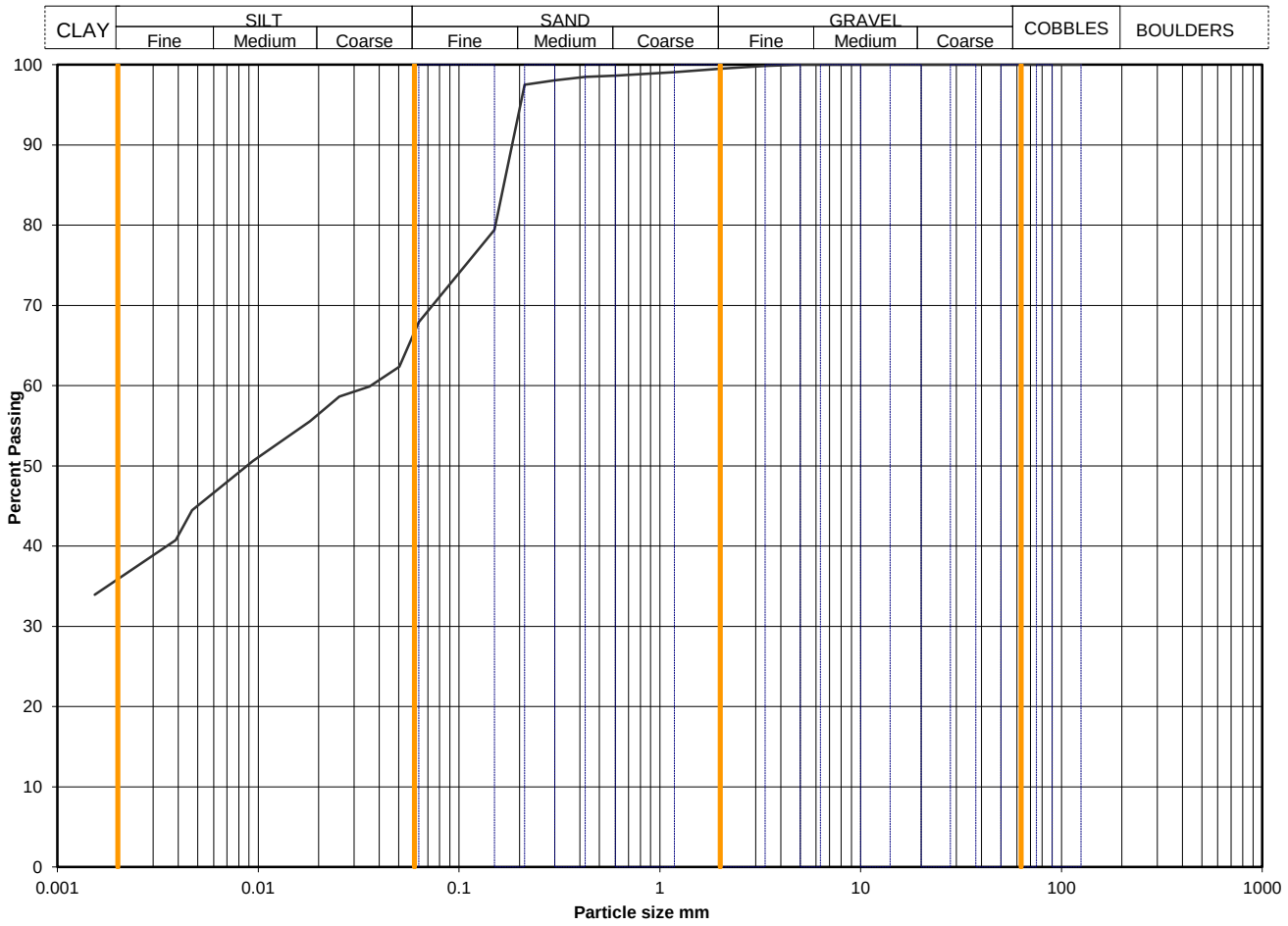
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191211040158

Hole No	ATK-TP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B13
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	68
90	100	0.0504	62
75	100	0.0358	60
63	100	0.0254	59
50	100	0.0181	56
37.5	100	0.0094	51
28	100	0.0047	44
20	100	0.0039	41
14	100	0.0015	34
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	79	10.8	
0.063	68		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.5	0.5
	Sand	31.6	31.6
*<60mm values to aid description only	Silt	32.0	32.0
	Clay	35.9	35.9

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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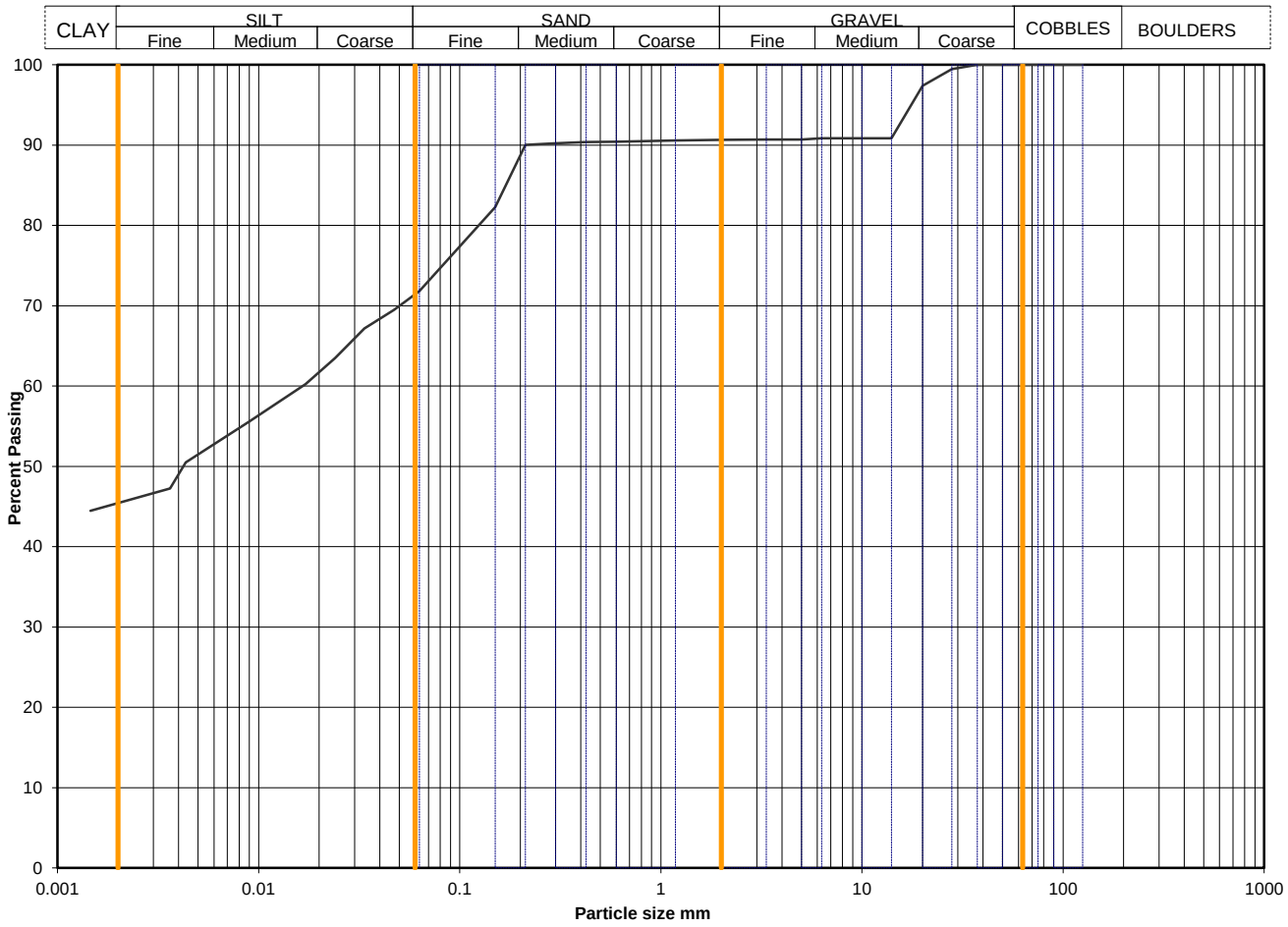
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127042548

Hole No	ATK-TP-07
Sample Depth (m BGL)	0.85 - 0.90
Sample Type and No	B6
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	72
90	100	0.0472	69
75	100	0.0336	67
63	100	0.0240	63
50	100	0.0172	60
37.5	100	0.0090	56
28	99	0.0043	51
20	97	0.0036	47
14	91	0.0015	44
10	91		
6.3	91		
5.0	91		
3.35	91		
2.00	91		
1.18	91	Particle density, Mg/m3	
0.600	90		
0.425	90	2.65 assumed	
0.300	90	Dry mass of sample, kg	
0.212	90		
0.150	82	9.2	
0.063	72		

Soil description	Brown slightly sandy slightly gravelly silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	9.4	9.4
	Sand	18.8	18.8
*<60mm values to aid description only	Silt	26.4	26.4
	Clay	45.4	45.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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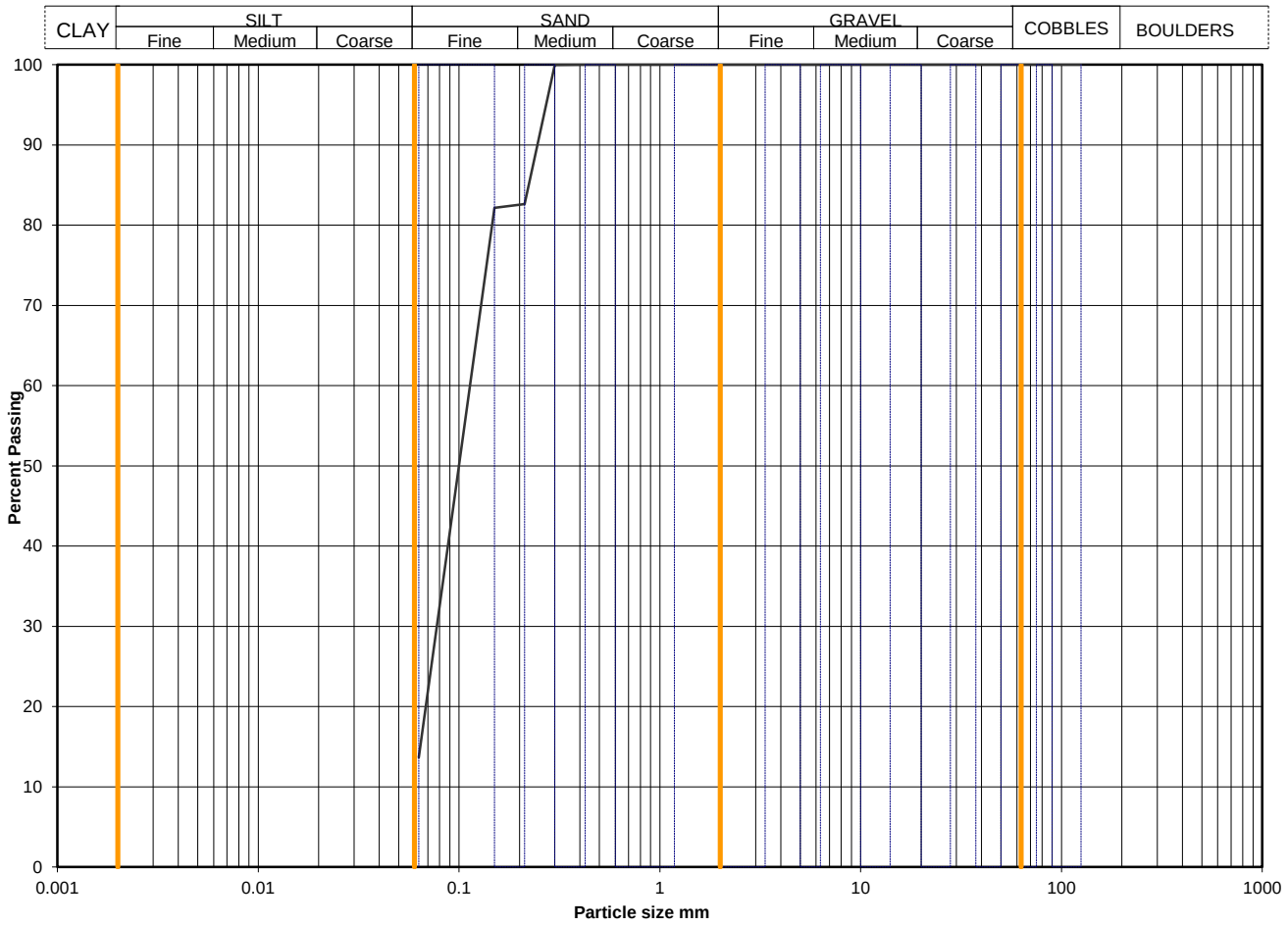
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191127042601

Hole No	ATK-TP-07
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B9
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100		
0.300	100	Dry mass of sample, kg	
0.212	83		
0.150	82	8.6	
0.063	14		

Soil description	Brown clayey SAND.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	86.3	86.3
*<60mm values to aid description only	Silt	silt+clay =	
	Clay	13.7	13.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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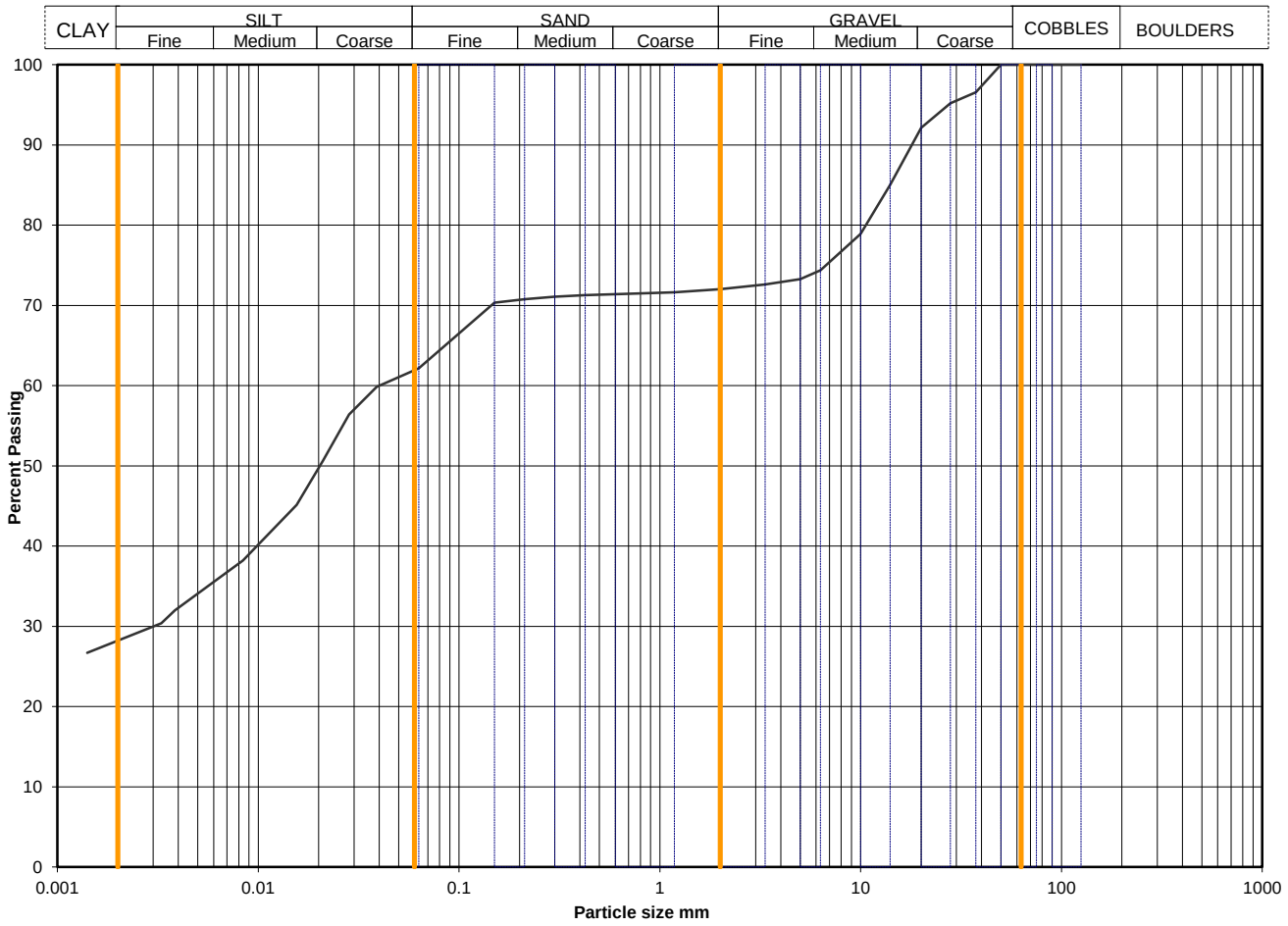
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204021804

Hole No	ATK-TP-08
Sample Depth (m BGL)	0.20 - 0.30
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	62
90	100	0.0389	60
75	100	0.0284	56
63	100	0.0211	51
50	100	0.0155	45
37.5	97	0.0084	38
28	95	0.0038	32
20	92	0.0033	30
14	85	0.0014	27
10	79		
6.3	74		
5.0	73		
3.35	73		
2.00	72		
1.18	72	Particle density, Mg/m3	
0.600	71		
0.425	71	2.65 assumed	
0.300	71	Dry mass of sample, kg	
0.212	71		
0.150	70	11.1	
0.063	62		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	28.0	28.0
	Sand	9.9	9.9
*<60mm values to aid description only	Silt	33.9	33.9
	Clay	28.2	28.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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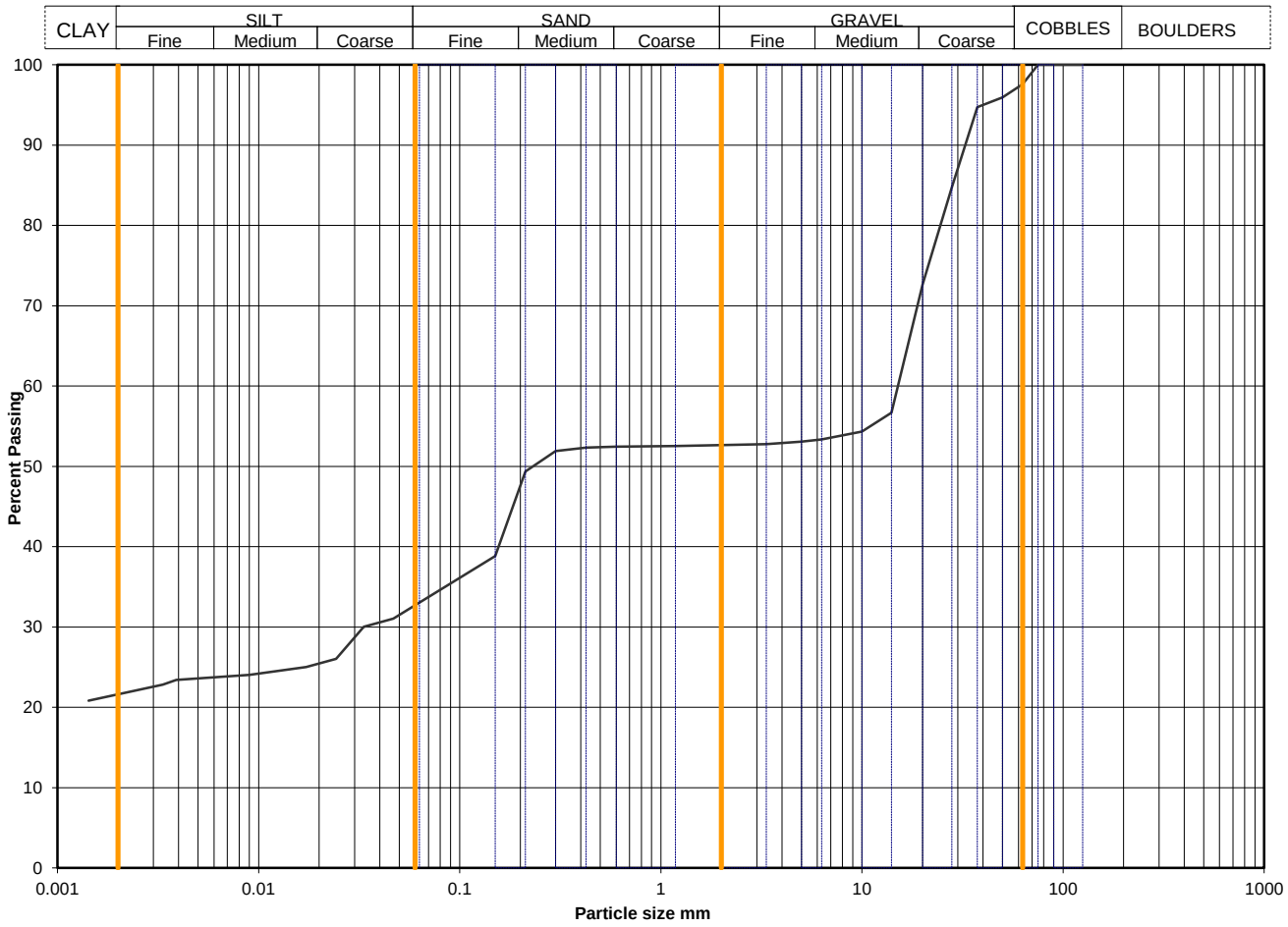
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204021819

Hole No	ATK-TP-08
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	33
90	100	0.0468	31
75	100	0.0334	30
63	98	0.0243	26
50	96	0.0173	25
37.5	95	0.0090	24
28	85	0.0039	23
20	73	0.0033	23
14	57	0.0014	21
10	54		
6.3	53		
5.0	53		
3.35	53		
2.00	53		
1.18	53	Particle density, Mg/m3	
0.600	52		
0.425	52	2.65 assumed	
0.300	52	Dry mass of sample, kg	
0.212	49		
0.150	39	16.8	
0.063	33		

Soil description	Brown slightly sandy gravelly CLAY with one cobble.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	2.4	0.0
	Gravel	45.0	46.1
	Sand	19.6	20.1
*<60mm values to aid description only	Silt	11.4	11.7
	Clay	21.6	22.1

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

UKAS TESTING
1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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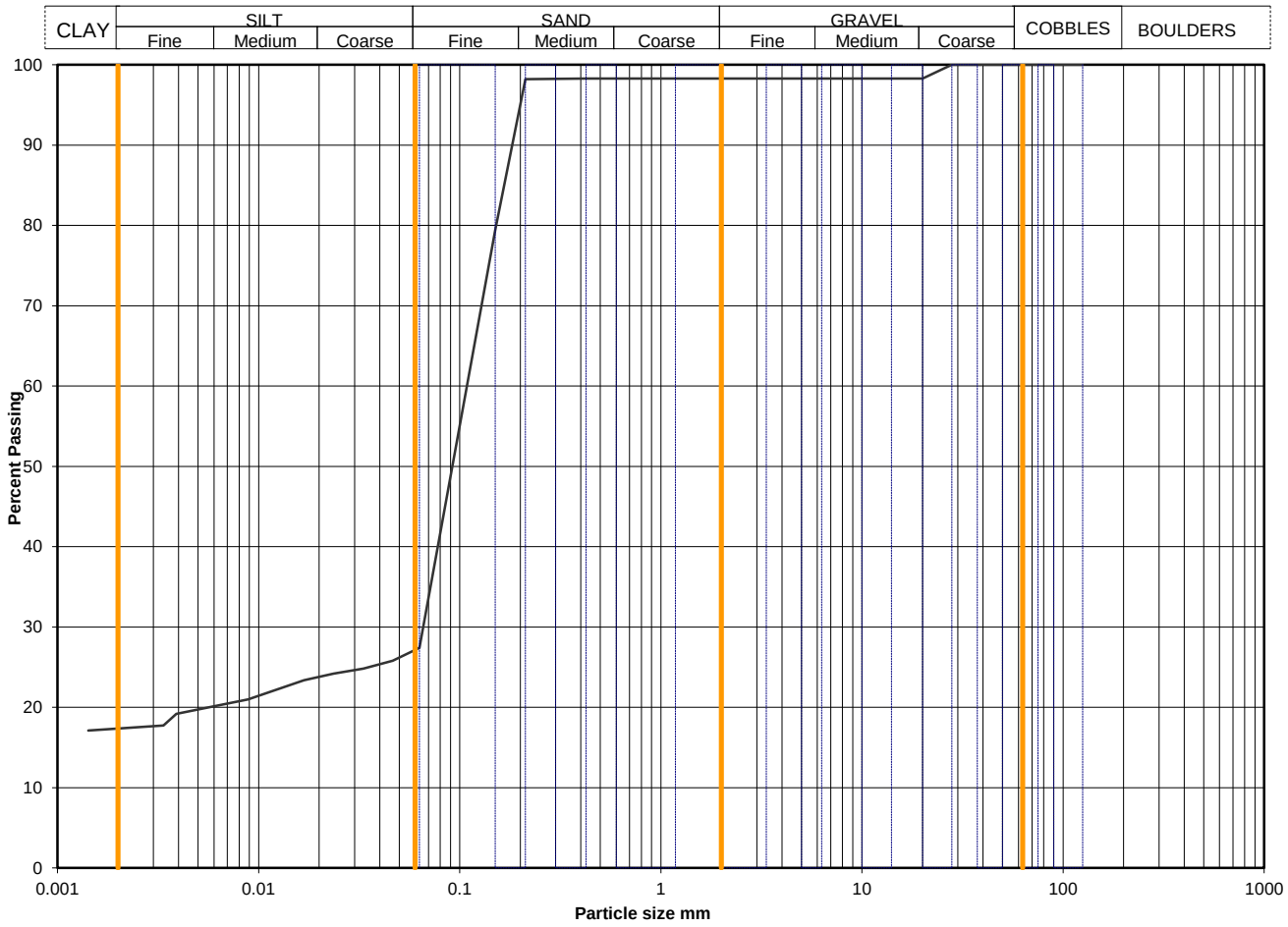
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204021828

Hole No	ATK-TP-08
Sample Depth (m BGL)	1.50
Sample Type and No	B11
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	27
90	100	0.0465	26
75	100	0.0332	25
63	100	0.0236	24
50	100	0.0168	23
37.5	100	0.0089	21
28	100	0.0039	19
20	98	0.0034	18
14	98	0.0014	17
10	98		
6.3	98		
5.0	98		
3.35	98		
2.00	98		
1.18	98	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	79	4.9	
0.063	27		

Soil description	Brown slightly gravelly very clayey SAND.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.6	1.6
	Sand	70.9	70.9
*<60mm values to aid description only	Silt	10.1	10.1
	Clay	17.4	17.4

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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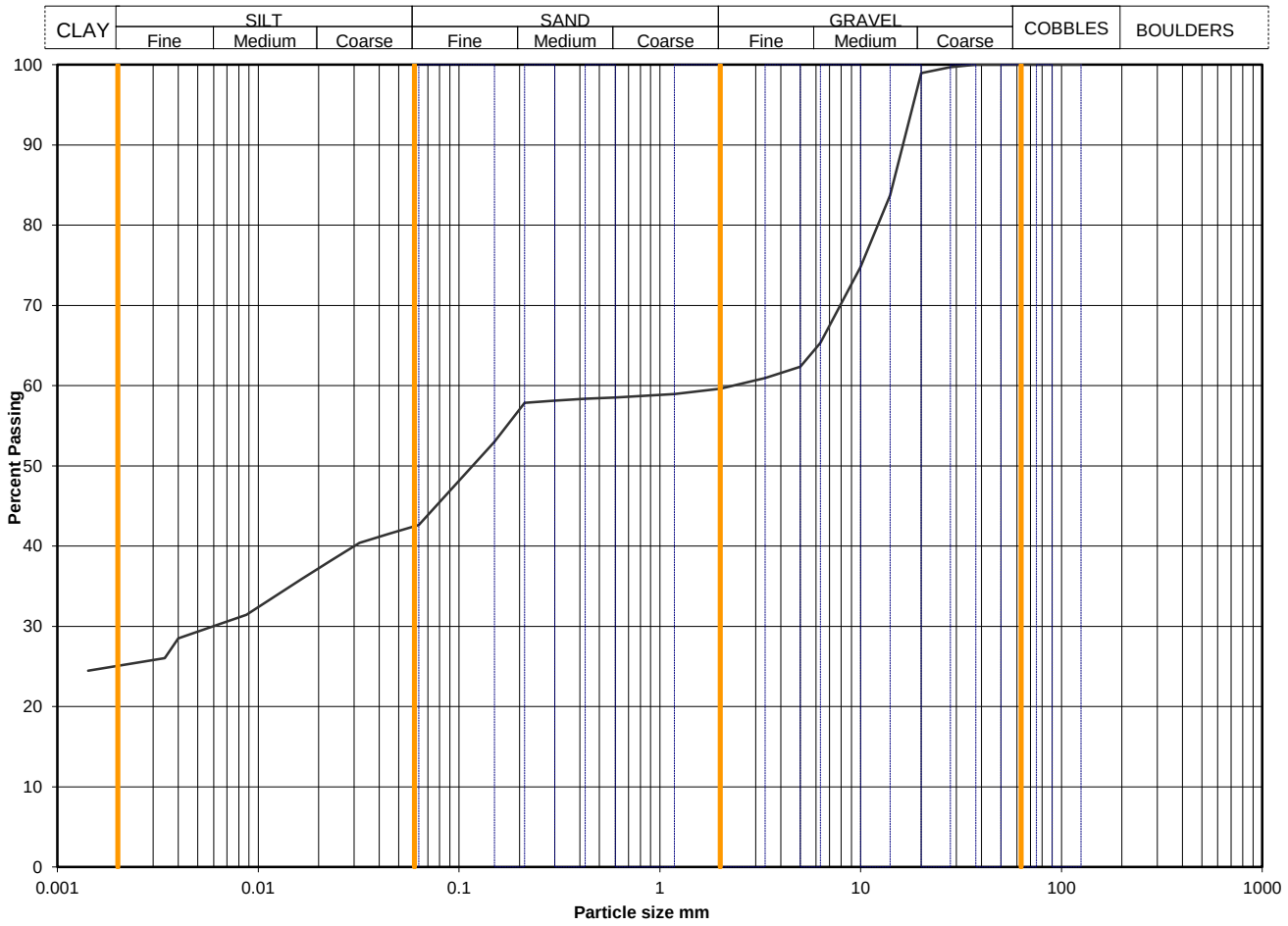
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204015231

Hole No	ATK-TPM-02
Sample Depth (m BGL)	1.00 - 1.10
Sample Type and No	B6
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	43
90	100	0.0447	42
75	100	0.0319	40
63	100	0.0229	38
50	100	0.0164	36
37.5	100	0.0087	31
28	100	0.0040	29
20	99	0.0034	26
14	84	0.0014	24
10	75		
6.3	65		
5.0	62		
3.35	61		
2.00	60		
1.18	59	Particle density, Mg/m3	
0.600	59		
0.425	58	2.65 assumed	
0.300	58	Dry mass of sample, kg	
0.212	58		
0.150	53	10.7	
0.063	43		

Soil description	Brown slightly sandy gravelly CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
*<60mm values to aid description only	Cobbles / boulders	0.0	0.0
	Gravel	40.3	40.3
	Sand	17.0	17.0
	Silt	17.6	17.6
	Clay	25.1	25.1

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref
SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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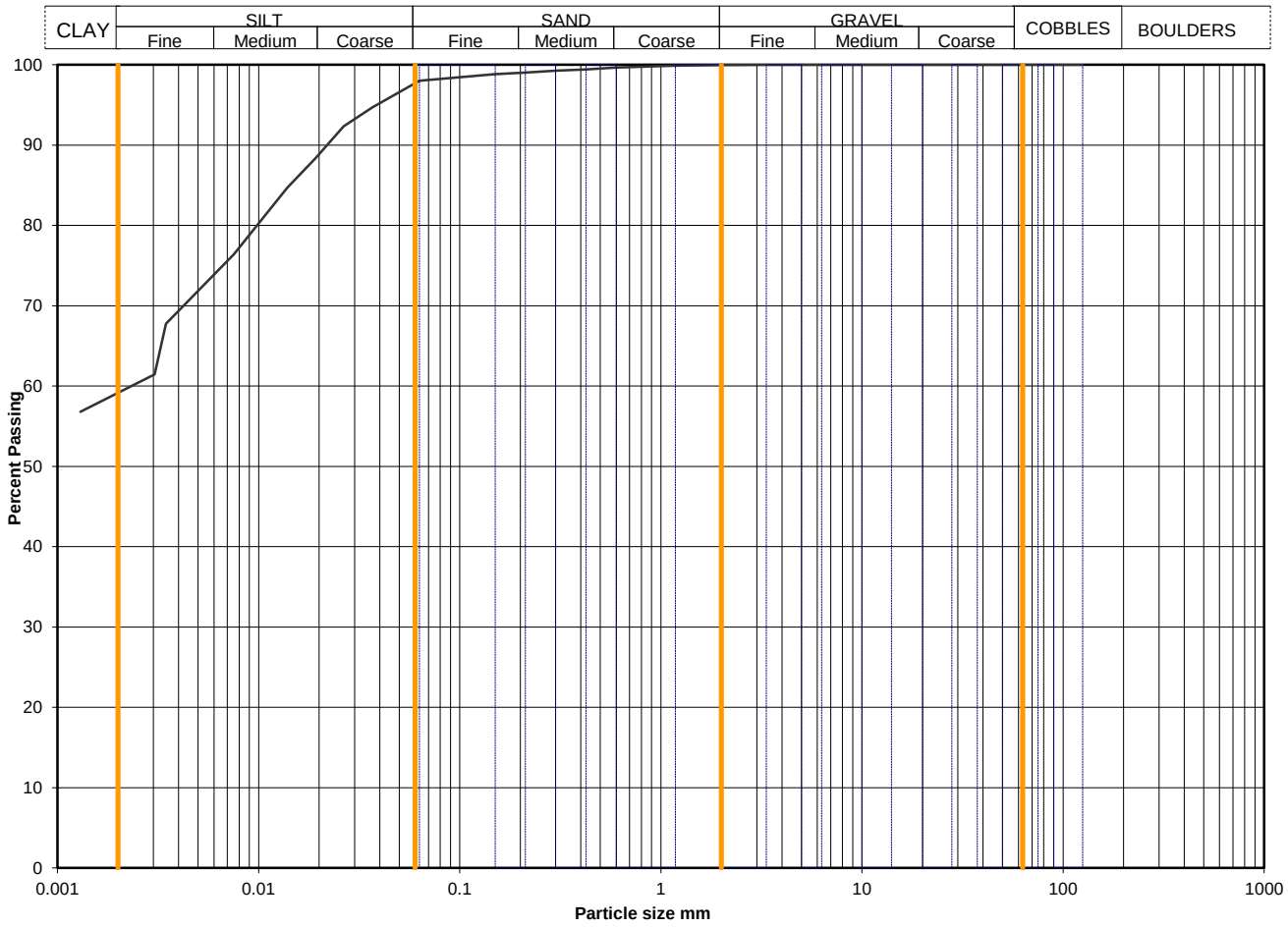
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204015240

Hole No	ATK-TPM-02
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B9
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0368	95
75	100	0.0264	92
63	100	0.0192	88
50	100	0.0139	85
37.5	100	0.0075	76
28	100	0.0035	68
20	100	0.0030	61
14	100	0.0013	57
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	9.2	
0.063	98		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	2.0	2.0
*<60mm values to aid description only	Silt	38.8	38.8
	Clay	59.2	59.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

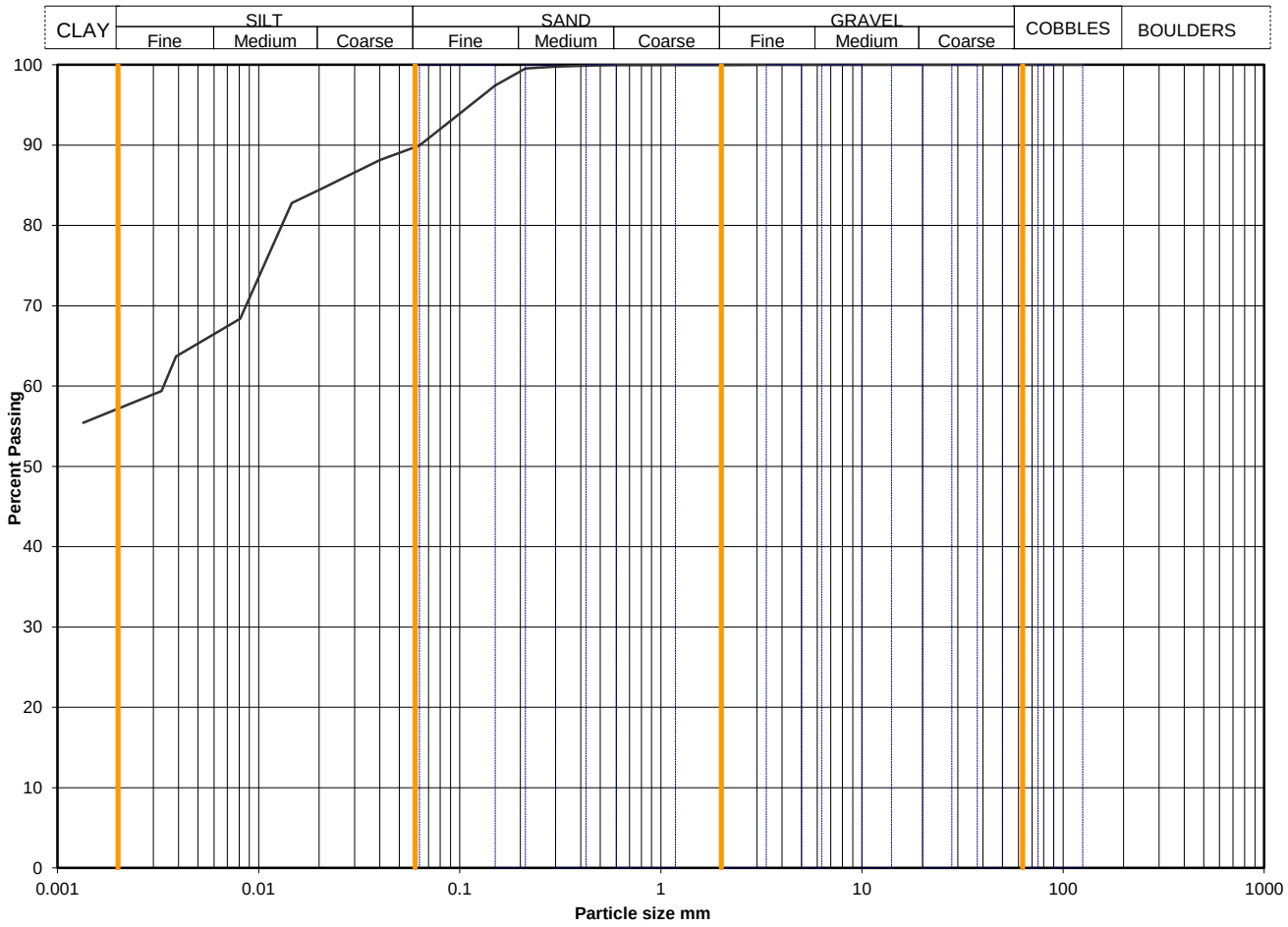
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204104300

Hole No	ATK-TPM-03
Sample Depth (m BGL)	0.40 - 0.50
Sample Type and No	B3A
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	90
90	100	0.0402	88
75	100	0.0287	86
63	100	0.0205	85
50	100	0.0146	83
37.5	100	0.0081	68
28	100	0.0039	64
20	100	0.0033	59
14	100	0.0013	55
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	97	14.6	
0.063	90		

Soil description	Brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	10.0	10.0
*<60mm values to aid description only	Silt	32.8	32.8
	Clay	57.2	57.2

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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1157

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

PSD

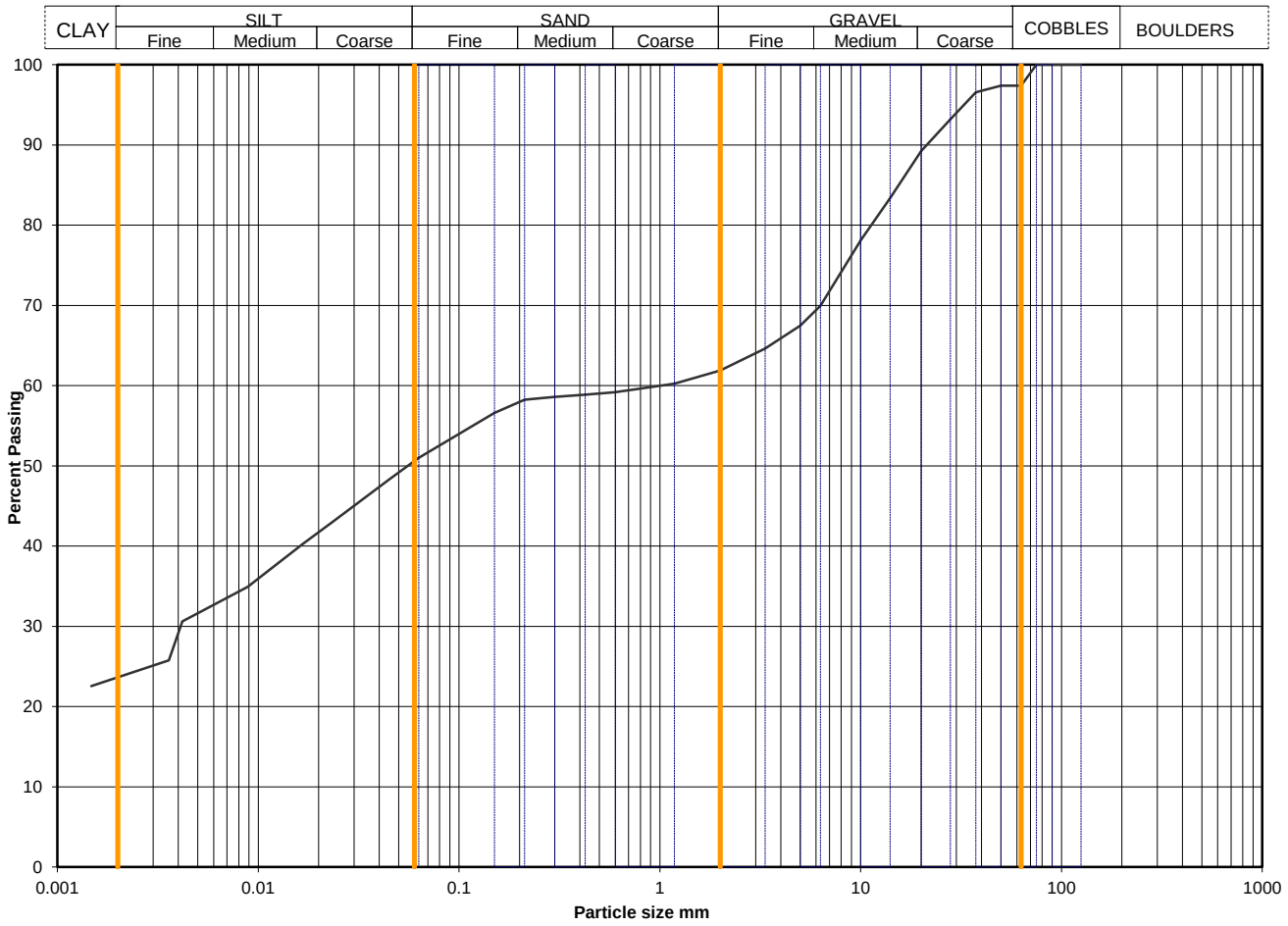
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204110916

Hole No	ATK-TPM-03
Sample Depth (m BGL)	2.50 - 2.60
Sample Type and No	B8
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	51
90	100	0.0451	48
75	100	0.0324	46
63	97	0.0232	43
50	97	0.0167	40
37.5	97	0.0089	35
28	93	0.0042	31
20	89	0.0036	26
14	83	0.0015	23
10	78		
6.3	70		
5.0	67		
3.35	65		
2.00	62		
1.18	60	Particle density, Mg/m3	
0.600	59		
0.425	59	2.65 assumed	
0.300	59	Dry mass of sample, kg	
0.212	58		
0.150	57	14.6	
0.063	51		

Soil description	Brown slightly sandy gravelly CLAY with one cobble.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	2.5	0.0
	Gravel	35.5	36.4
	Sand	10.9	11.2
*<60mm values to aid description only	Silt	27.4	28.1
	Clay	23.7	24.3

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
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1157

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Figure

PSD

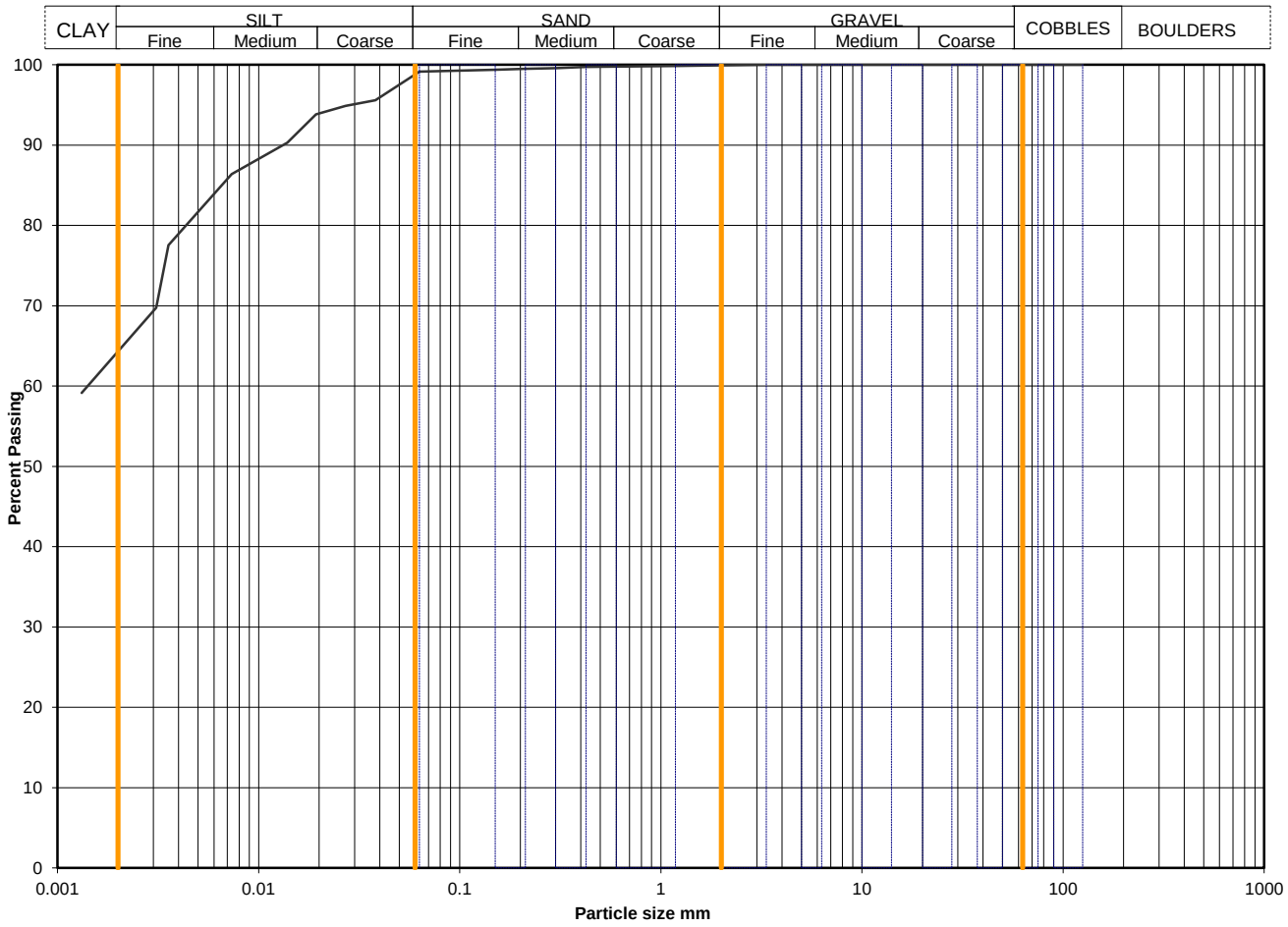
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-1920191204125101

Hole No	ATK-TPM-04
Sample Depth (m BGL)	1.50 - 1.60
Sample Type and No	B7
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0381	96
75	100	0.0271	95
63	100	0.0193	94
50	100	0.0139	90
37.5	100	0.0073	86
28	100	0.0036	78
20	100	0.0031	70
14	100	0.0013	59
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	99		
0.150	99	8.9	
0.063	99		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.1	0.1
	Sand	0.8	0.8
*<60mm values to aid description only	Silt	34.8	34.8
	Clay	64.3	64.3

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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Jul 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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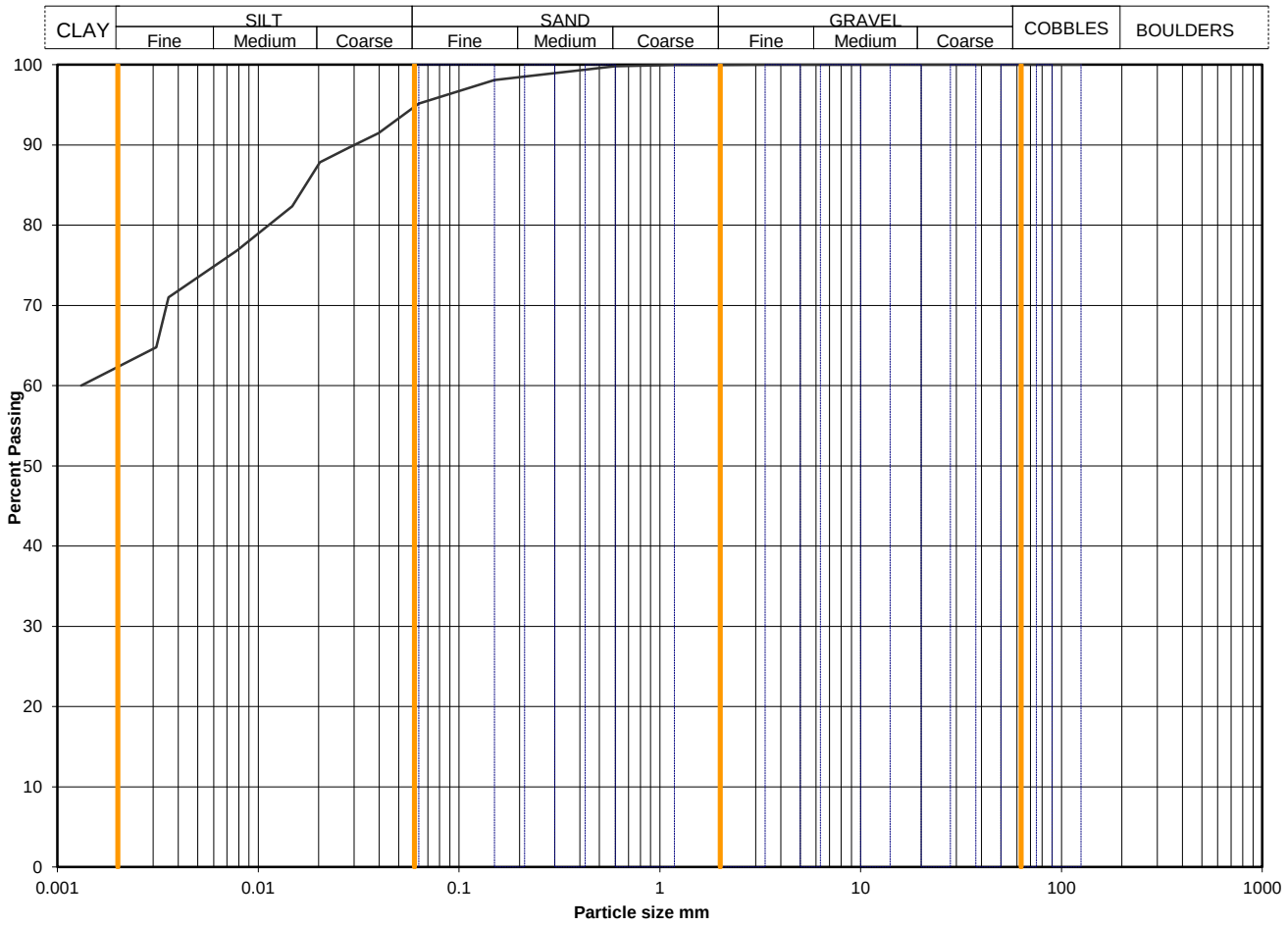
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191120031821

Hole No	ATK-TPM-05
Sample Depth (m BGL)	0.70 - 1.00
Sample Type and No	B4
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	95
90	100	0.0397	91
75	100	0.0284	90
63	100	0.0203	88
50	100	0.0148	82
37.5	100	0.0078	77
28	100	0.0036	71
20	100	0.0031	65
14	100	0.0013	60
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	5.8	
0.063	95		

Soil description	Brown slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	0.0	0.0
	Sand	4.9	4.9
*<60mm values to aid description only	Silt	32.8	32.8
	Clay	62.3	62.3

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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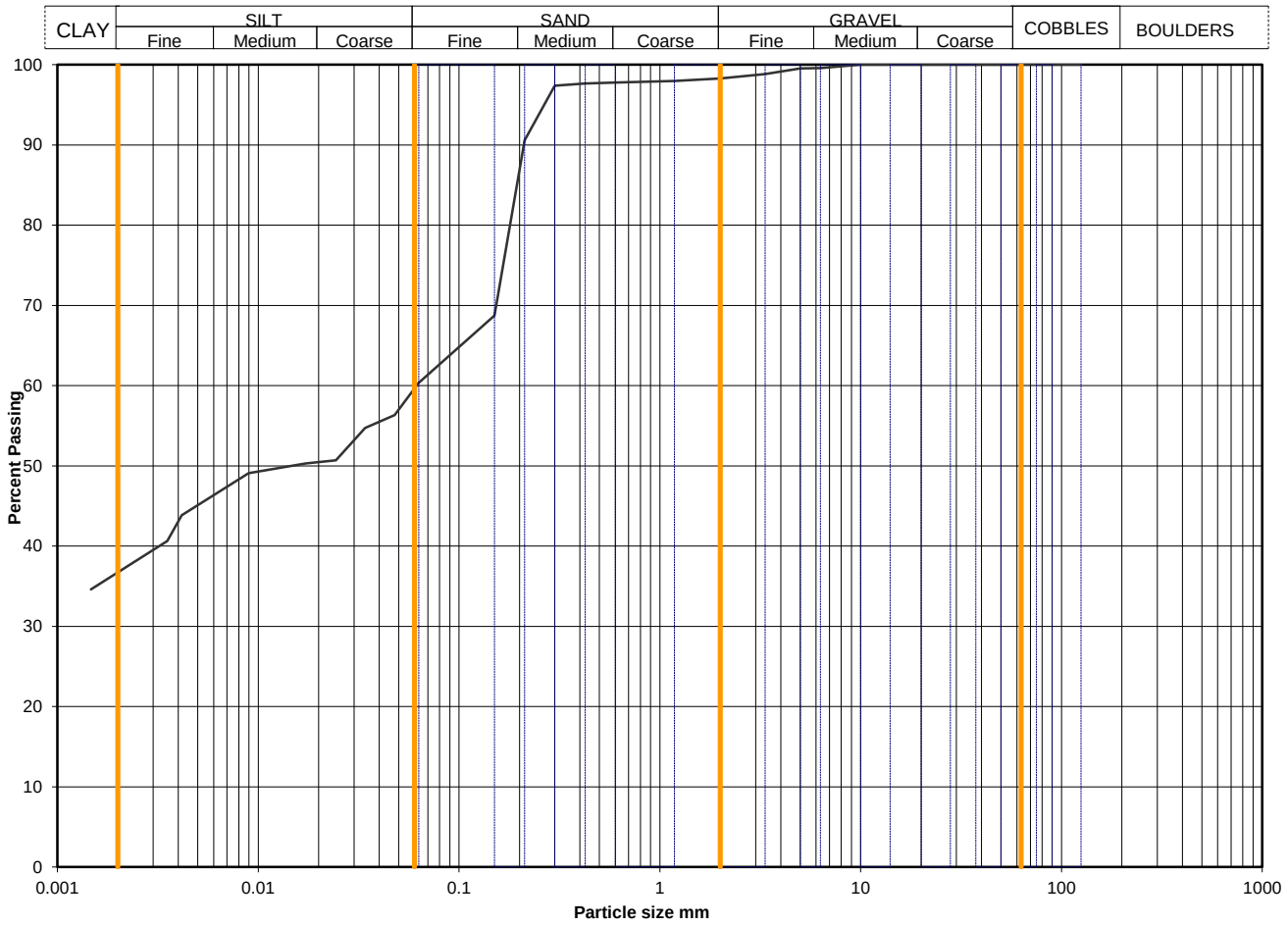
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Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:
	A9031-19-20191120032104

Hole No	ATK-TPM-05
Sample Depth (m BGL)	2.20 - 2.20
Sample Type and No	D101
Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	60
90	100	0.0479	56
75	100	0.0340	55
63	100	0.0244	51
50	100	0.0173	50
37.5	100	0.0090	49
28	100	0.0042	44
20	100	0.0035	41
14	100	0.0015	35
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	98		
1.18	98	Particle density, Mg/m3	
0.600	98		
0.425	98	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	91		
0.150	69	0.6	
0.063	60		

Soil description	Brown slightly gravelly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0.0	0.0
	Gravel	1.8	1.8
	Sand	37.9	37.9
*<60mm values to aid description only	Silt	23.6	23.6
	Clay	36.7	36.7

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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SLR 2,9
Rev 2.21
Jul 17

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Project No A9031-19

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DETERMINATION OF SHRINKAGE CHARACTERISTICS - SUMMARY OF RESULTS

Hole No.	Sample				Sample Desription	Sample Preparation	<425 Micro %	Linear Shrinkage %	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-06	20	4.00	4.45	UT	Firm red and grey mottled slightly sandy CLAY	Natural	100	15	
ATK-CP-06	27	6.00	6.45	UT	Firm multicoloured slightly sandy CLAY.	Natural	100	14	
ATK-CP-07A	21	6.00	6.40	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	Natural	100	10	
ATK-CP-07A	28	8.00	8.35	UT	Very stiff grey mottled reddish brown slightly sandy CLAY.	Natural	100	14	
ATK-CP-07A	35	10.00	10.35	UT	Very stiff reddish brown mottled grey and brown slightly sandy CLAY.	Natural	100	10	
ATK-CP-08	15	4.20	4.65	UT	Very stiff reddish brown slightly sandy CLAY.	Natural	100	14	
ATK-CP-09	16	4.20	4.65	UT	Stiff reddish brown mottled grey slightly sandy CLAY.	Natural	100	13	
ATK-CP-10	26	7.00	7.45	UT	Very stiff thinly laminated dark brown slightly sandy CLAY.	Natural	100	17	
ATK-CP-11	19	4.00		UT	Firm to stiff greyish brown slightly sandy CLAY	Natural	100	16	
ATK-CP-11	27	6.00		UT	Firm laminated CLAY with silt on laminae.	Natural	100	15	
ATK-CP-12	24	6.00	6.50	B	Grey and reddish brown slightly sandy CLAY.	Natural	100	14	
ATK-CP-14	17	5.00	5.40	D	Dark brown slightly gravelly sandy CLAY	Washed	68	13	
ATK-CP-15	29	7.00		UT	Firm to stiff dark greyish brown silty CLAY.	Natural	100	17	
ATK-CP-16	21	7.00	7.45	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	Natural	100	13	
ATK-TP-06	7	0.90		D	Brown slightly sandy CLAY	Natural	100	14	
ATK-TP-06	12	3.00		D	Brown slightly sandy CLAY	Natural	100	16	

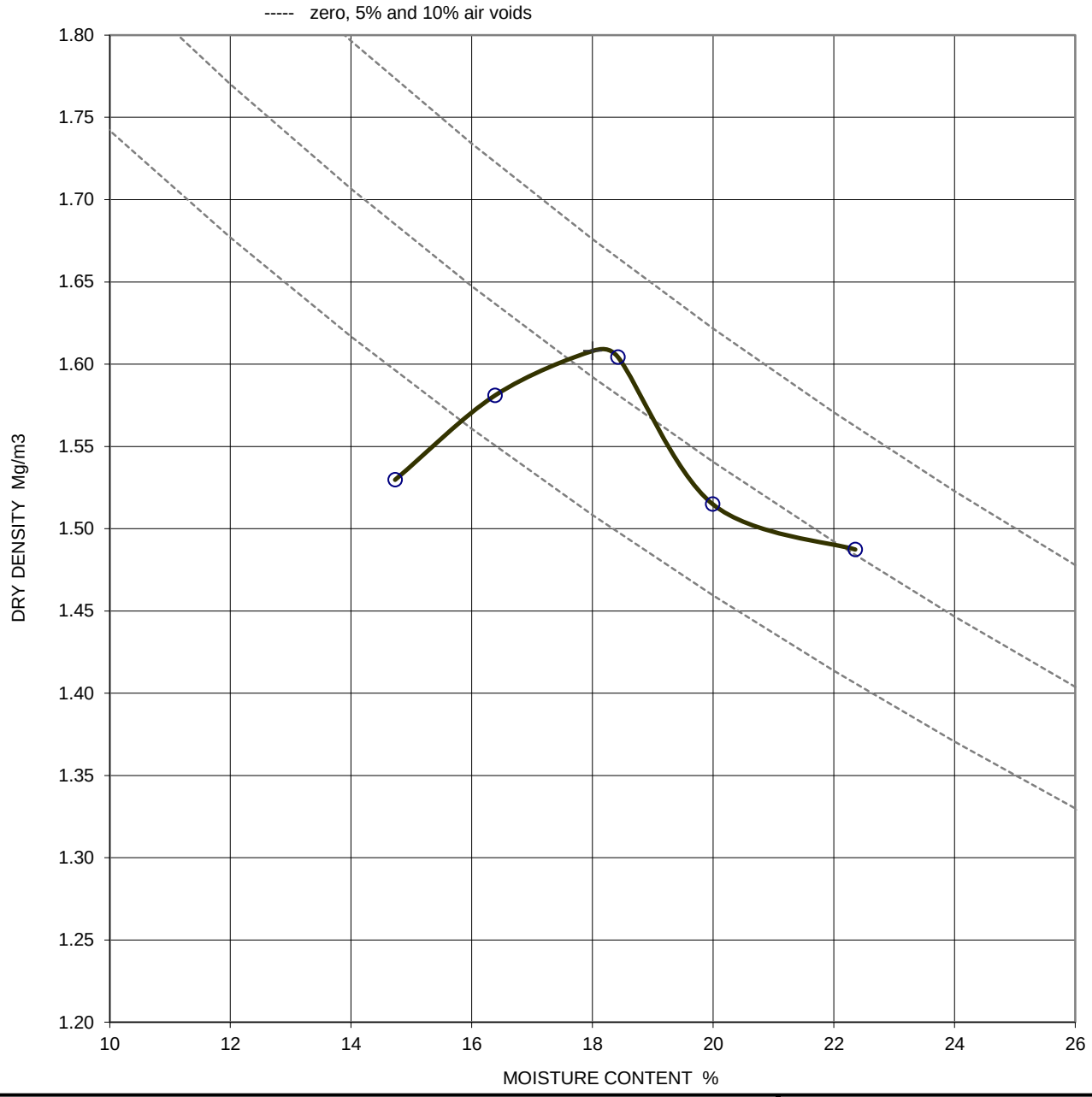
Test Method : BS 1377 : Part 2 : 1990 : Section 6.5

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191218095028

Hole No	ATK-BH-02
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B3
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.40	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.61**

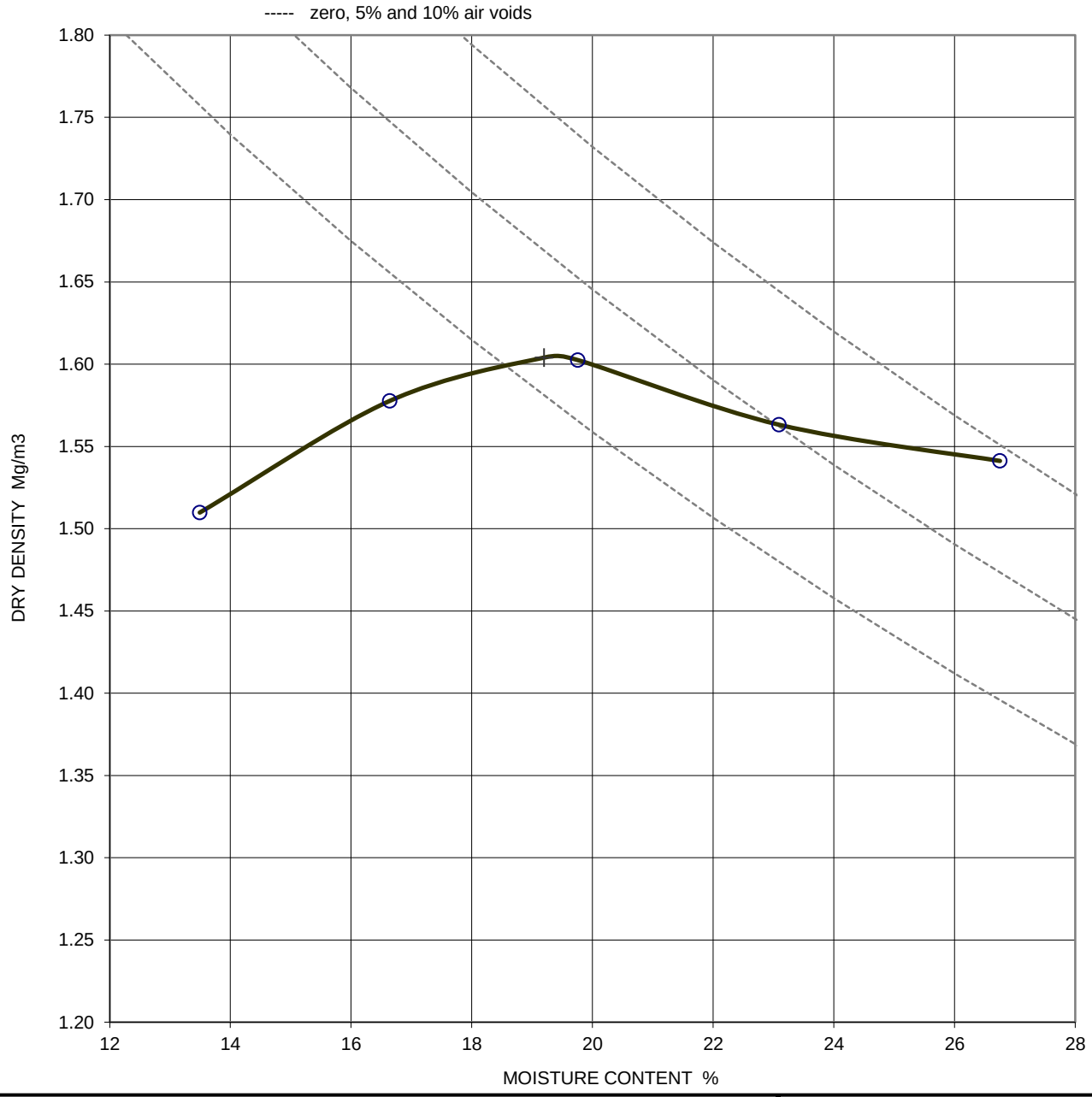
Optimum moisture content, % **18**

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191107112613

Hole No	ATK-CP-01
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.60**

Optimum moisture content, % **19**

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SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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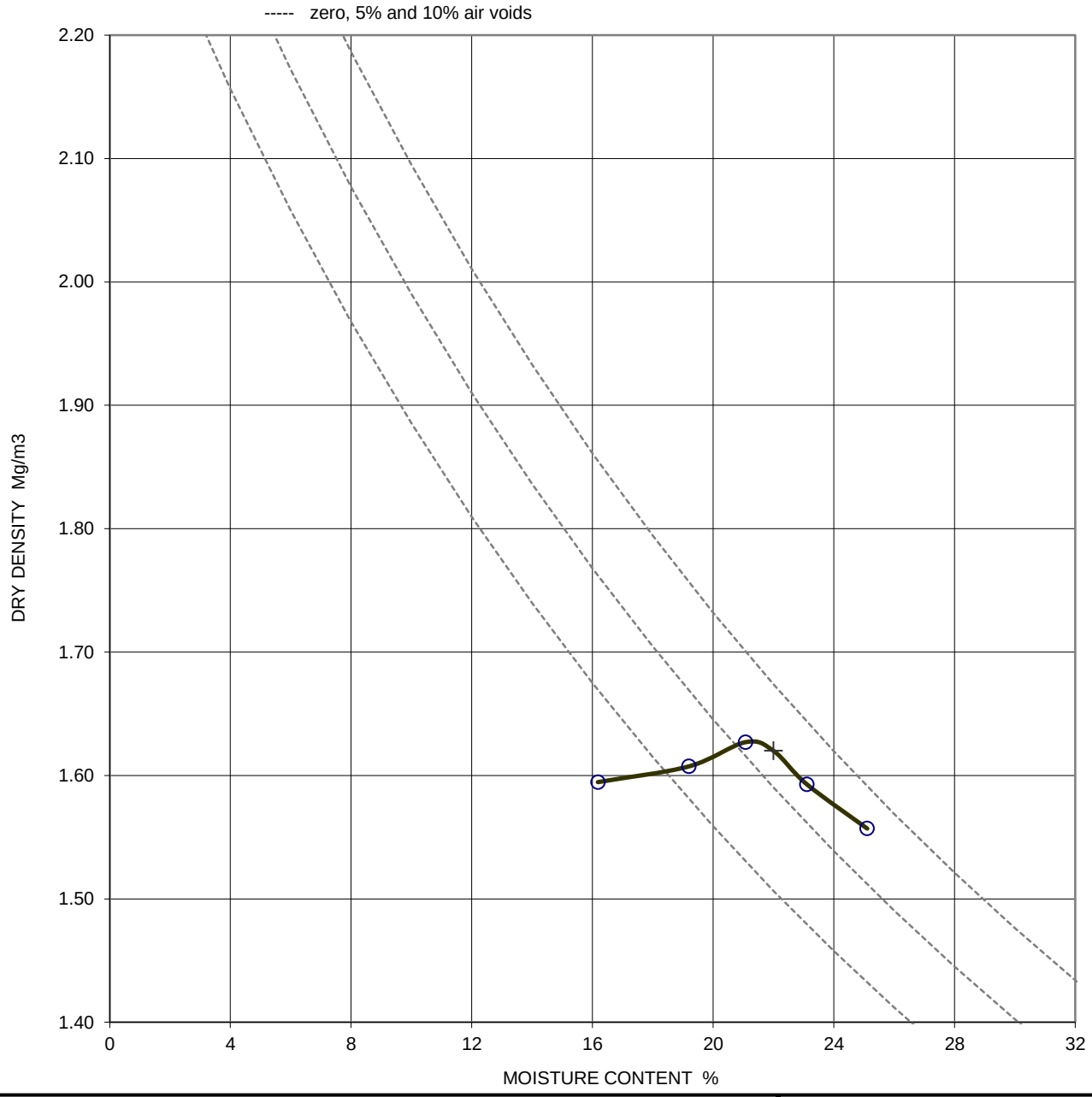
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191112122921

Hole No	ATK-CP-01
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B17
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.62**

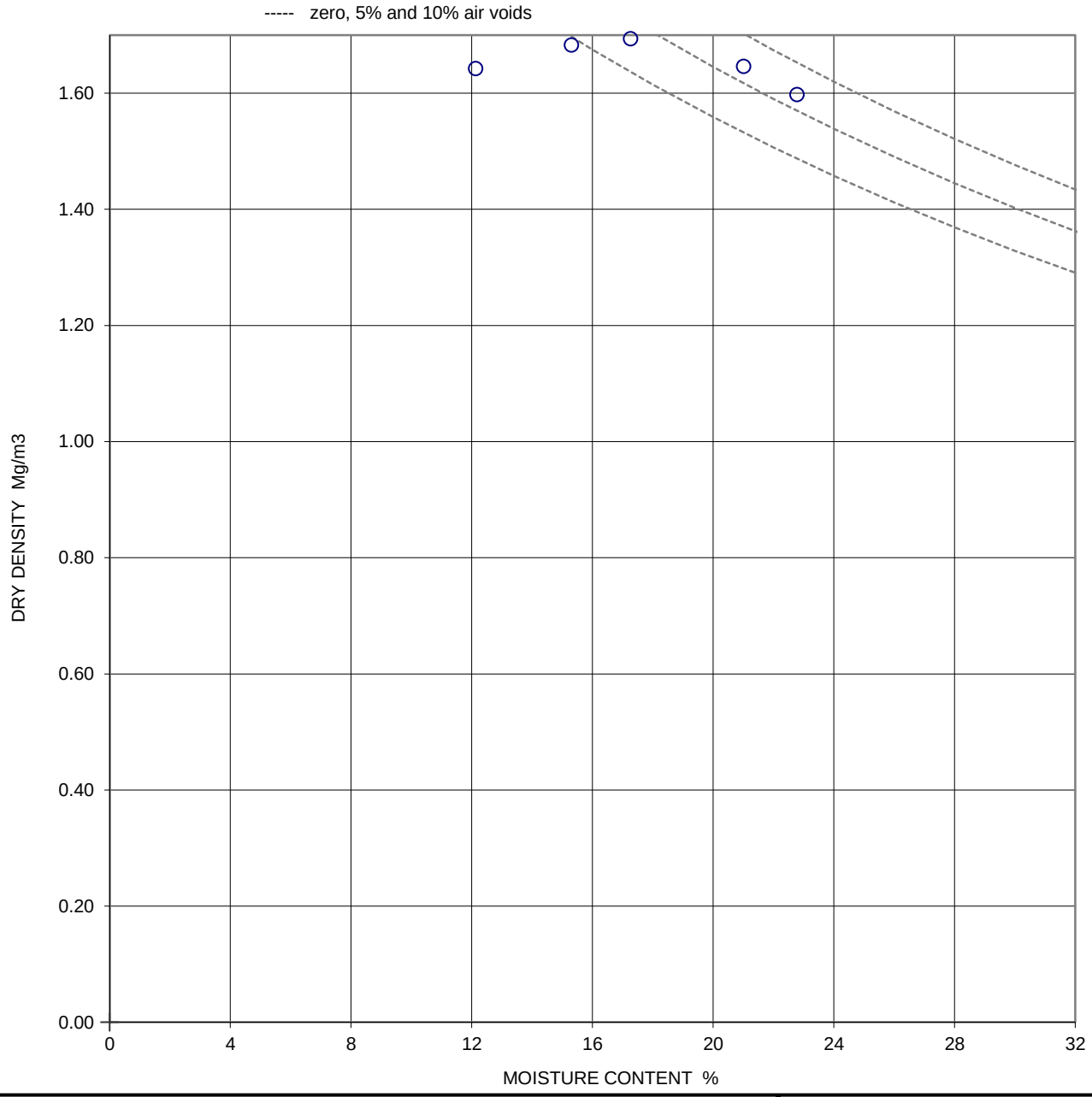
Optimum moisture content, % **22**

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191112122012

Hole No	ATK-CP-02
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B5
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **0.00**

Optimum moisture content, %

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Figure
COMPL

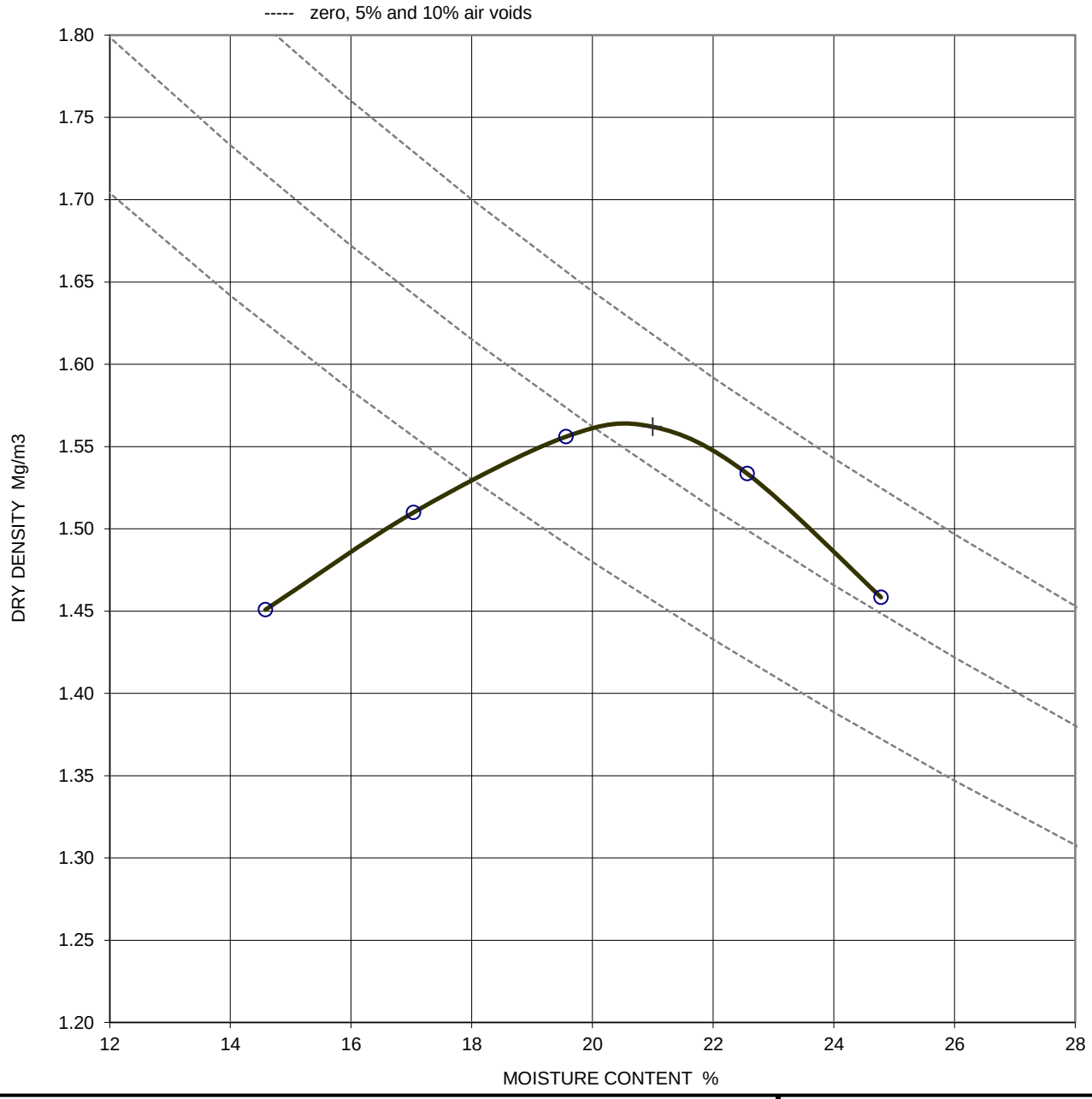
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191212034428

Hole No	ATK-CP-03
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B12
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.45	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.56**

Optimum moisture content, % **21**

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Project No A9031-19

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Figure
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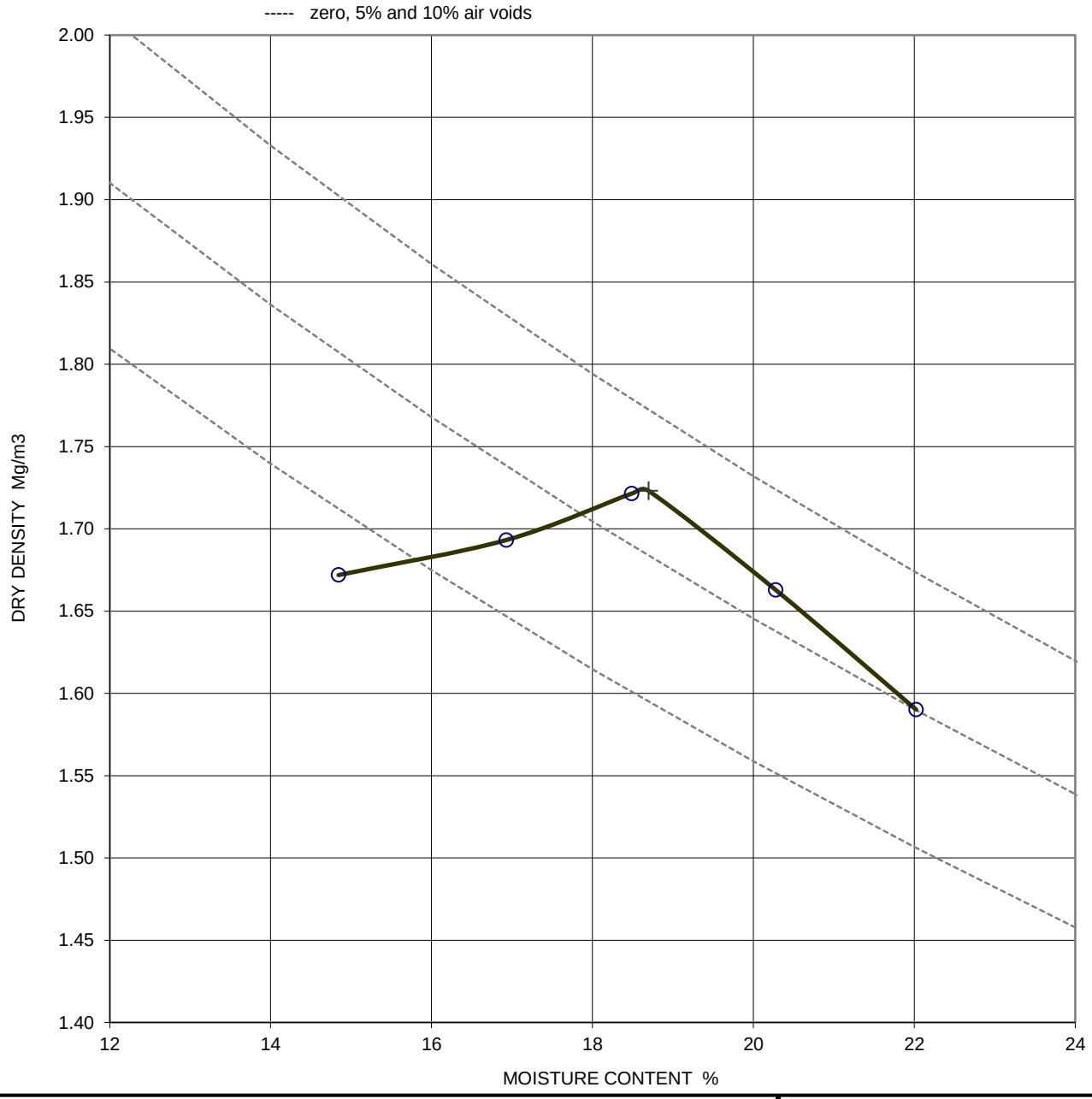
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191118090111

Hole No	ATK-CP-04
Sample Depth (m BGL)	0.80 - 1.20
Sample Type and No	B6
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.72**

Optimum moisture content, % **19**

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SLD 4, 3.3/4
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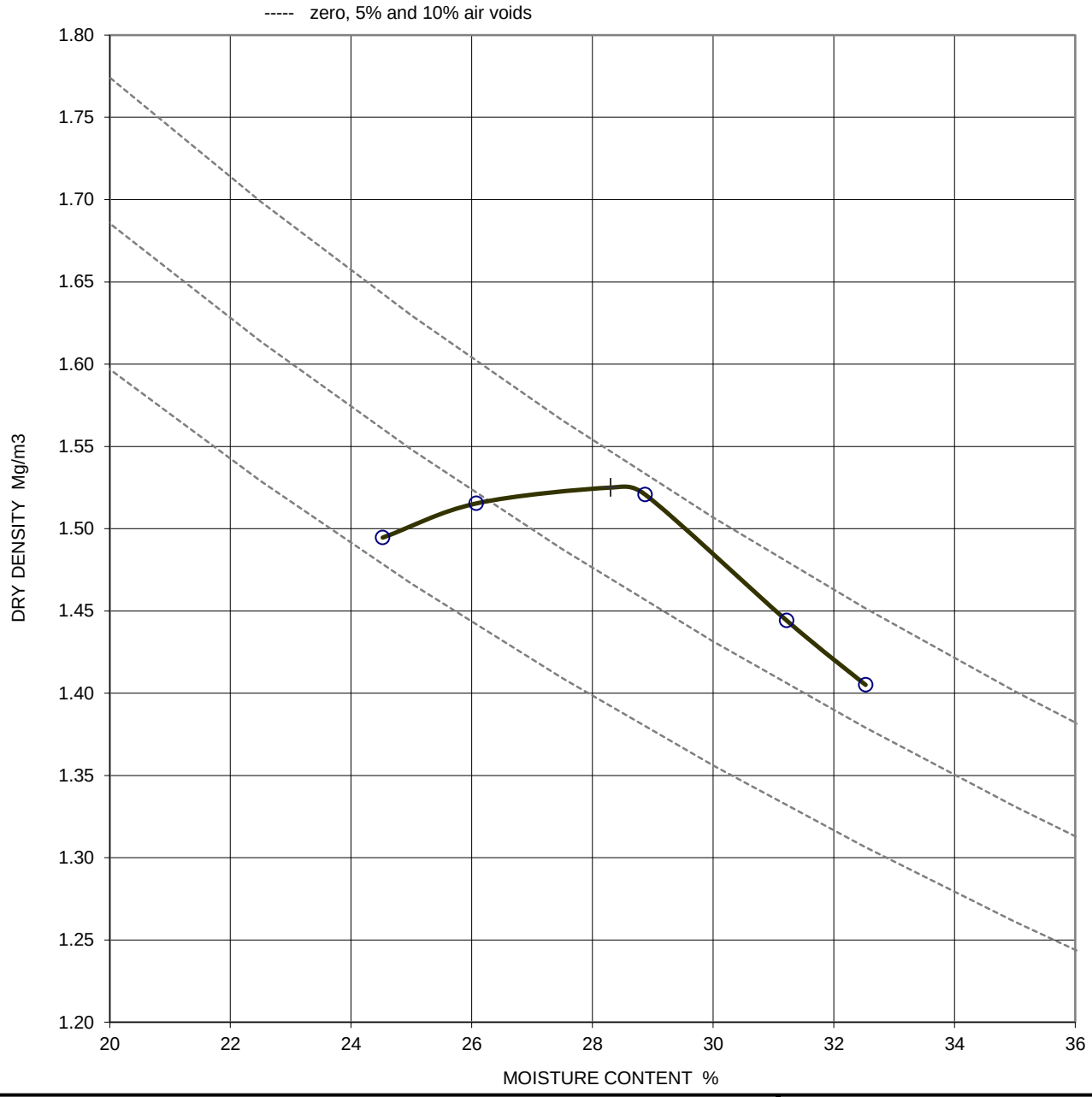
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191118090257

Hole No	ATK-CP-04
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B13
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.75	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.53

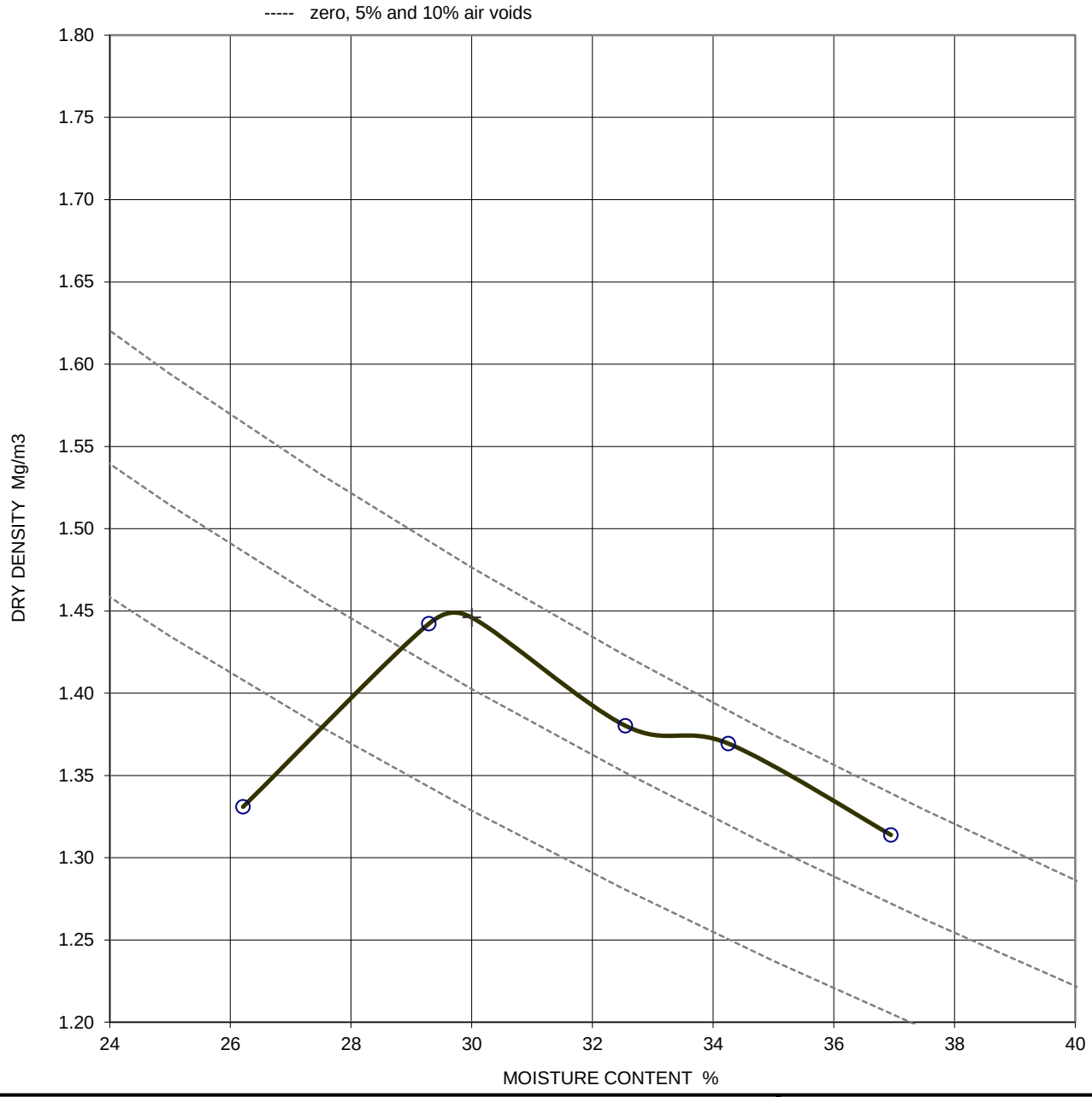
Optimum moisture content, %
28

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191121112036

Hole No	ATK-CP-05
Sample Depth (m BGL)	0.80 - 1.20
Sample Type and No	B6
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.45

Optimum moisture content, %
30

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SLD 4, 3.3/4
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Figure
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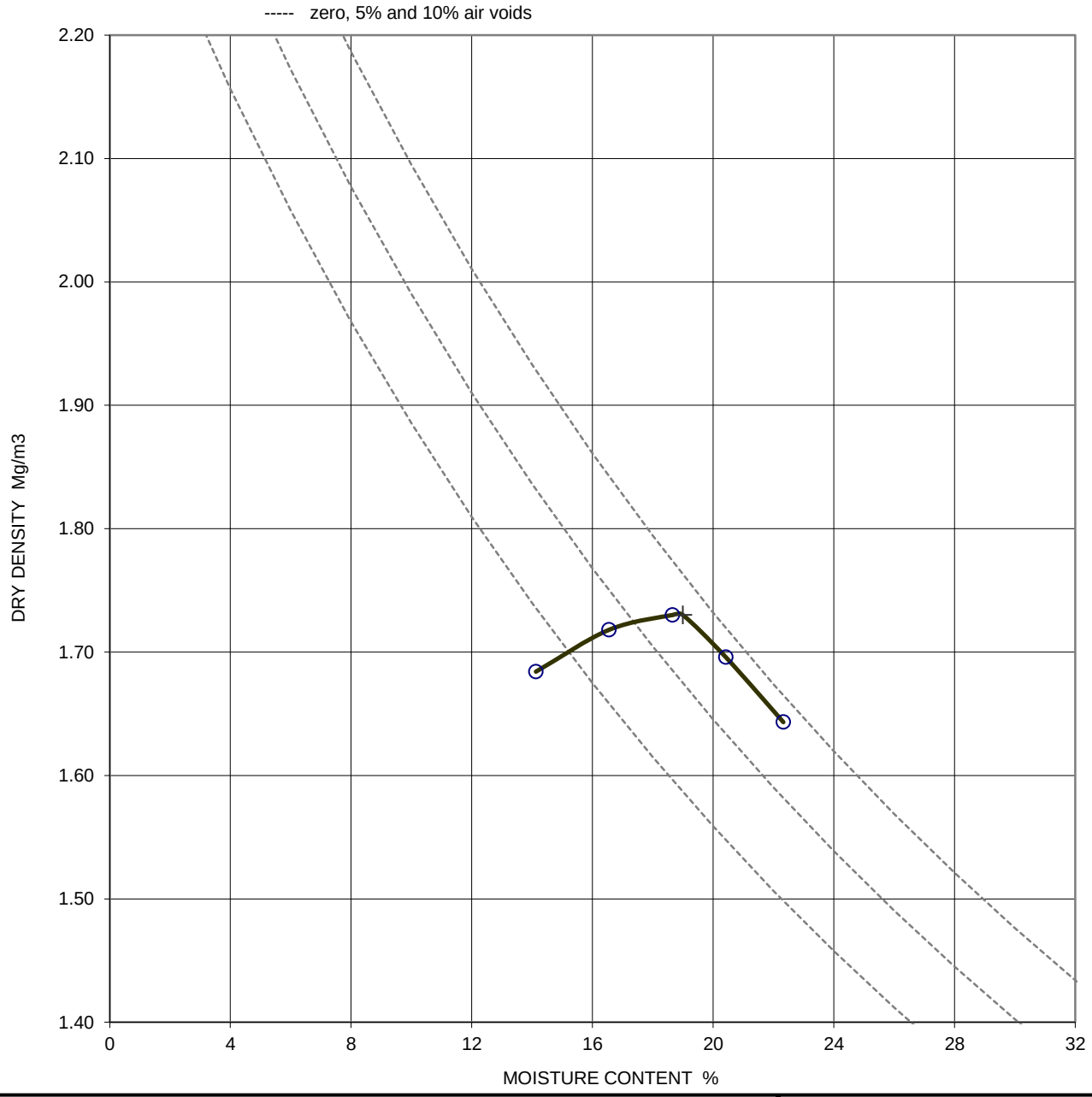
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191205122237

Hole No	ATK-CP-06
Sample Depth (m BGL)	1
Sample Type and No	B7
Specimen Ref	



Soil description	Light brown slightly sandy gravelly CLAY with two cobbles.		
Test method	BS 1377:part 4:1990: clause 3.6, 2.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	12	%	
Material < 37.5mm > 20mm	22	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.73**

Optimum moisture content, % **19**

Grading Zone X

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

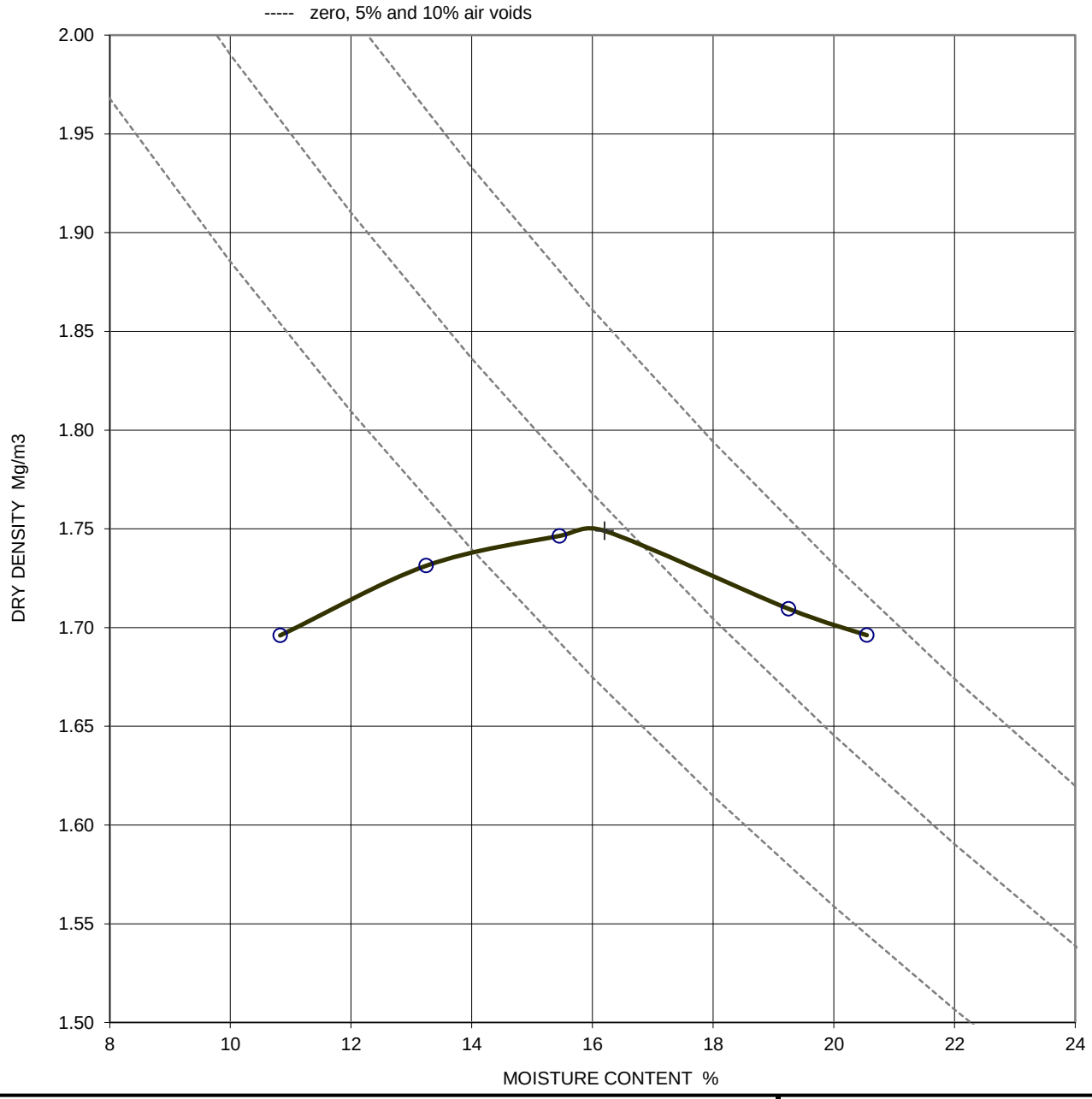
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191205122329

Hole No	ATK-CP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B16
Specimen Ref	



Soil description	Dark brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.75

Optimum moisture content, %
16

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

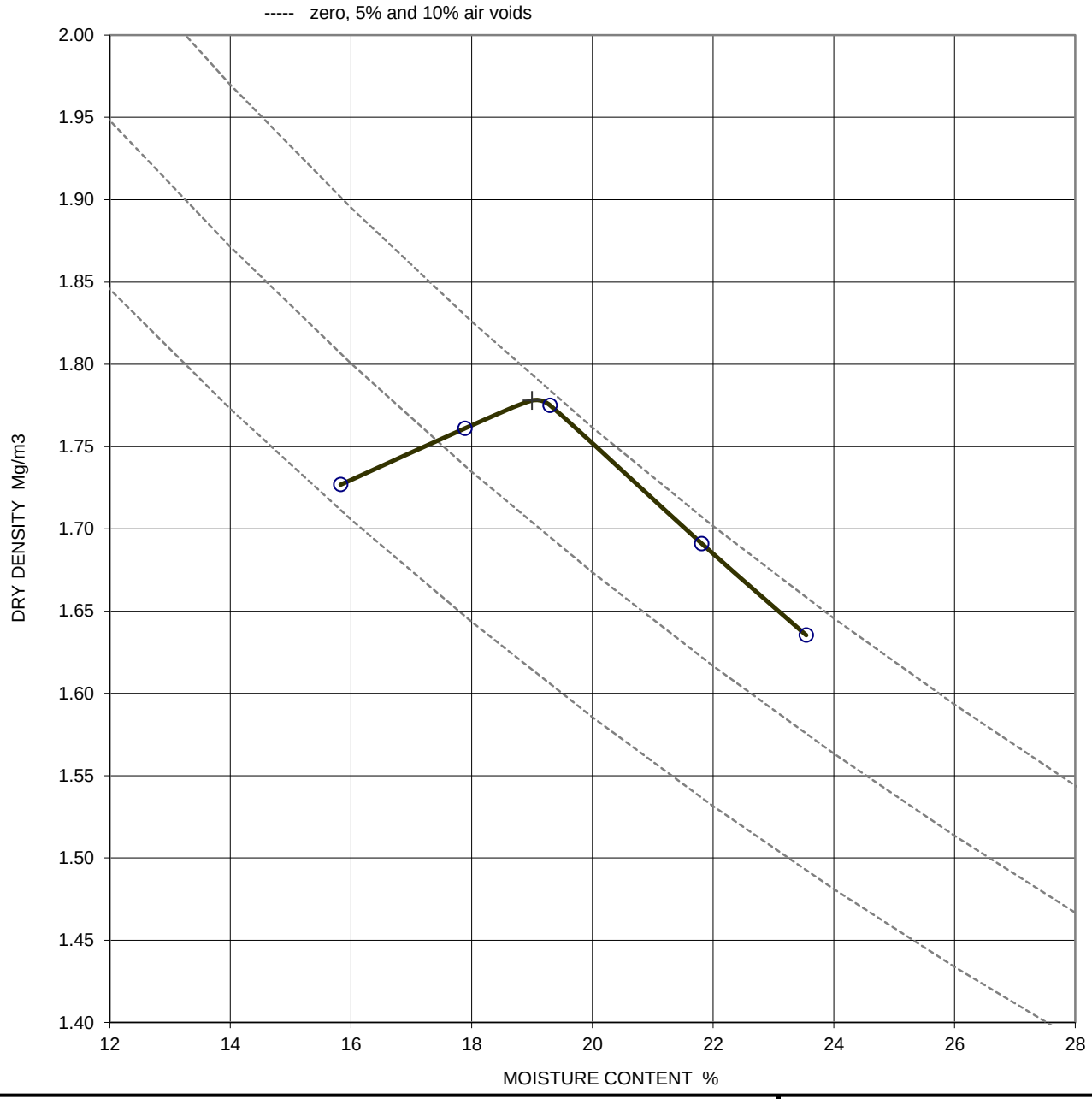
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191209030426

Hole No	ATK-CP-07A
Sample Depth (m BGL)	9.00 - 9.50
Sample Type and No	B32
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.78**

Optimum moisture content, % **19**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

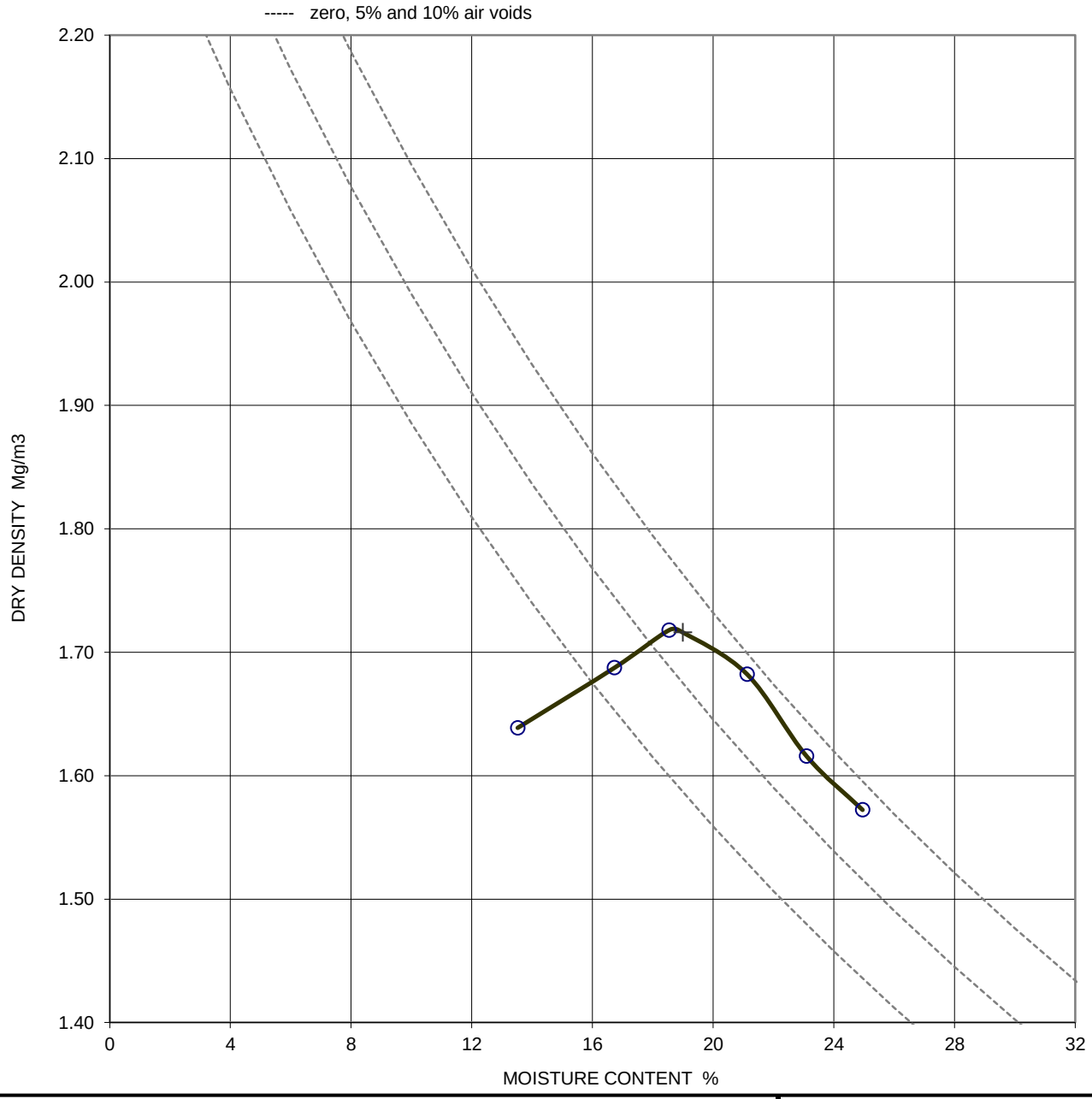
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191126042048

Hole No	ATK-CP-08
Sample Depth (m BGL)	2.65 - 3.20
Sample Type and No	B11
Specimen Ref	



Soil description

Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould	
Preparation	Original material was natural, single sample tested	
Material > 37.5mm	0	%
Material < 37.5mm > 20mm	2	%
Particle density	2.65	assumed
Remarks		

Derived Parameters +

Maximum dry density, Mg/m3 **1.72**

Optimum moisture content, % **19**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

UKAS TESTING
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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

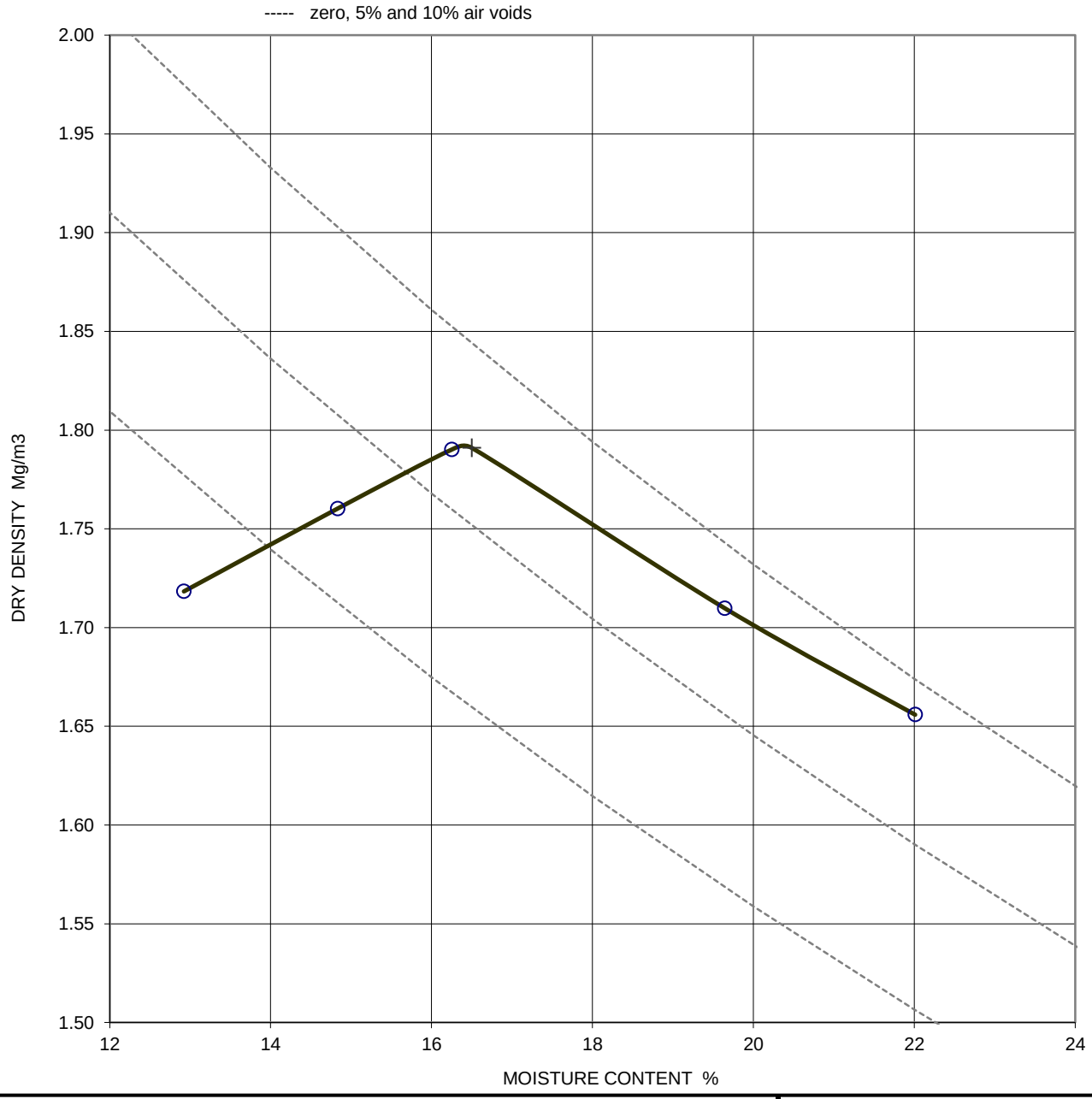
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191205104608

Hole No	ATK-CP-08
Sample Depth (m BGL)	7.65 - 8.20
Sample Type and No	B27
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.79**

Optimum moisture content, % **17**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

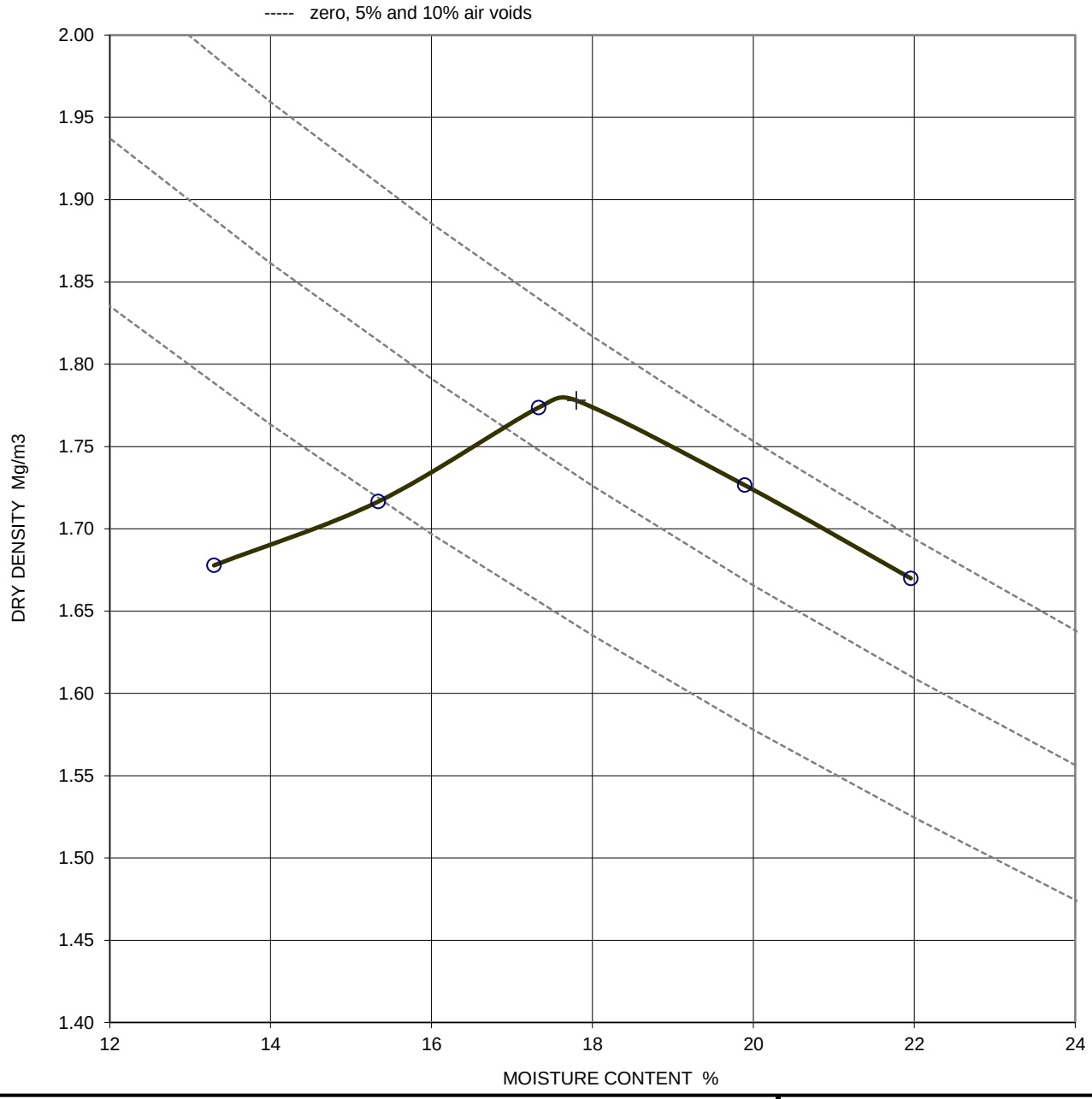
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191129110433

Hole No	ATK-CP-09
Sample Depth (m BGL)	4.65 - 5.20
Sample Type and No	B18
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.78**

Optimum moisture content, % **18**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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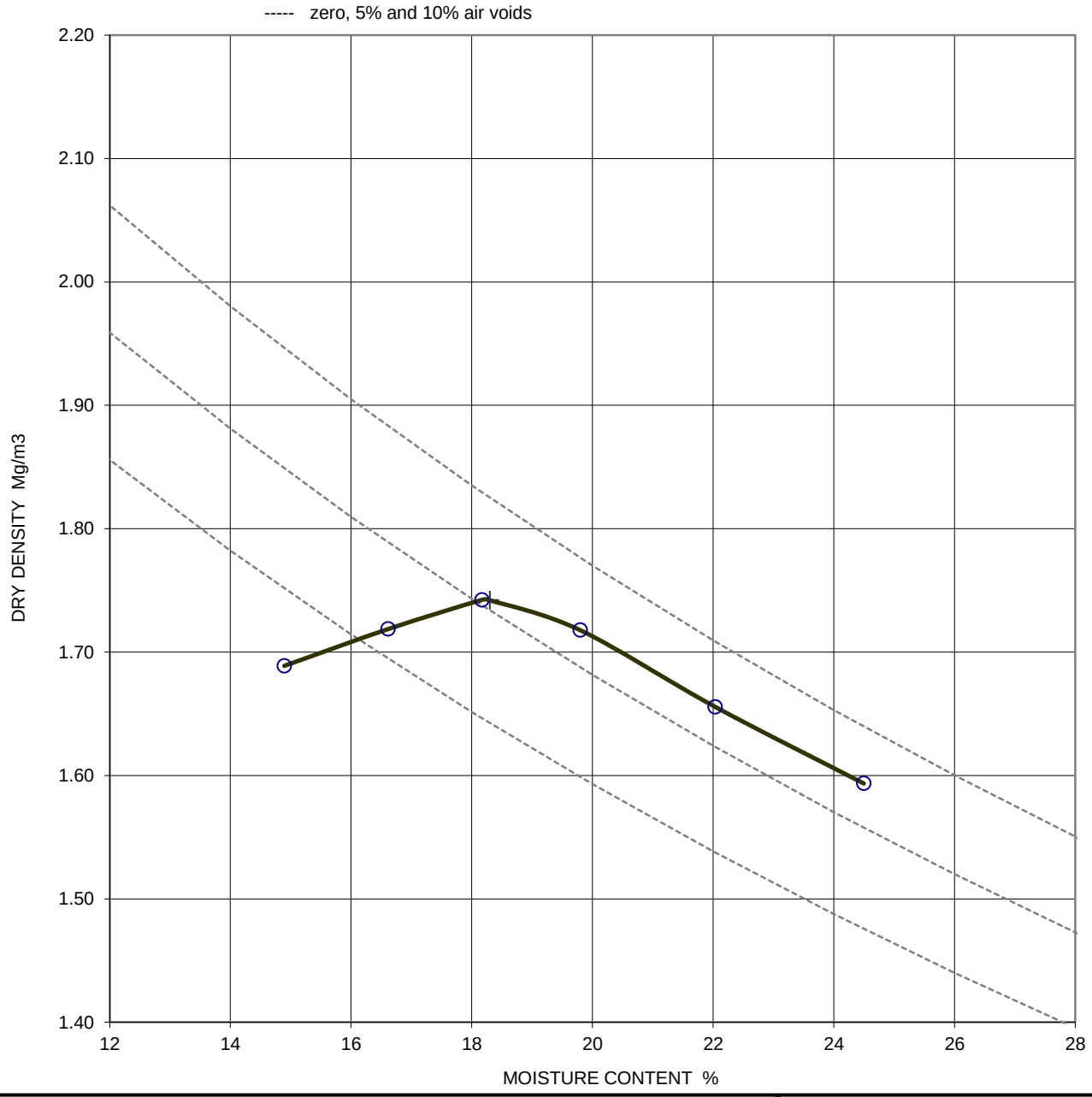
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191129110932

Hole No	ATK-CP-09
Sample Depth (m BGL)	6.95 - 7.20
Sample Type and No	B25
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.74	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.74**

Optimum moisture content, % **18**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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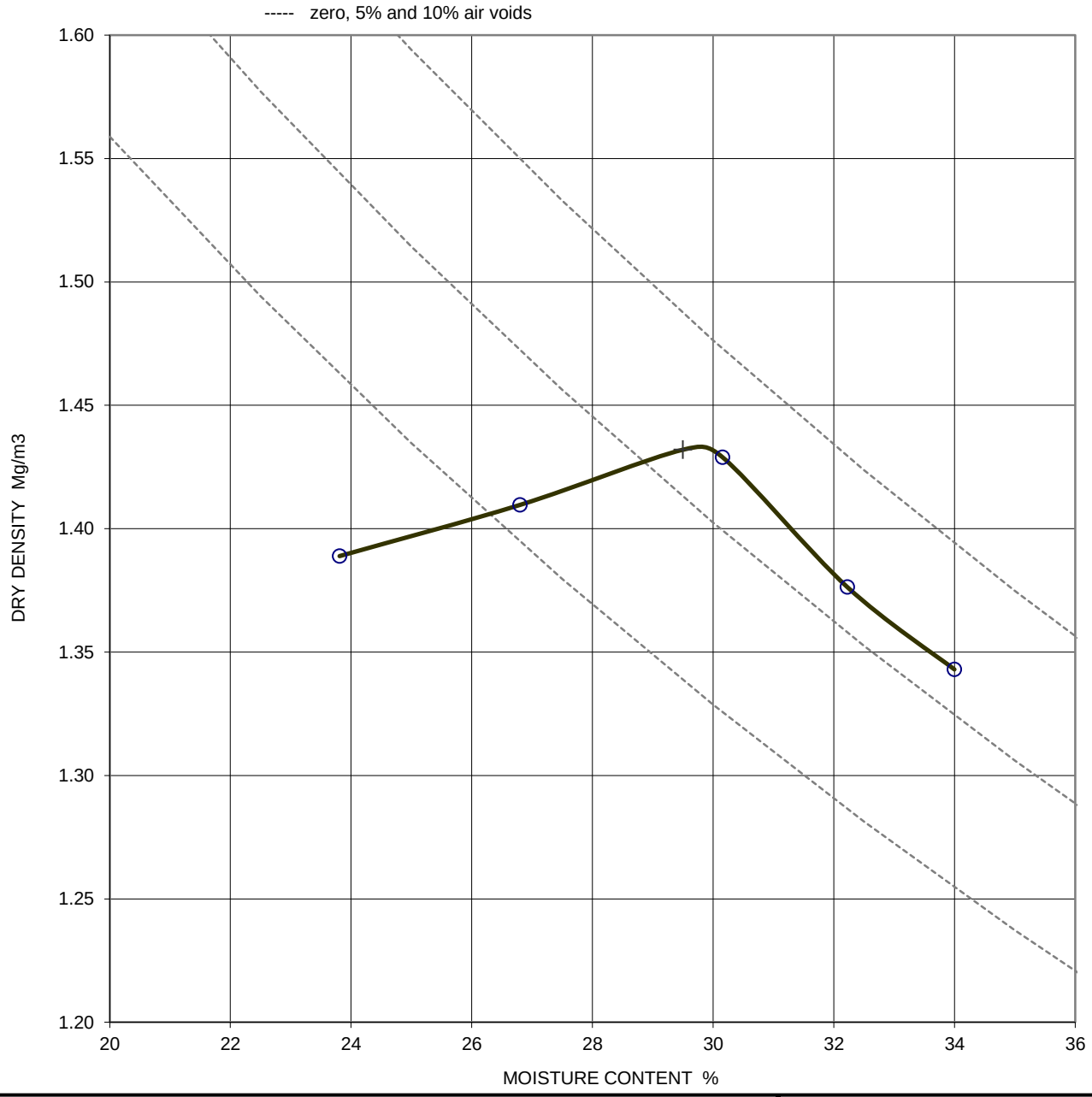
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191122011719

Hole No	ATK-CP-10
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B14
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.43**

Optimum moisture content, % **30**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

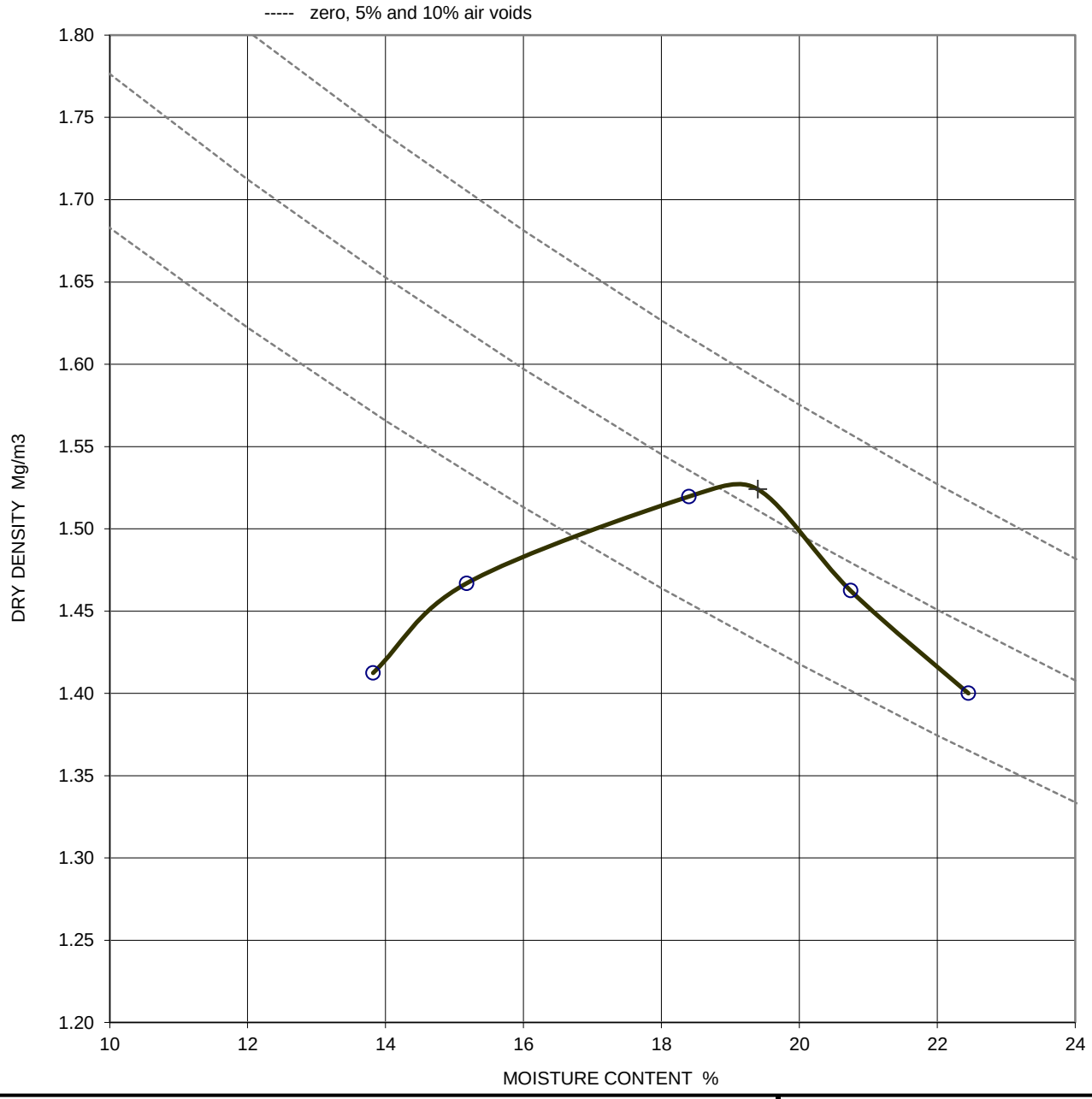
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191219104933

Hole No	ATK-CP-11
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B8
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.30	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.52**

Optimum moisture content, % **19**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

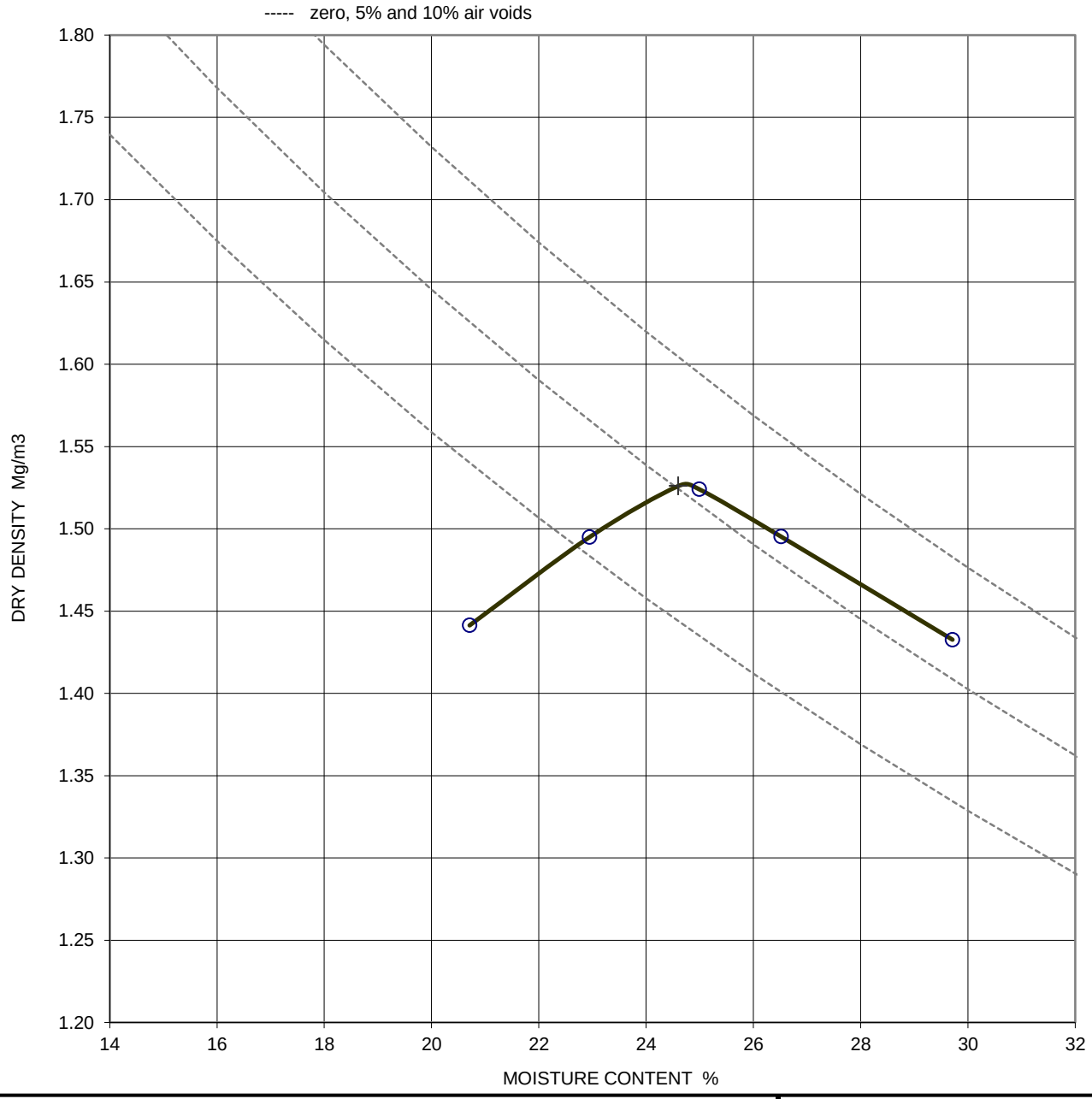
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191219105135

Hole No	ATK-CP-11
Sample Depth (m BGL)	5.00 - 5.50
Sample Type and No	B24
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.53

Optimum moisture content, %
25

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

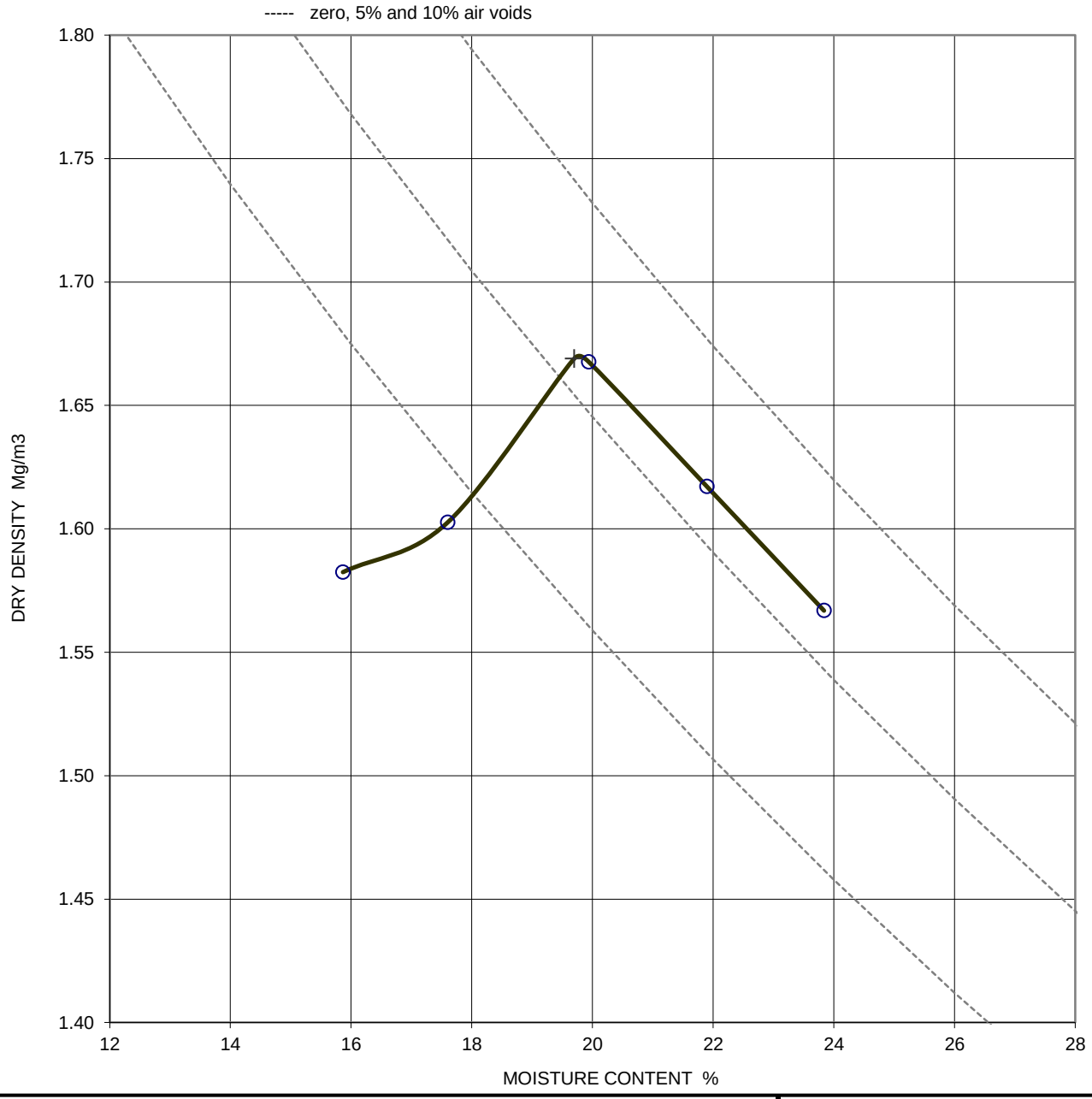
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191121112258

Hole No	ATK-CP-12
Sample Depth (m BGL)	1.20 - 1.70
Sample Type and No	B6
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.67**

Optimum moisture content, % **20**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

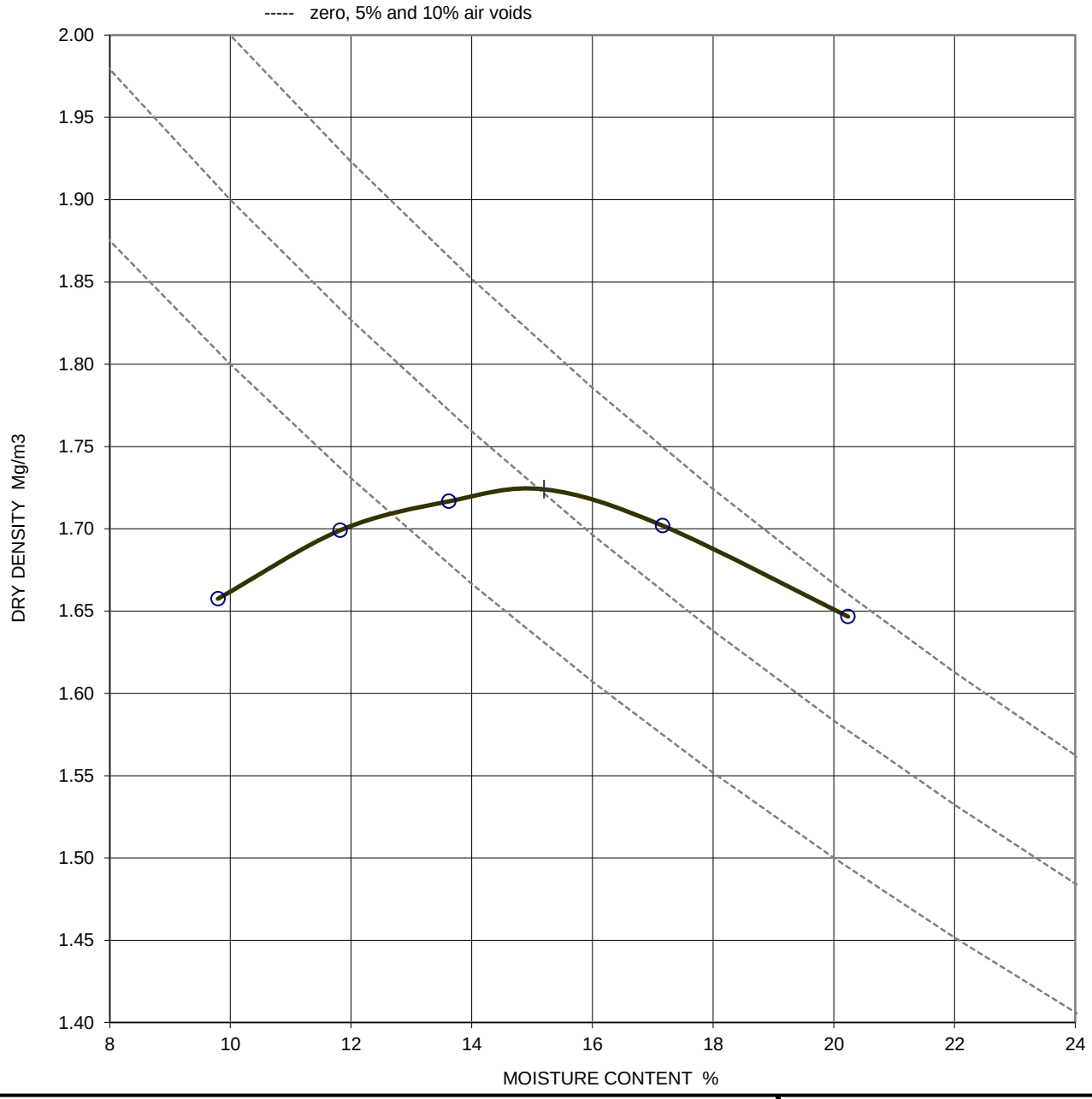
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191121112346

Hole No	ATK-CP-12
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B12
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.50	assumed	
Remarks	Replaces ATK-CP-12 D11.		

Derived Parameters +

Maximum dry density, Mg/m3
1.72

Optimum moisture content, %
15

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

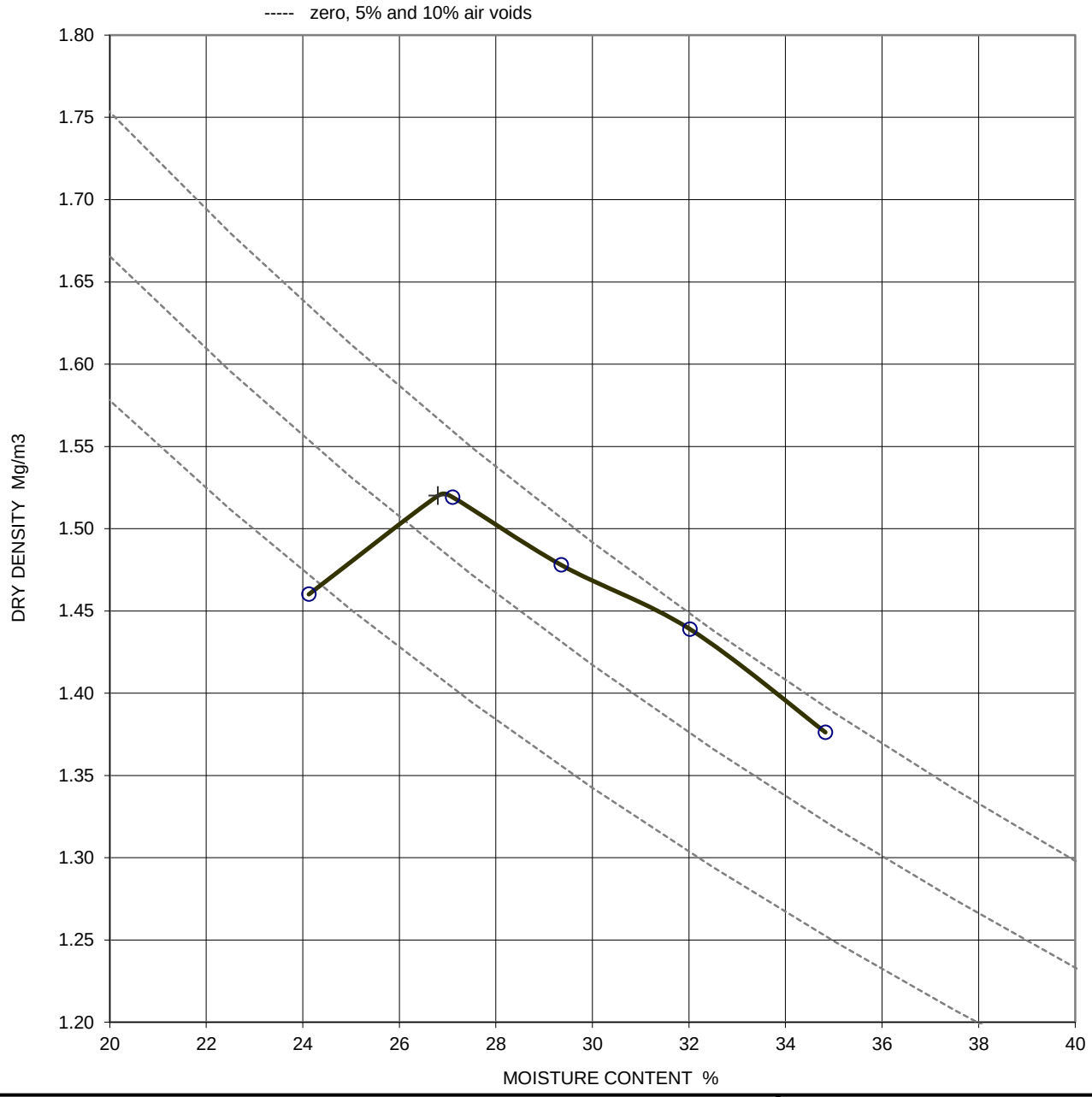
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127033323

Hole No	ATK-CP-13A
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.52

Optimum moisture content, %
27

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

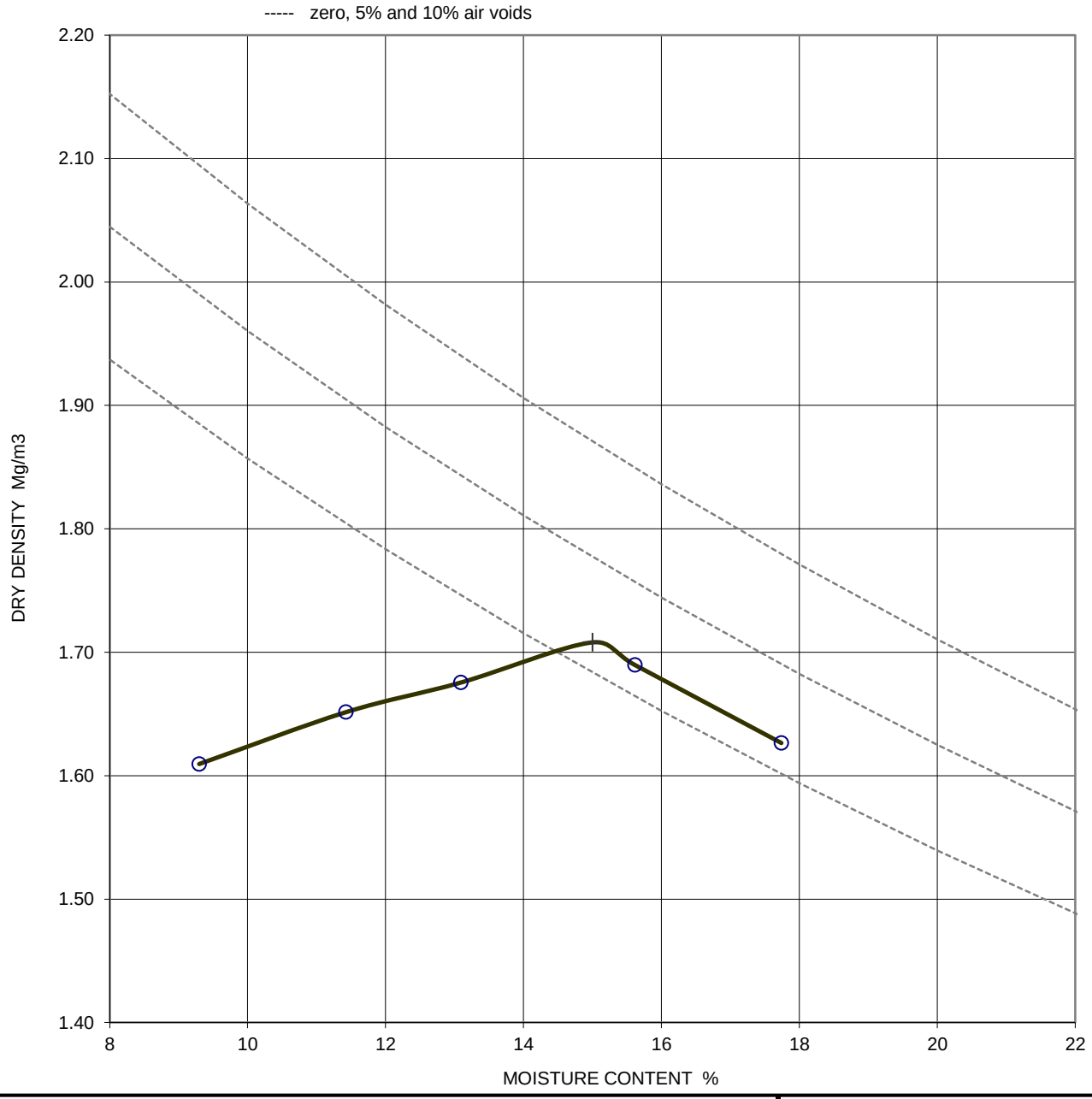
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127033721

Hole No	ATK-CP-13A
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B12
Specimen Ref	



Soil description	Brown slightly gravelly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	2	%	
Particle density	2.60	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.71**

Optimum moisture content, % **15**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
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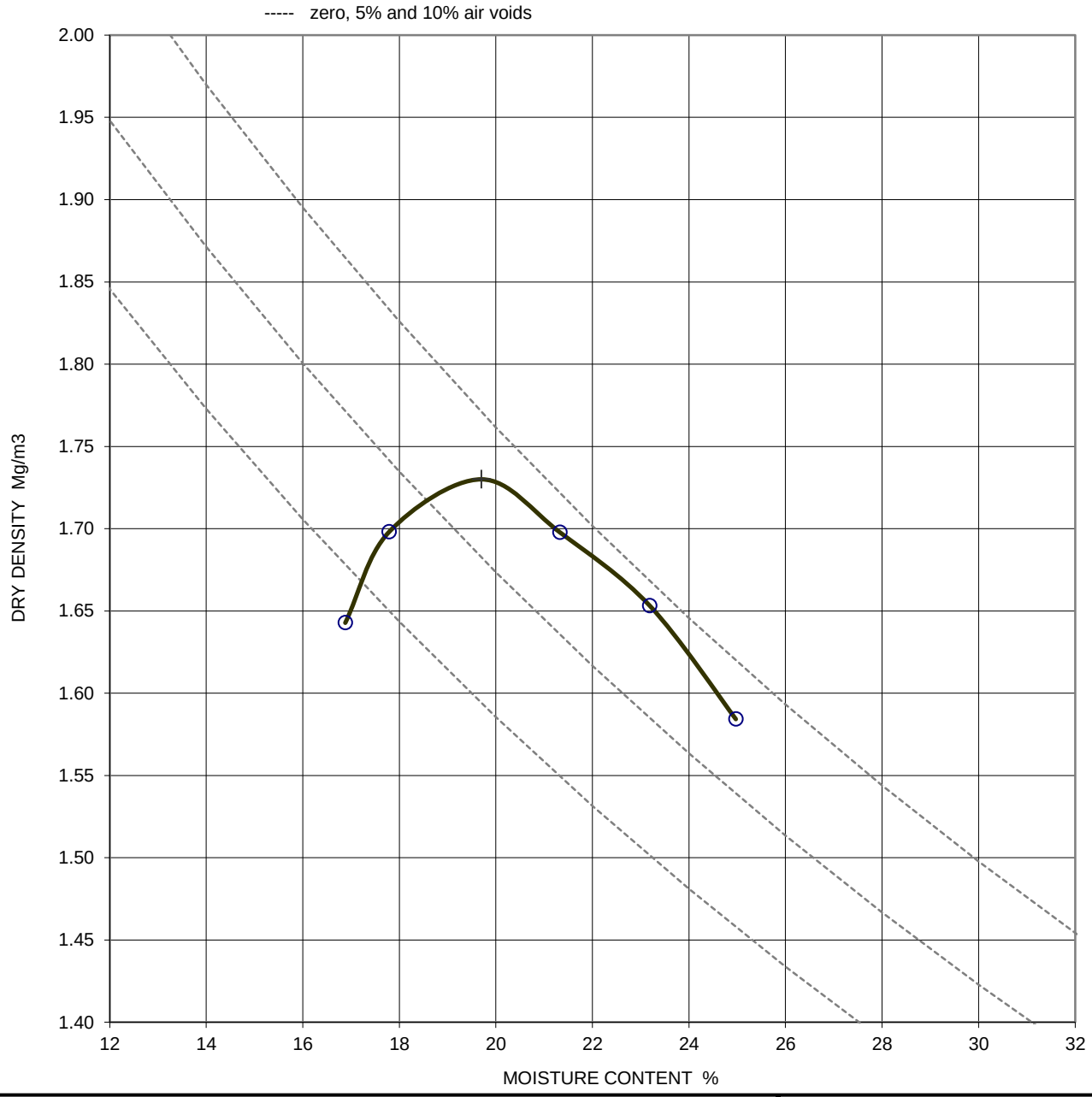
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127033838

Hole No	ATK-CP-13A
Sample Depth (m BGL)	5.00 - 5.50
Sample Type and No	B24
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.73**

Optimum moisture content, % **20**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

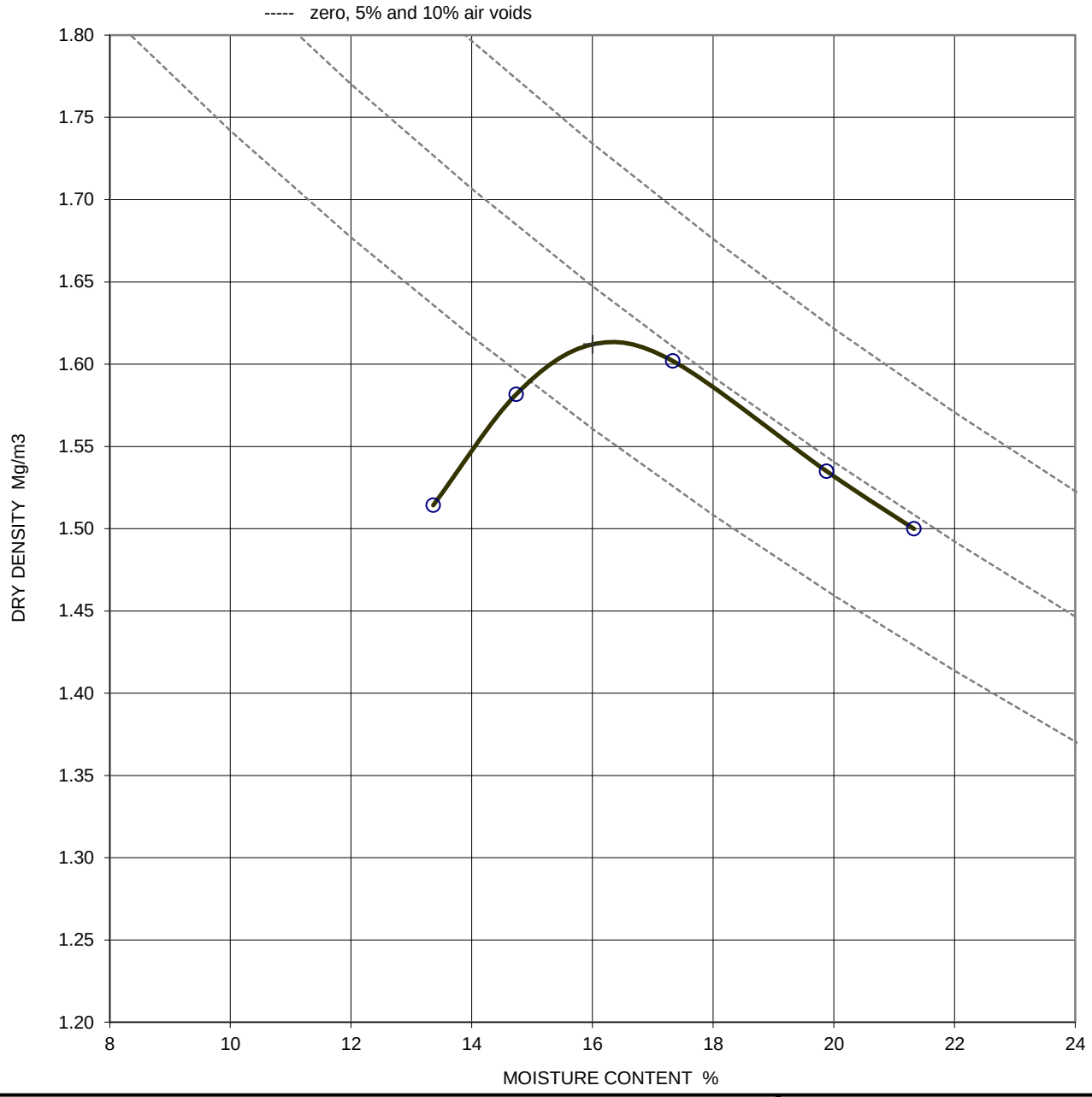
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191213110749

Hole No	ATK-CP-14
Sample Depth (m BGL)	0.50 - 1.00
Sample Type and No	B3
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.40	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.61**

Optimum moisture content, % **16**

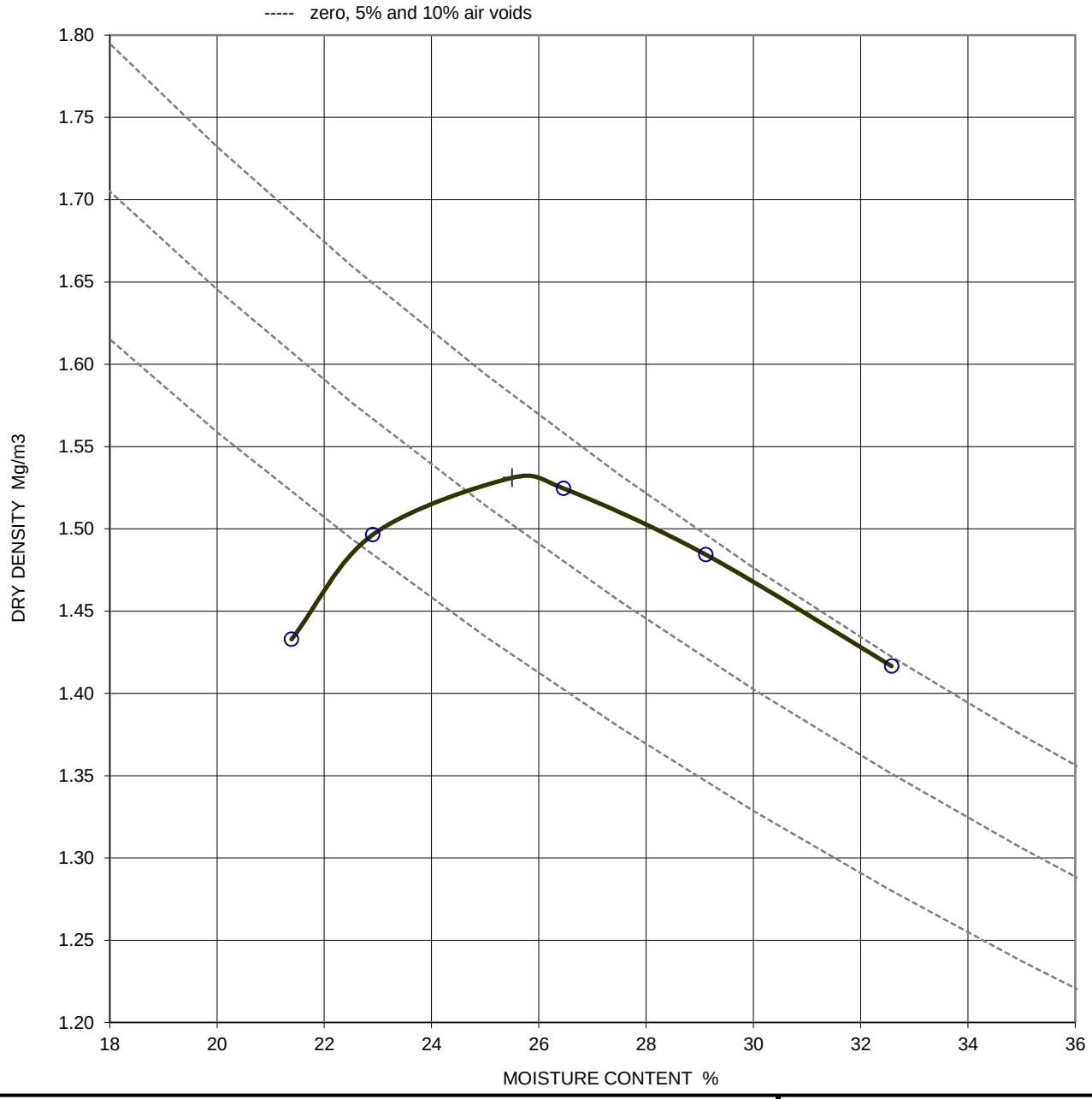
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191218101937

Hole No	ATK-CP-14
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B9
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks	Combined with ATK-CP-14 B11		

Derived Parameters +

Maximum dry density, Mg/m3
1.53

Optimum moisture content, %
26

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

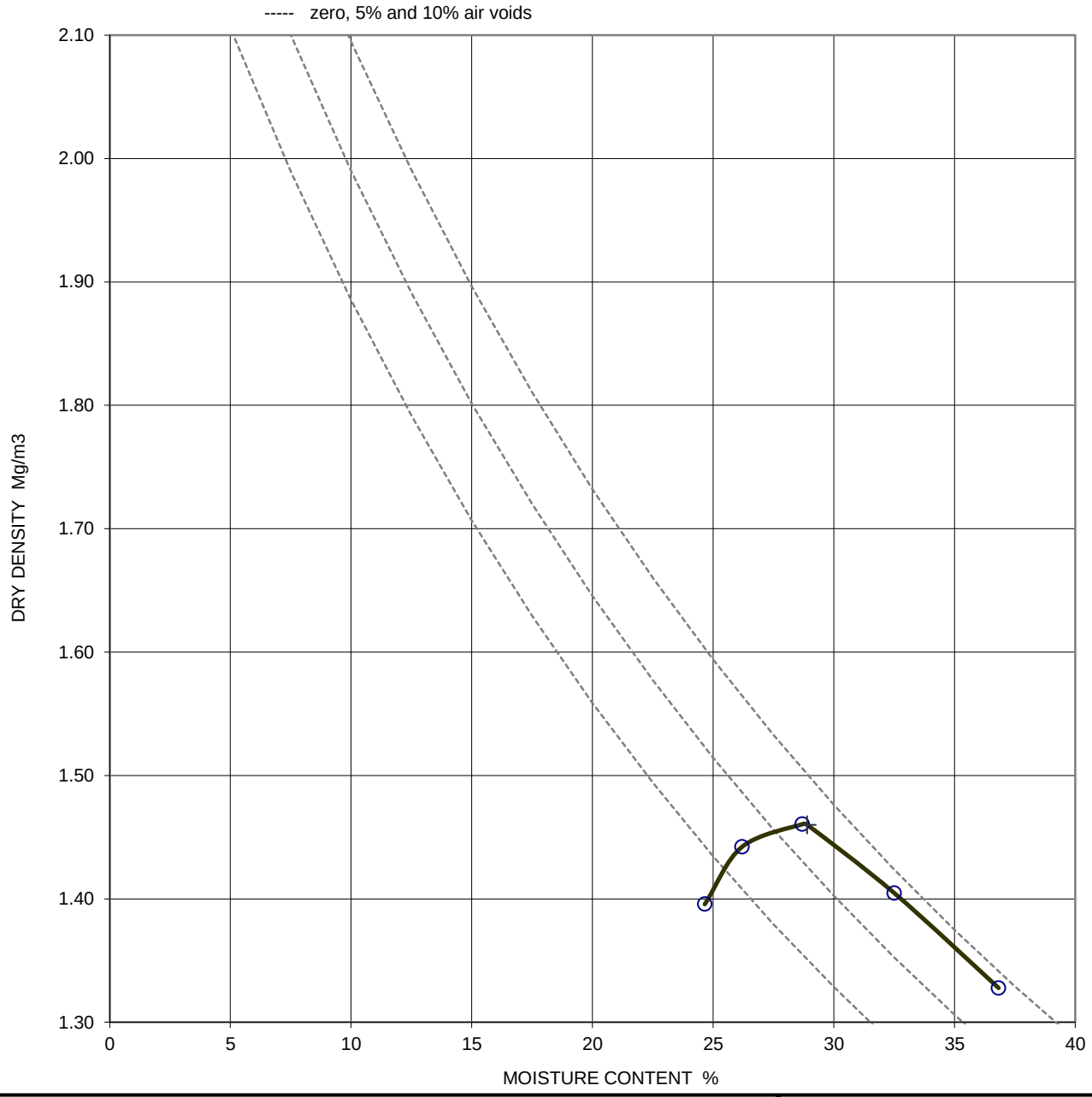
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191212110228

Hole No	ATK-CP-15
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.46**

Optimum moisture content, % **29**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

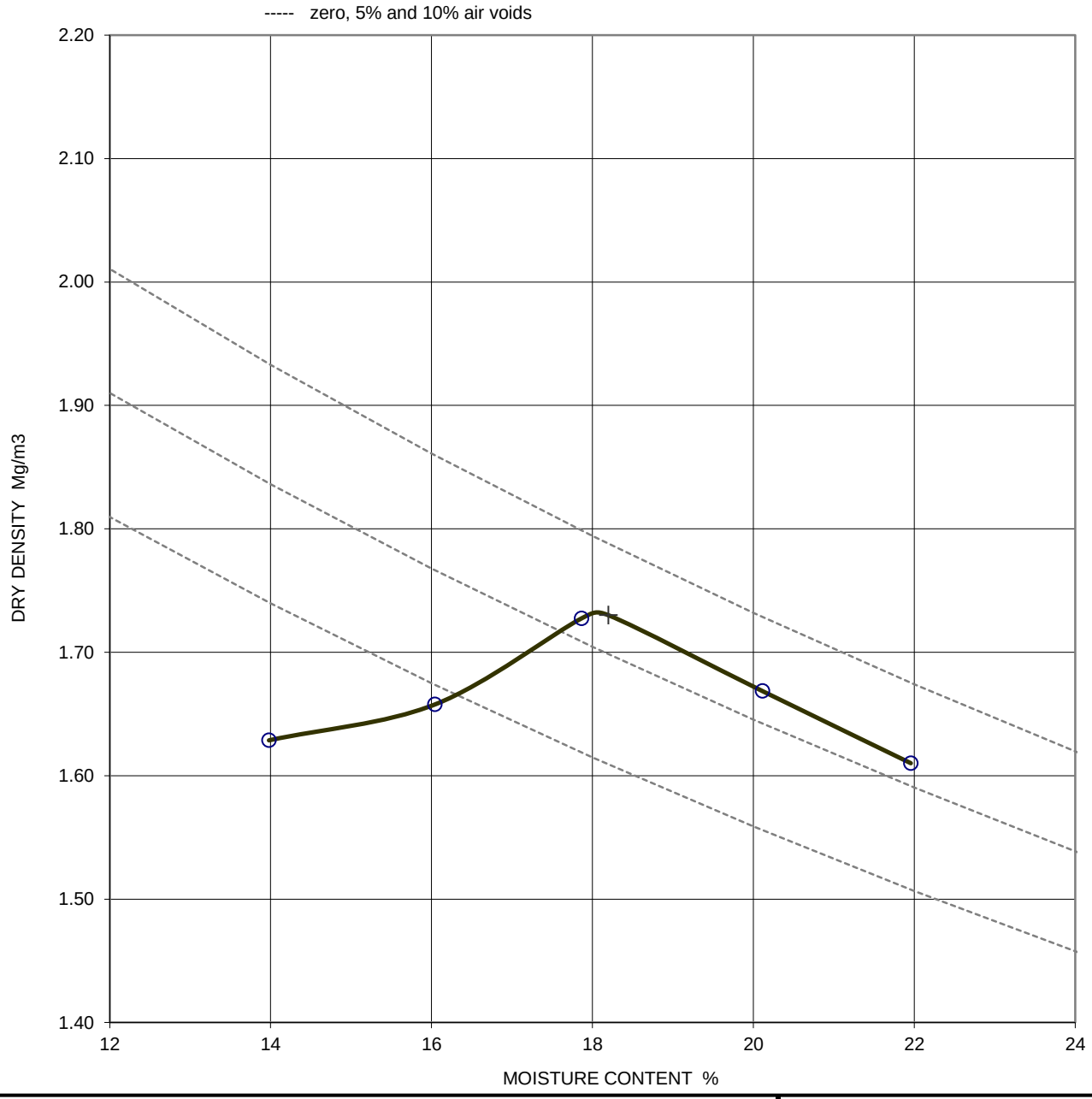
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191212110418

Hole No	ATK-CP-15
Sample Depth (m BGL)	2.00 - 2.50
Sample Type and No	B11
Specimen Ref	



Soil description	Grey and brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.73**

Optimum moisture content, % **18**

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SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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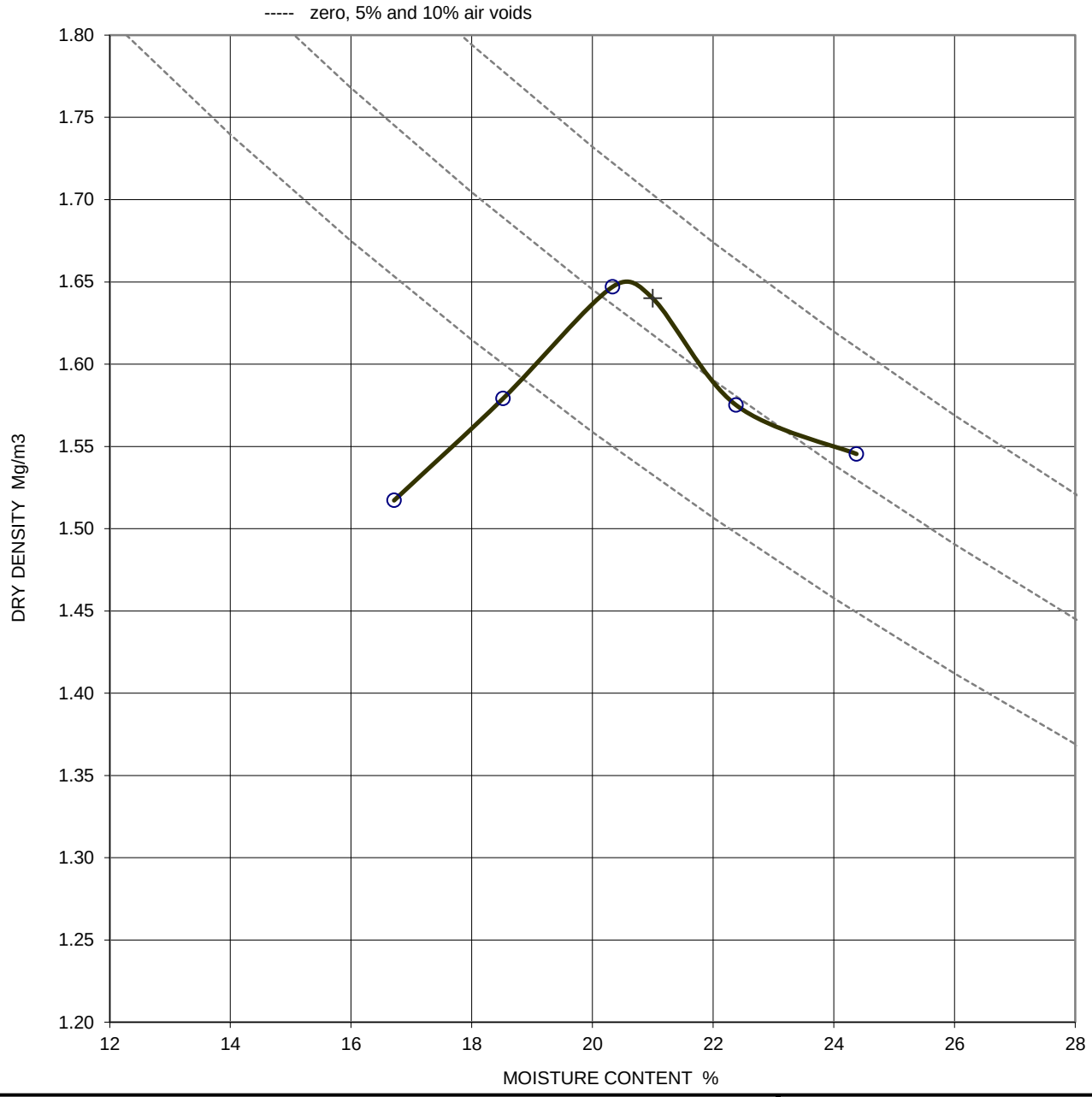
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204052617

Hole No	ATK-CP-15
Sample Depth (m BGL)	6.00 - 6.50
Sample Type and No	B26
Specimen Ref	



Soil description	Dark greyish brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.64

Optimum moisture content, %
21

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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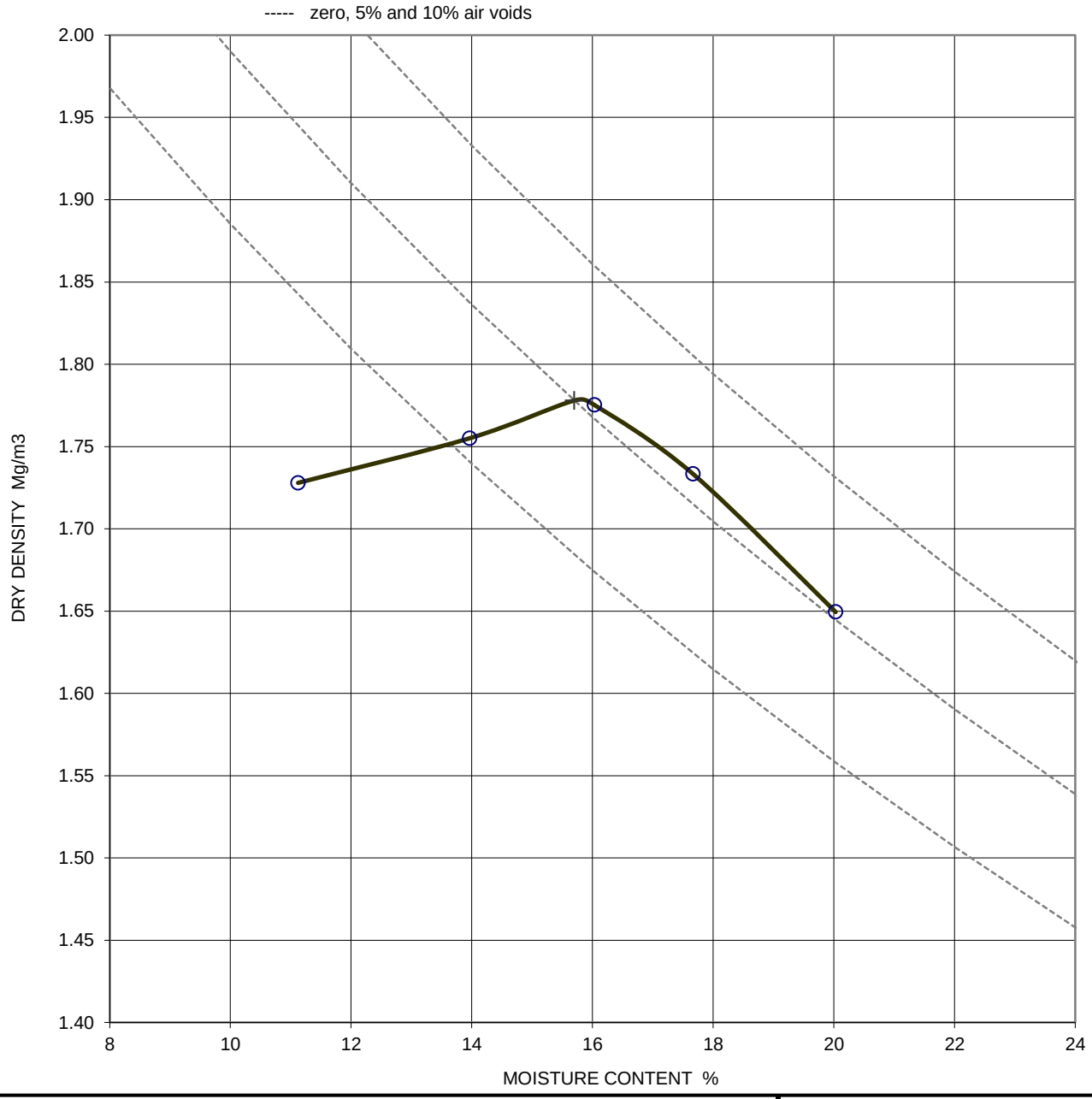
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191219115957

Hole No	ATK-CP-16
Sample Depth (m BGL)	2.50 - 3.00
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.78**

Optimum moisture content, % **16**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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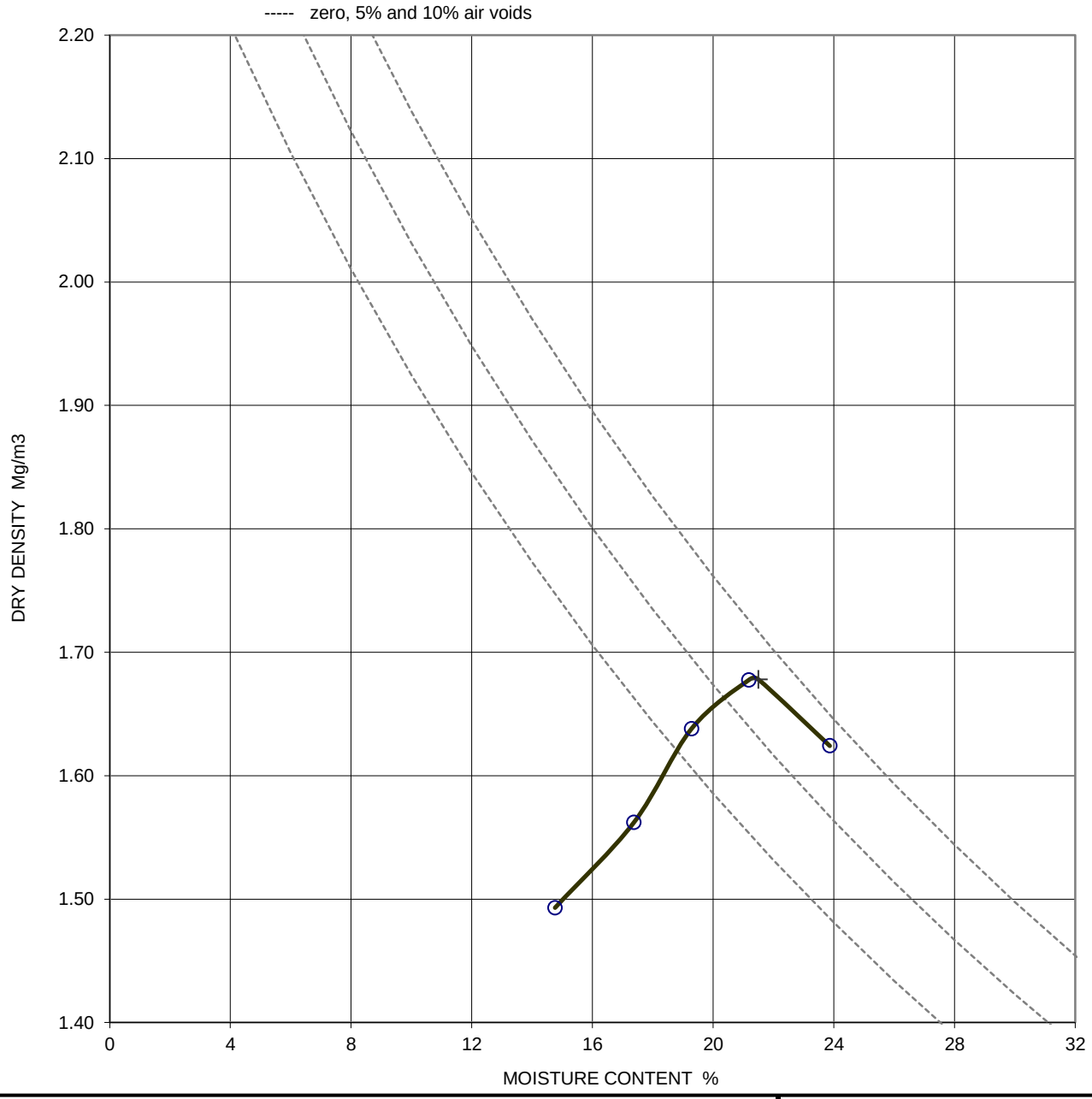
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191219022338

Hole No	ATK-CP-16
Sample Depth (m BGL)	7.50 - 8.00
Sample Type and No	B23
Specimen Ref	



Soil description	Brownish red mottled grey slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.68

Optimum moisture content, %
22

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SLD 4, 3.3/4
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Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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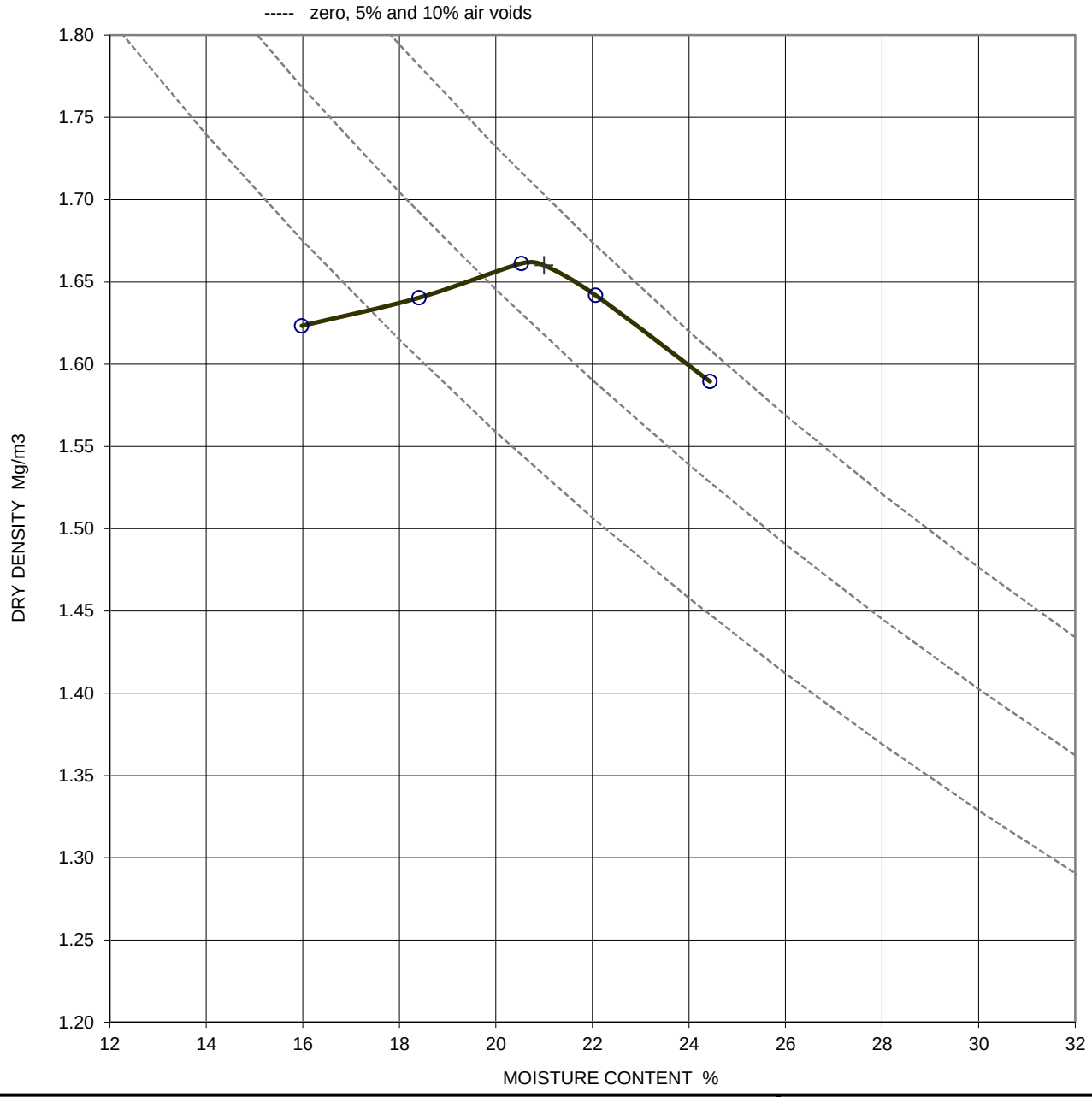
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191114114530

Hole No	ATK-TP-01
Sample Depth (m BGL)	0.50 - 0.60
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.66

Optimum moisture content, %
21

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

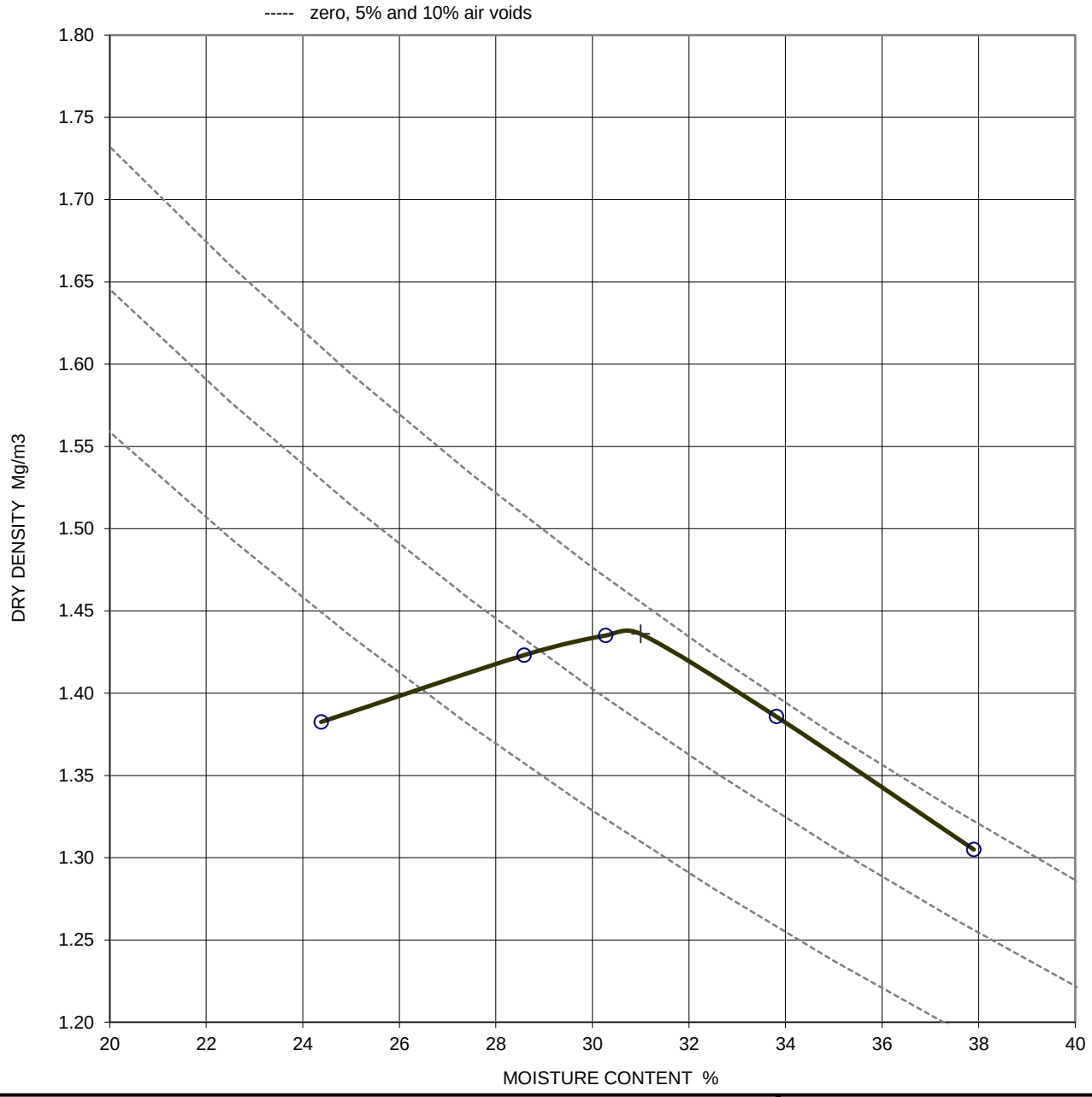
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191114114711

Hole No	ATK-TP-01
Sample Depth (m BGL)	2.80 - 2.90
Sample Type and No	B12
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.44**

Optimum moisture content, % **31**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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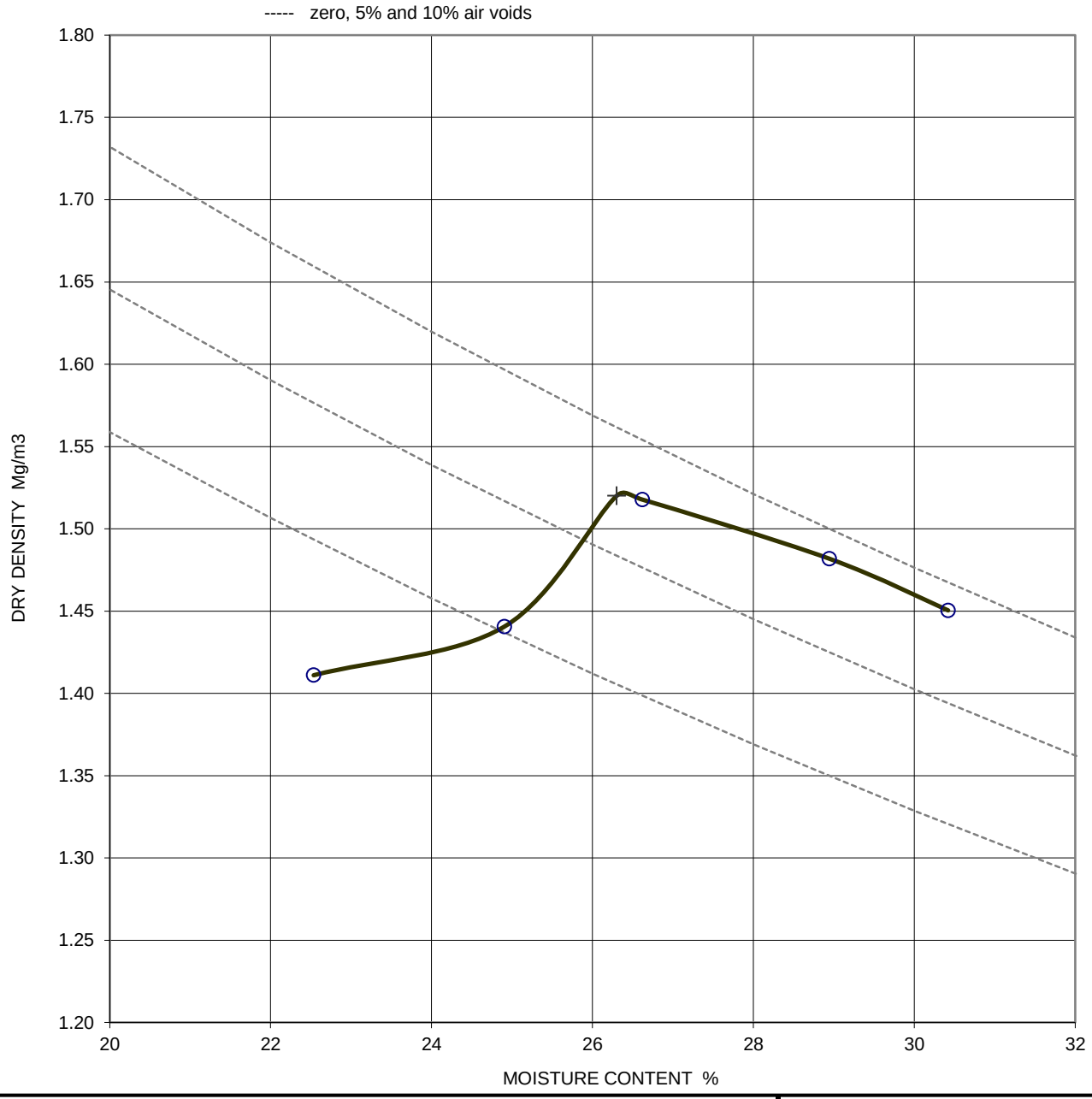
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191114114717

Hole No	ATK-TP-01
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B14
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.52**

Optimum moisture content, % **26**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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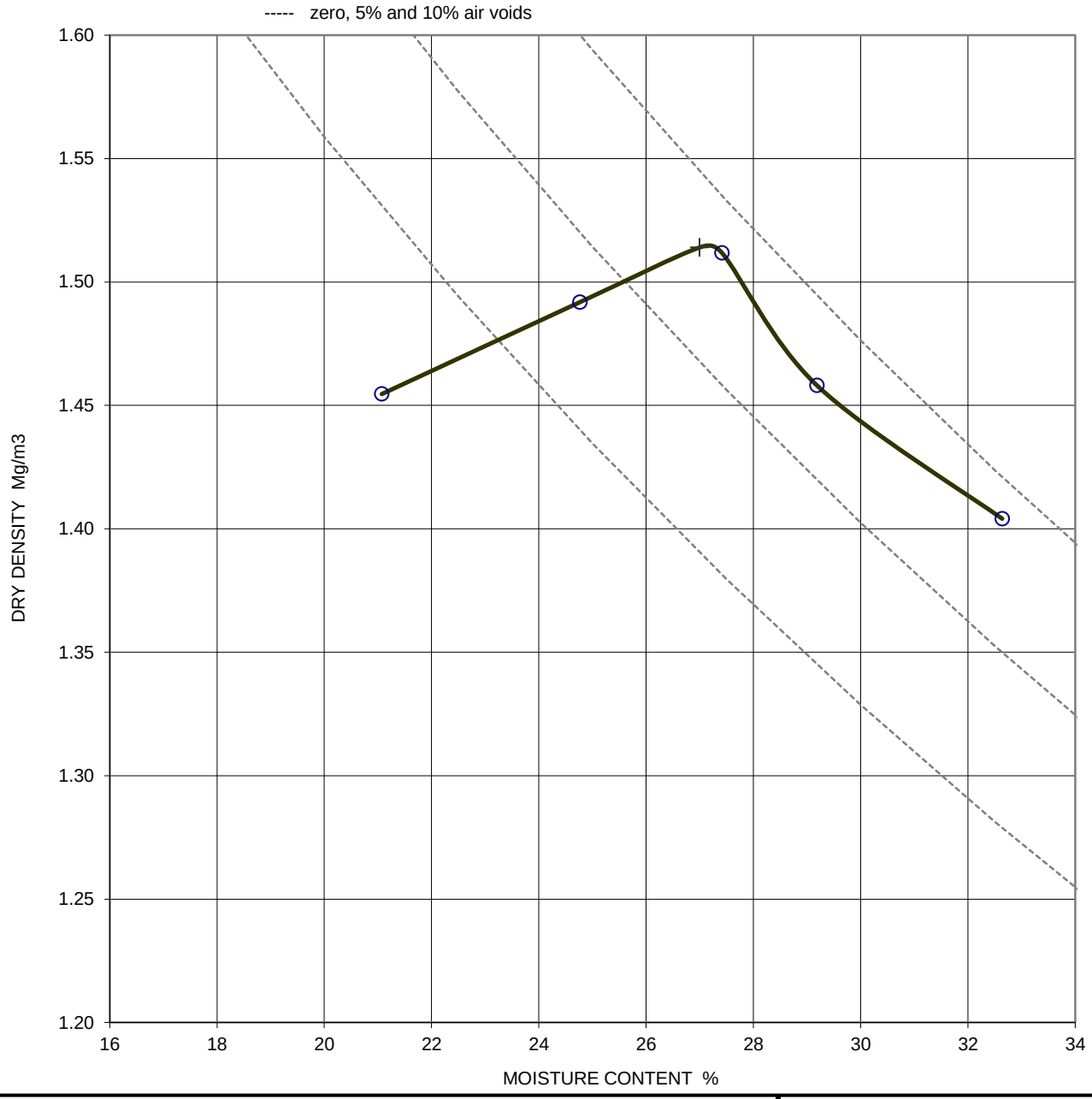
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191113101617

Hole No	ATK-TP-02
Sample Depth (m BGL)	1.30 - 1.40
Sample Type and No	B6
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.51

Optimum moisture content, %
27

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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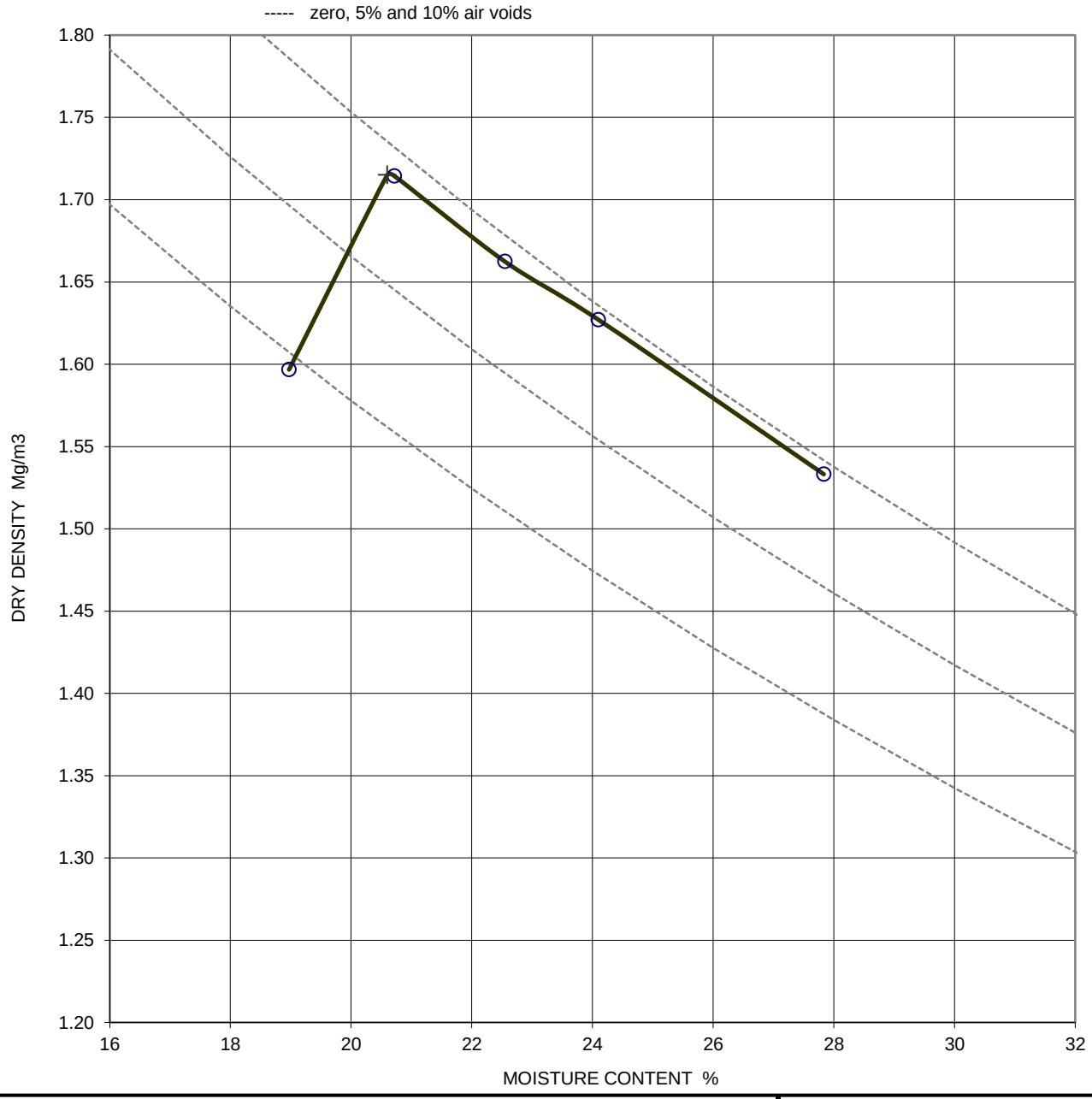
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191113101637

Hole No	ATK-TP-02
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B8
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.72**

Optimum moisture content, % **21**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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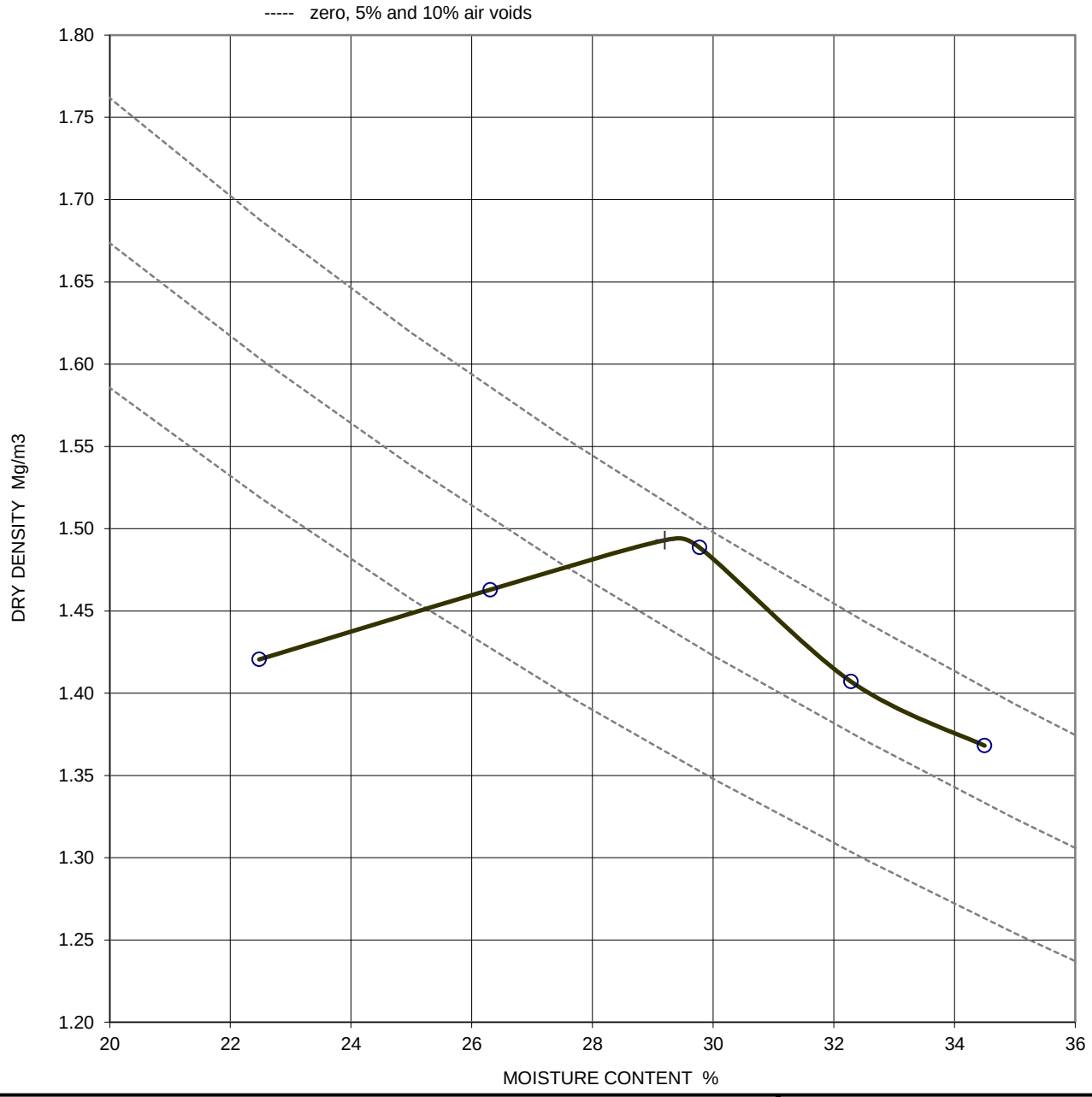
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191115080853

Hole No	ATK-TP-03
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B9
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.49**

Optimum moisture content, % **29**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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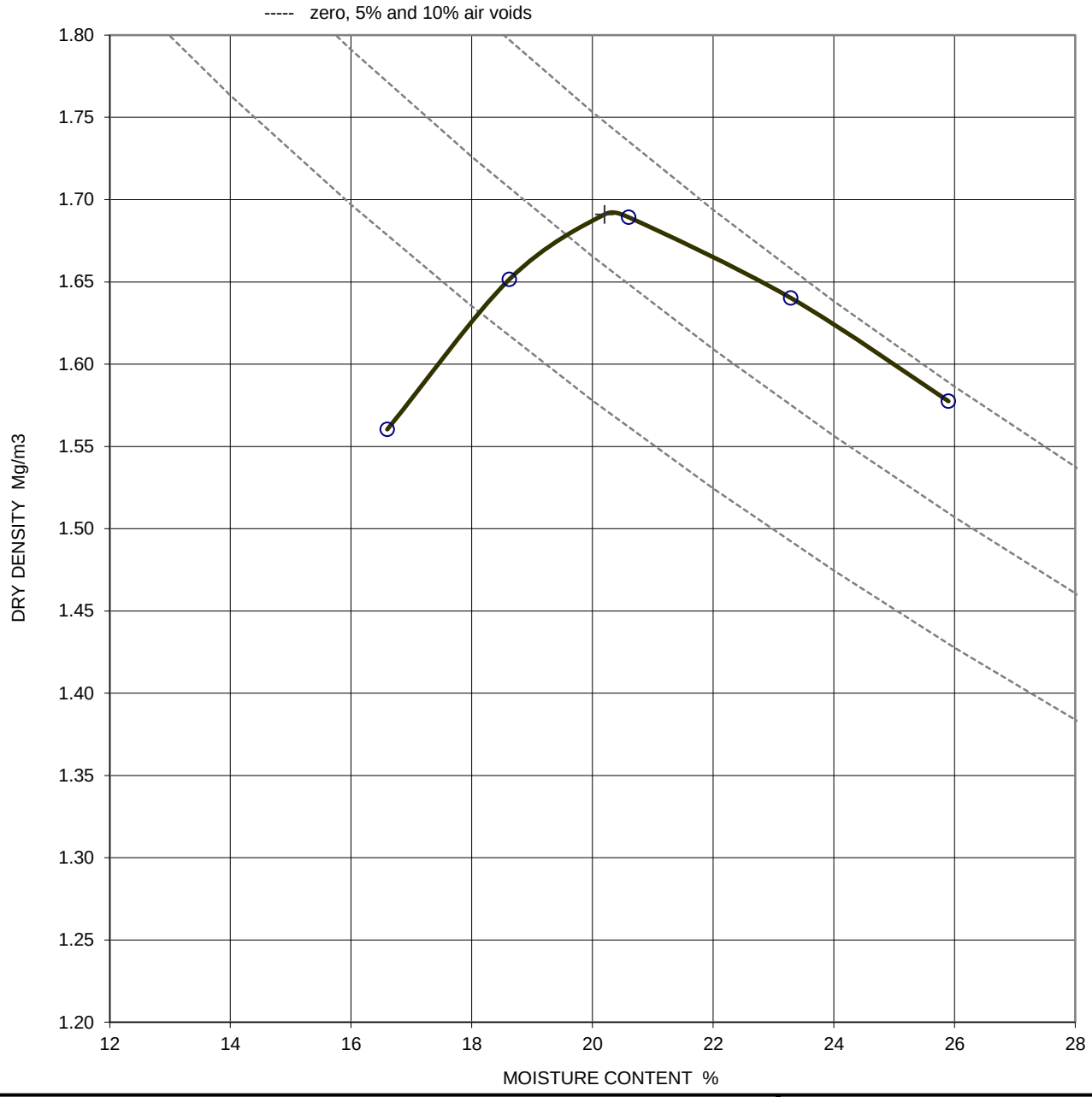
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191115080910

Hole No	ATK-TP-03
Sample Depth (m BGL)	3.10 - 3.20
Sample Type and No	B13
Specimen Ref	



Soil description	Dark grey slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.69**

Optimum moisture content, % **20**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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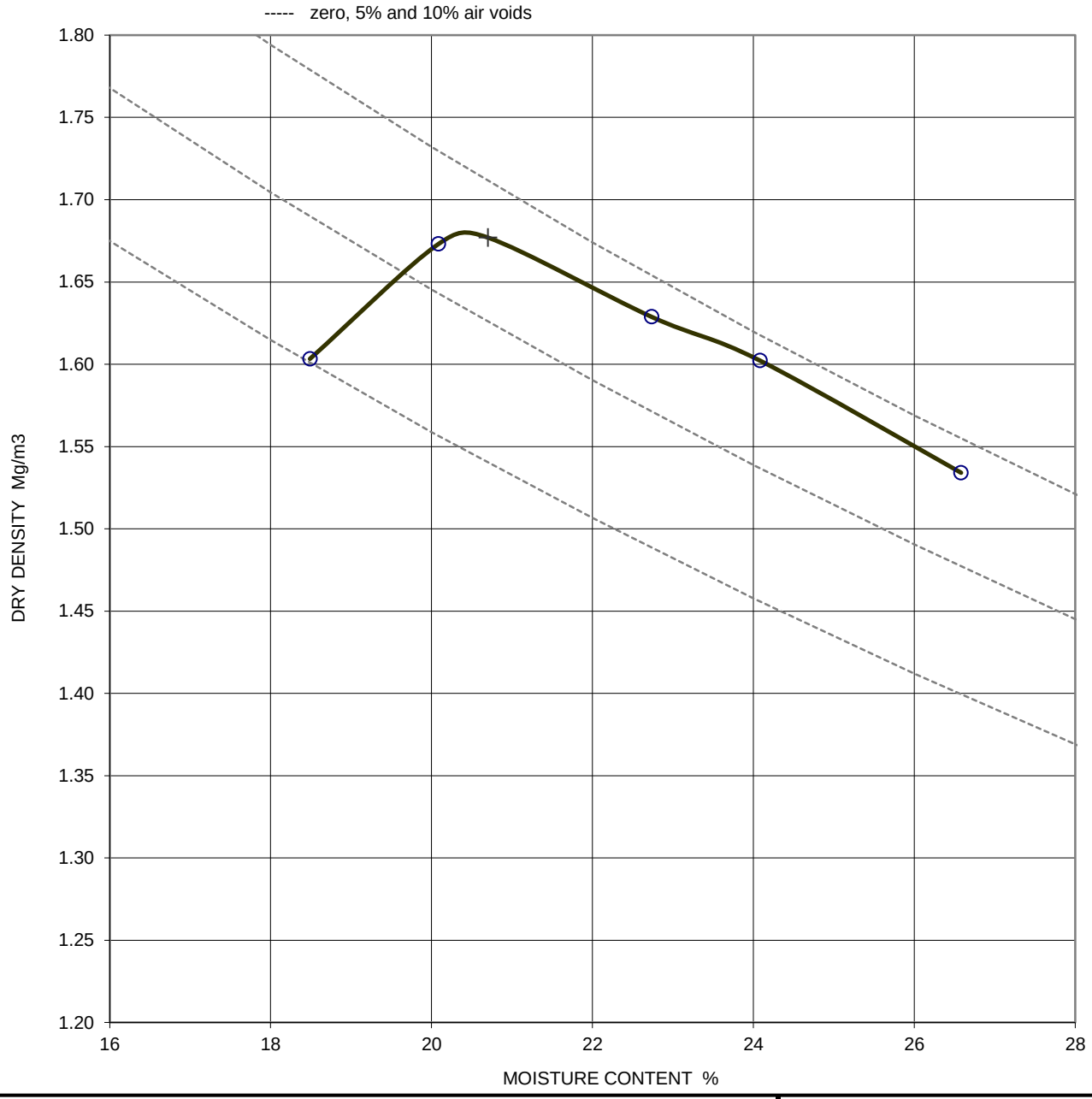
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127041409

Hole No	ATK-TP-04
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B5
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.68**

Optimum moisture content, % **21**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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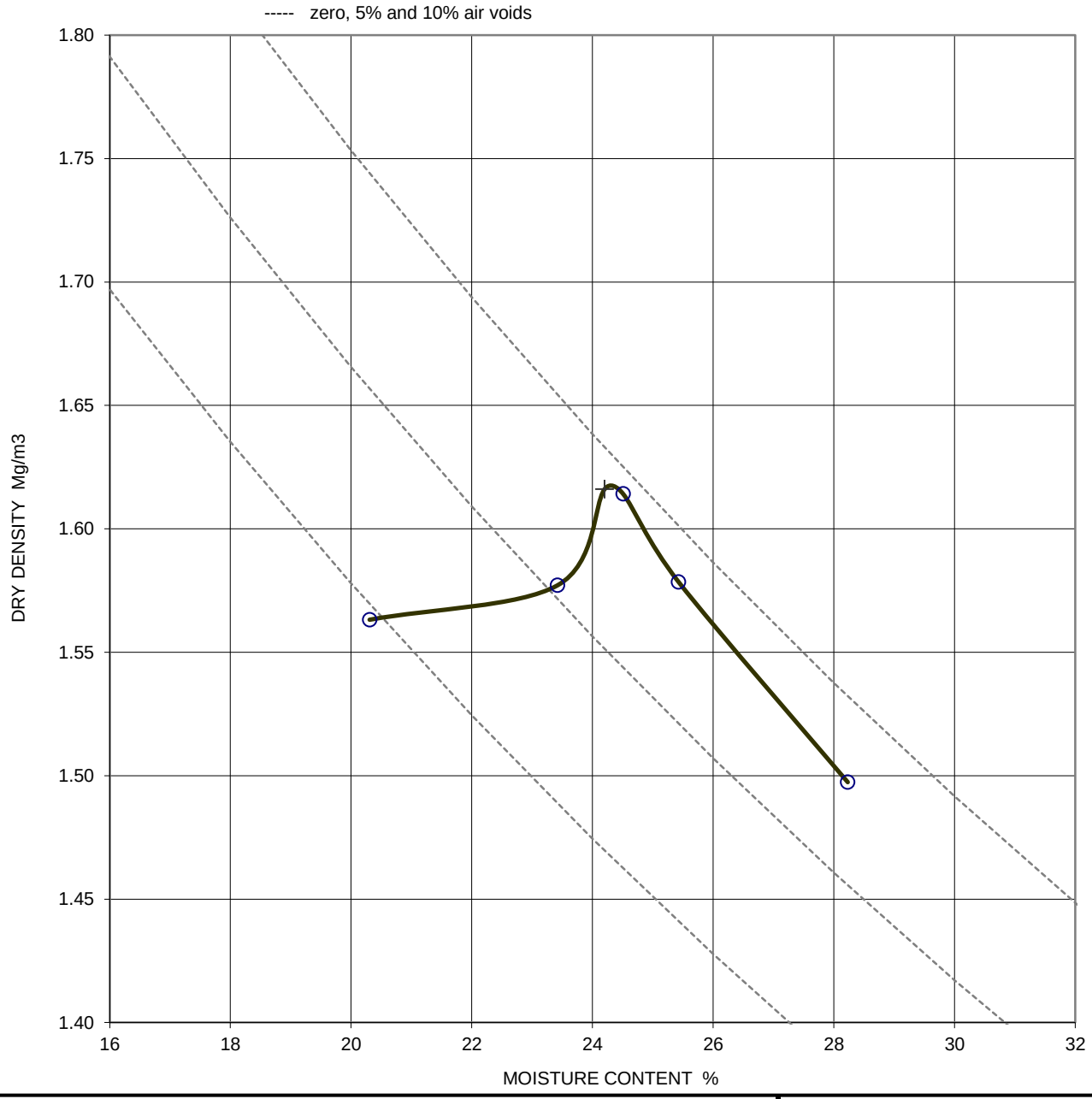
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127041449

Hole No	ATK-TP-04
Sample Depth (m BGL)	1.80 - 2.00
Sample Type and No	B10
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.62**

Optimum moisture content, % **24**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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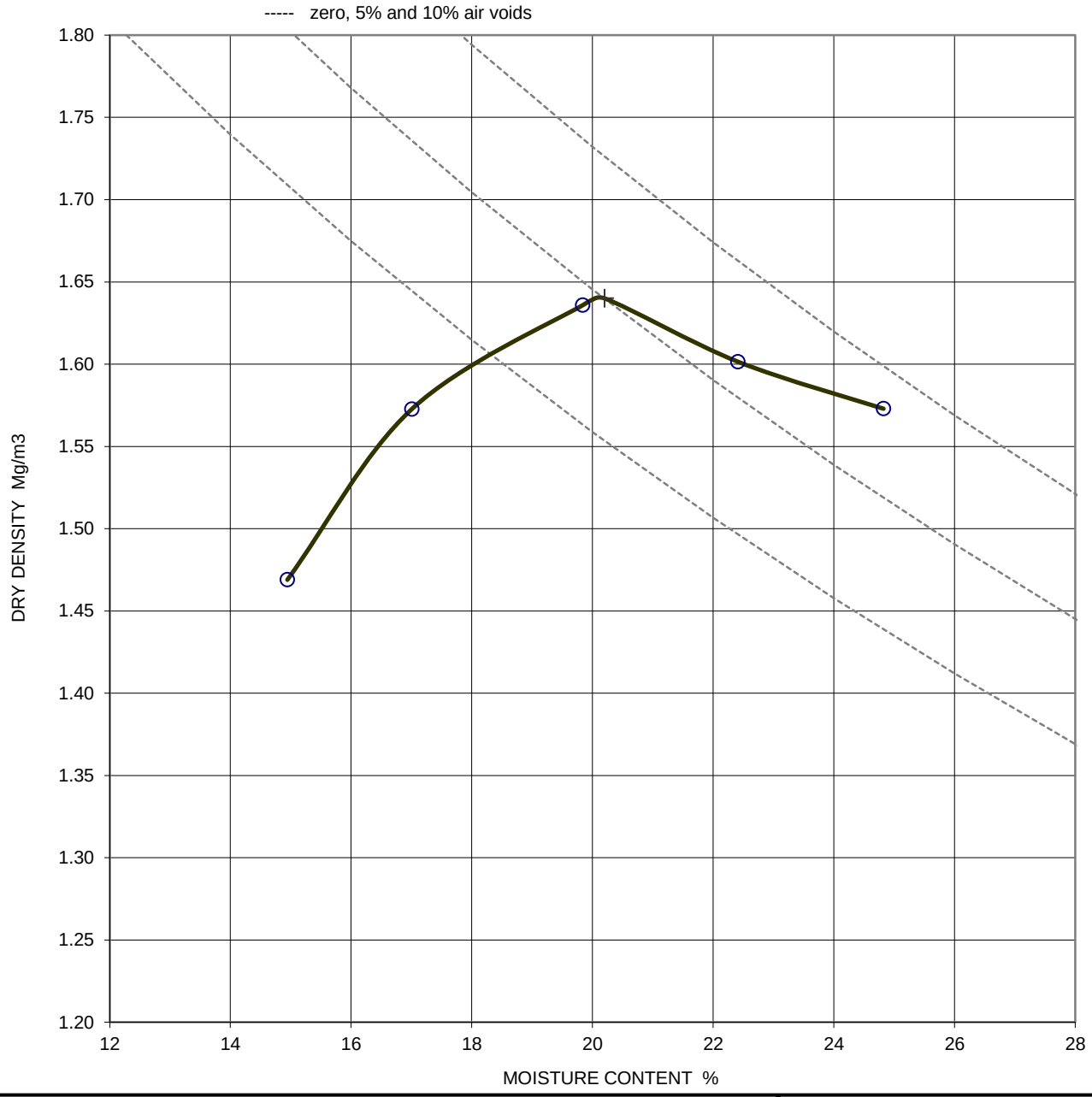
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127041518

Hole No	ATK-TP-04
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B12
Specimen Ref	



Soil description	Reddish brown mottled grey slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.64

Optimum moisture content, %
20

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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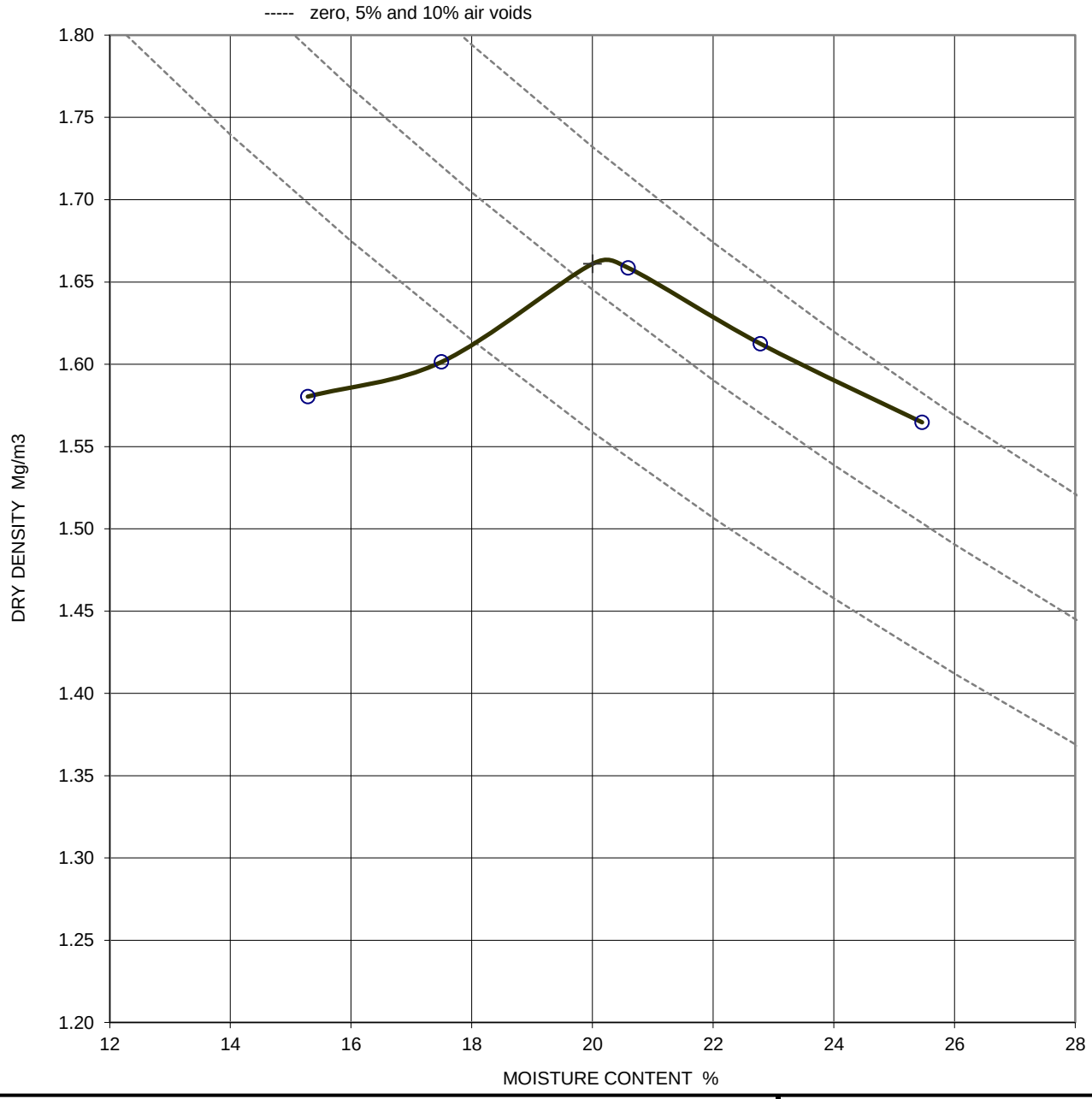
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127042148

Hole No	ATK-TP-05
Sample Depth (m BGL)	0.40 - 0.50
Sample Type and No	B3
Specimen Ref	



Soil description	Brown slightly gravelly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	3	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.66**

Optimum moisture content, % **20**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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COMPL

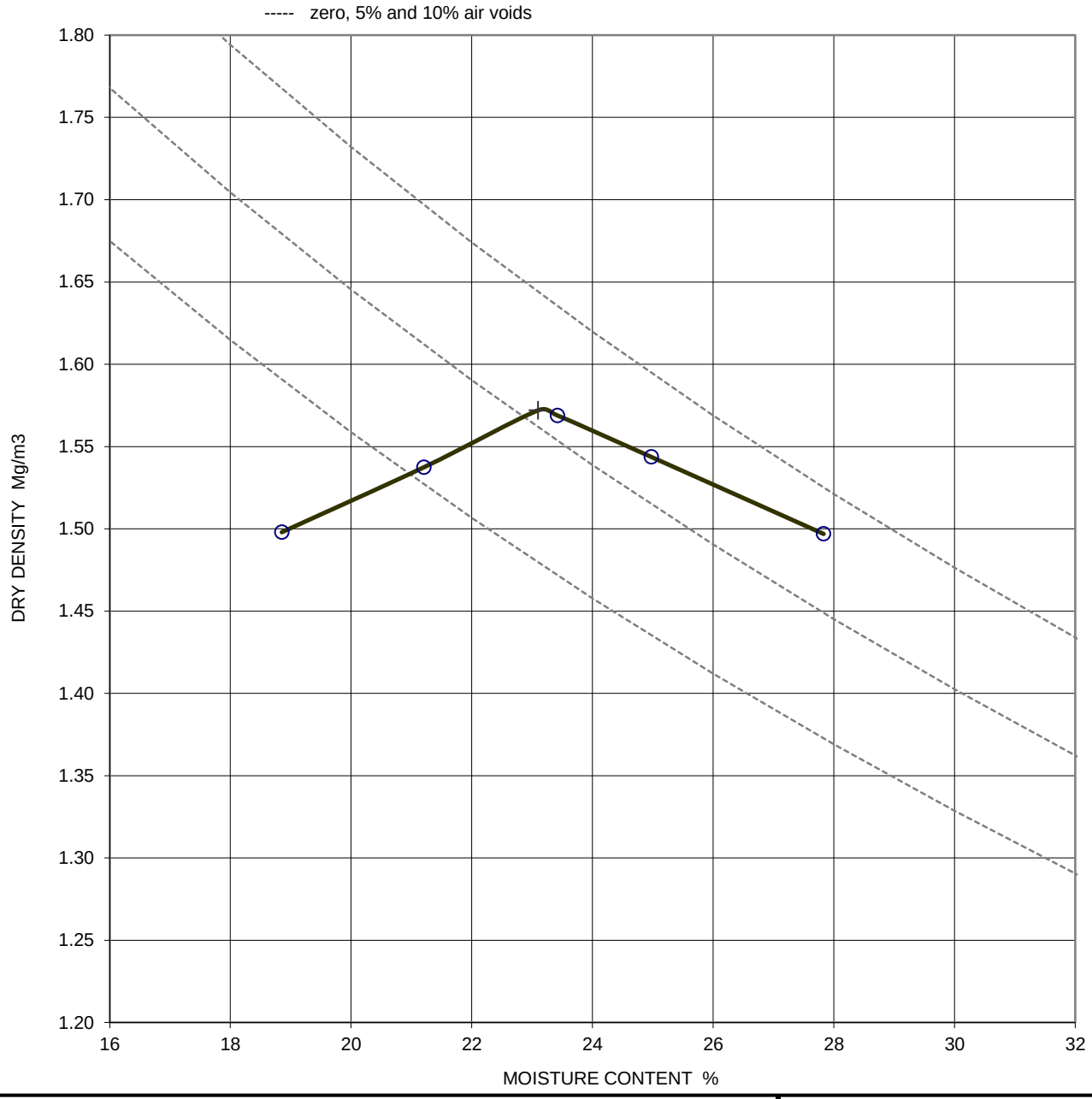
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127042207

Hole No	ATK-TP-05
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	



Soil description	Brown very sandy silty CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.57**

Optimum moisture content, % **23**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

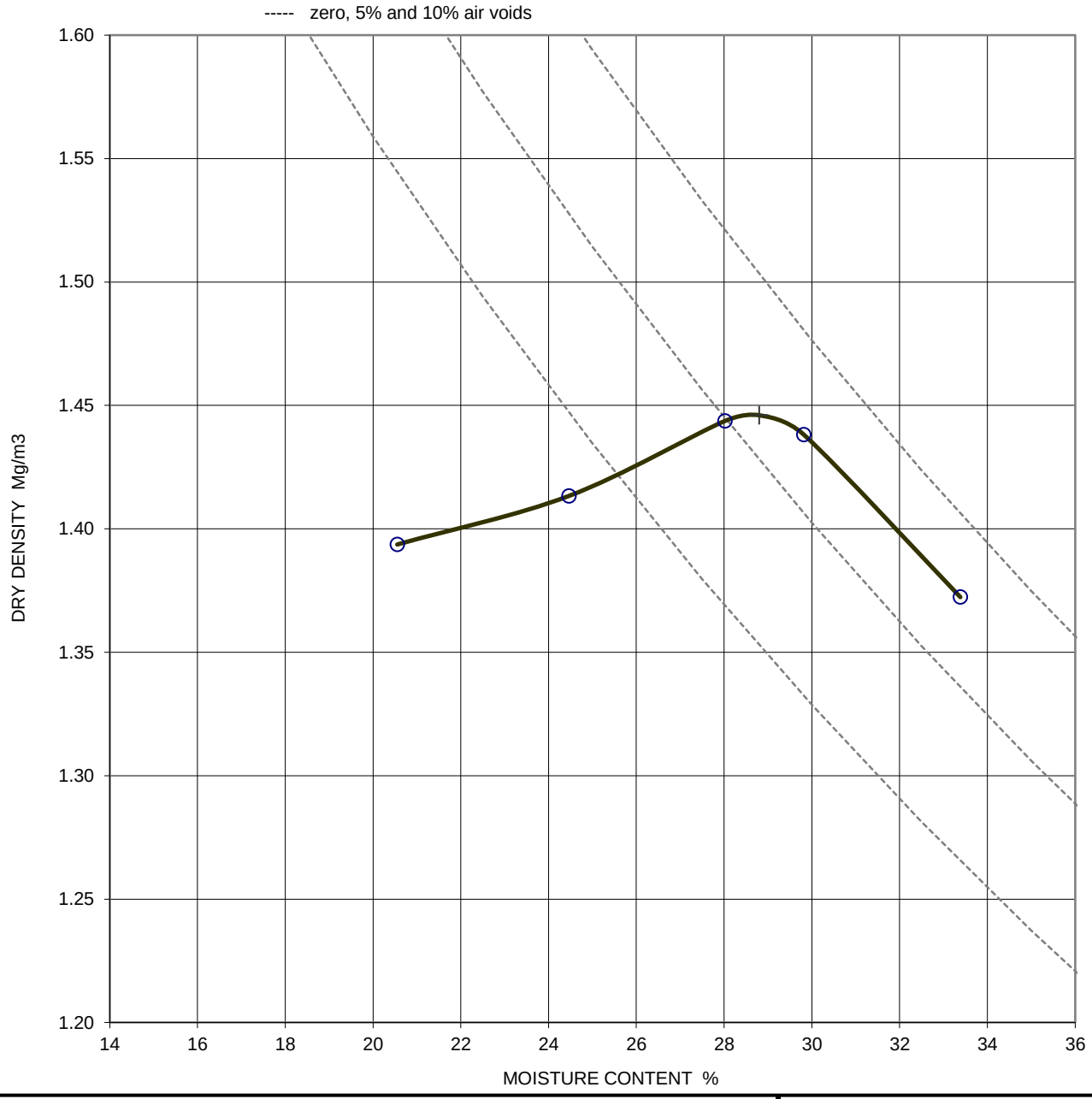
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191211040013

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.30 - 0.80
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy silty CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.45**

Optimum moisture content, % **29**

QA Ref
SLD 4, 3.3/4
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Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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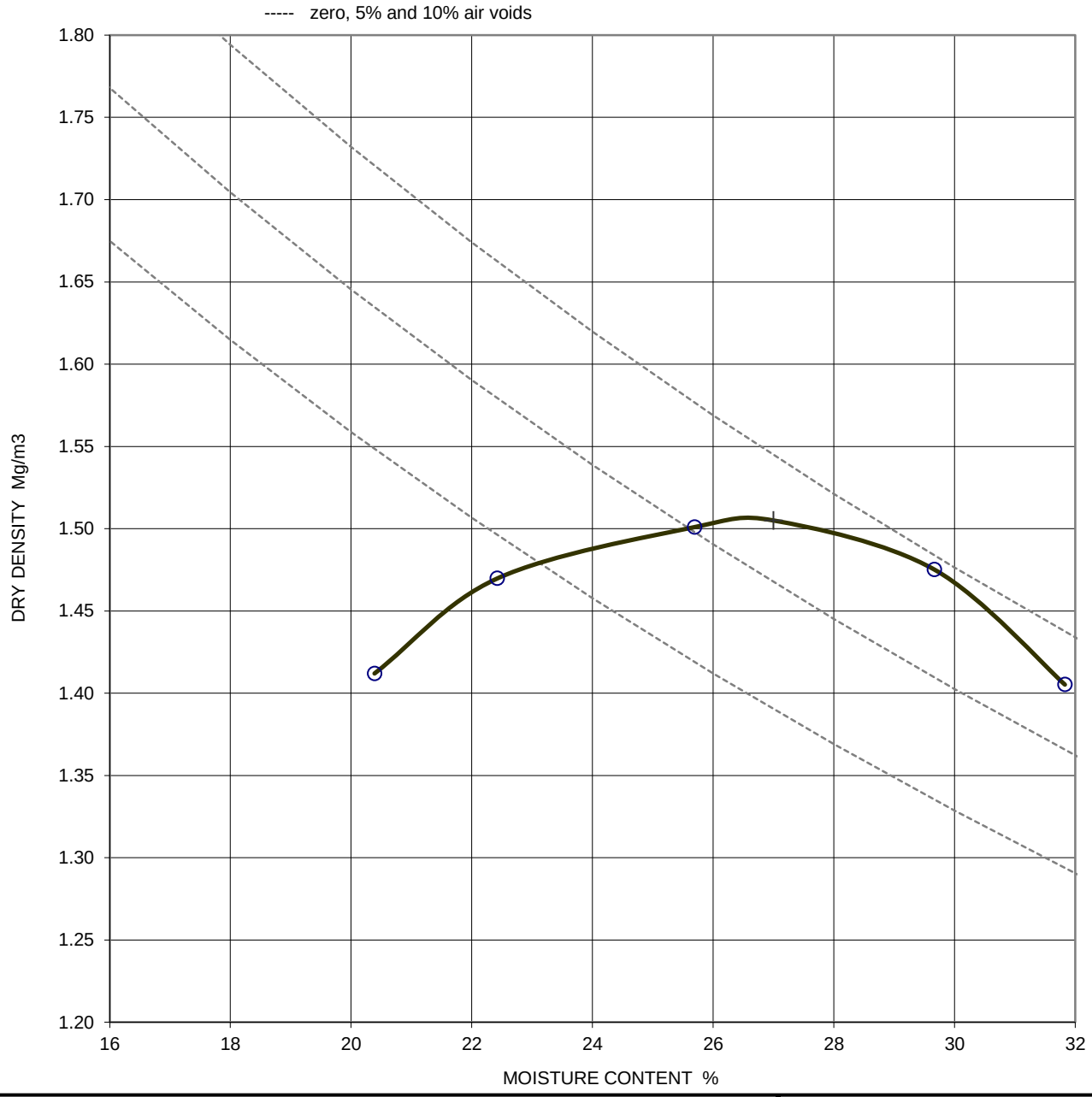
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191211040141

Hole No	ATK-TP-06
Sample Depth (m BGL)	2.00 - 2.40
Sample Type and No	B11
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.51**

Optimum moisture content, % **27**

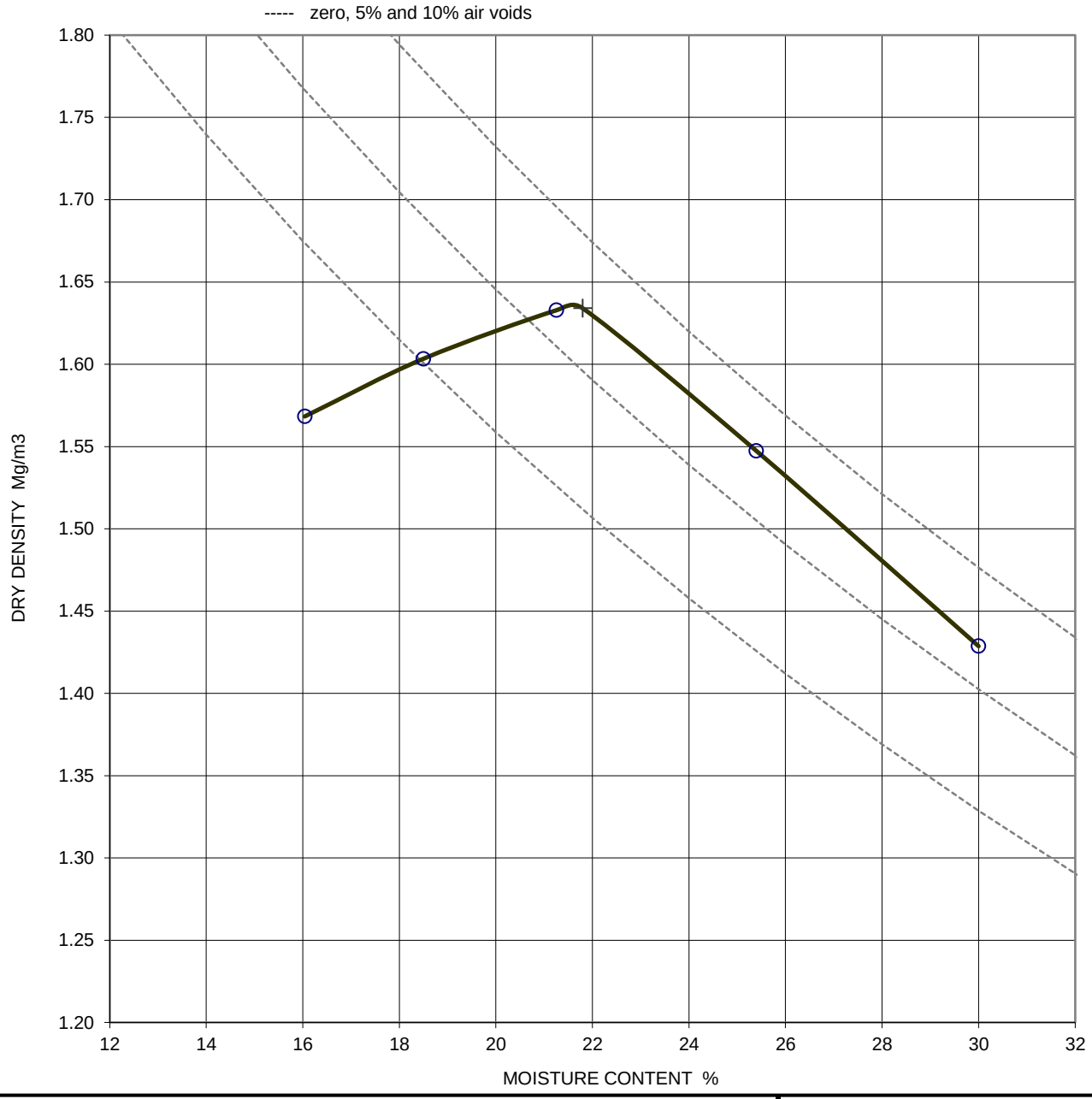
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127042601

Hole No	ATK-TP-07
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B9
Specimen Ref	



Soil description	Brown clayey SAND.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.63

Optimum moisture content, %
22

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

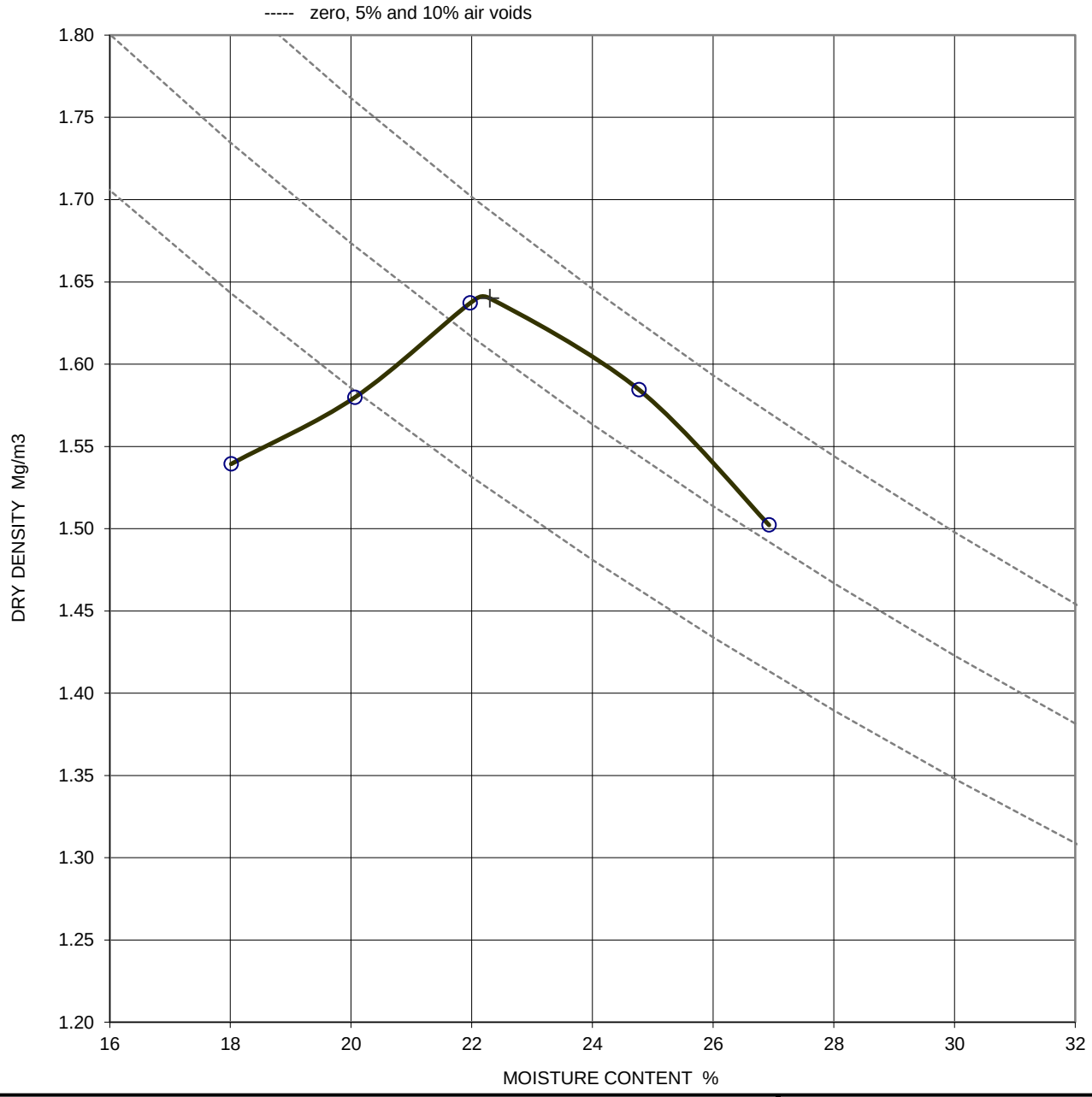
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204021819

Hole No	ATK-TP-08
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B8
Specimen Ref	



Soil description	Brown slightly sandy gravelly CLAY with one cobble.		
Test method	BS 1377:part 4:1990: clause 3.6, 2.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	5	%	
Material < 37.5mm > 20mm	22	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.64

Optimum moisture content, %
22

QA Ref
SLD 4, 3.3/4
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Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
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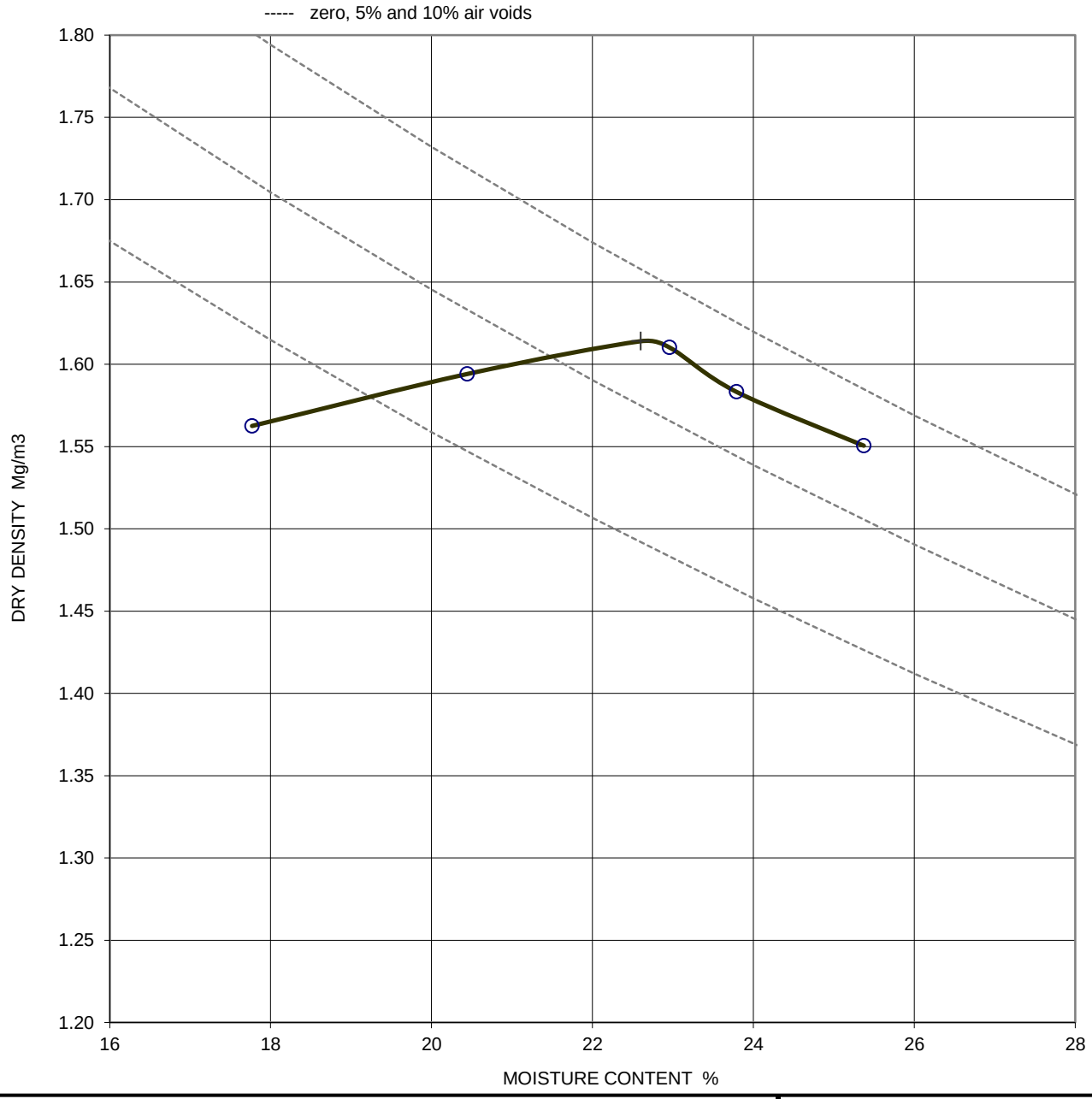
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204015219

Hole No	ATK-TPM-02
Sample Depth (m BGL)	0.40 - 0.50
Sample Type and No	B2
Specimen Ref	



Soil description	Brown slightly sandy silty CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.61**

Optimum moisture content, % **23**

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
COMPL

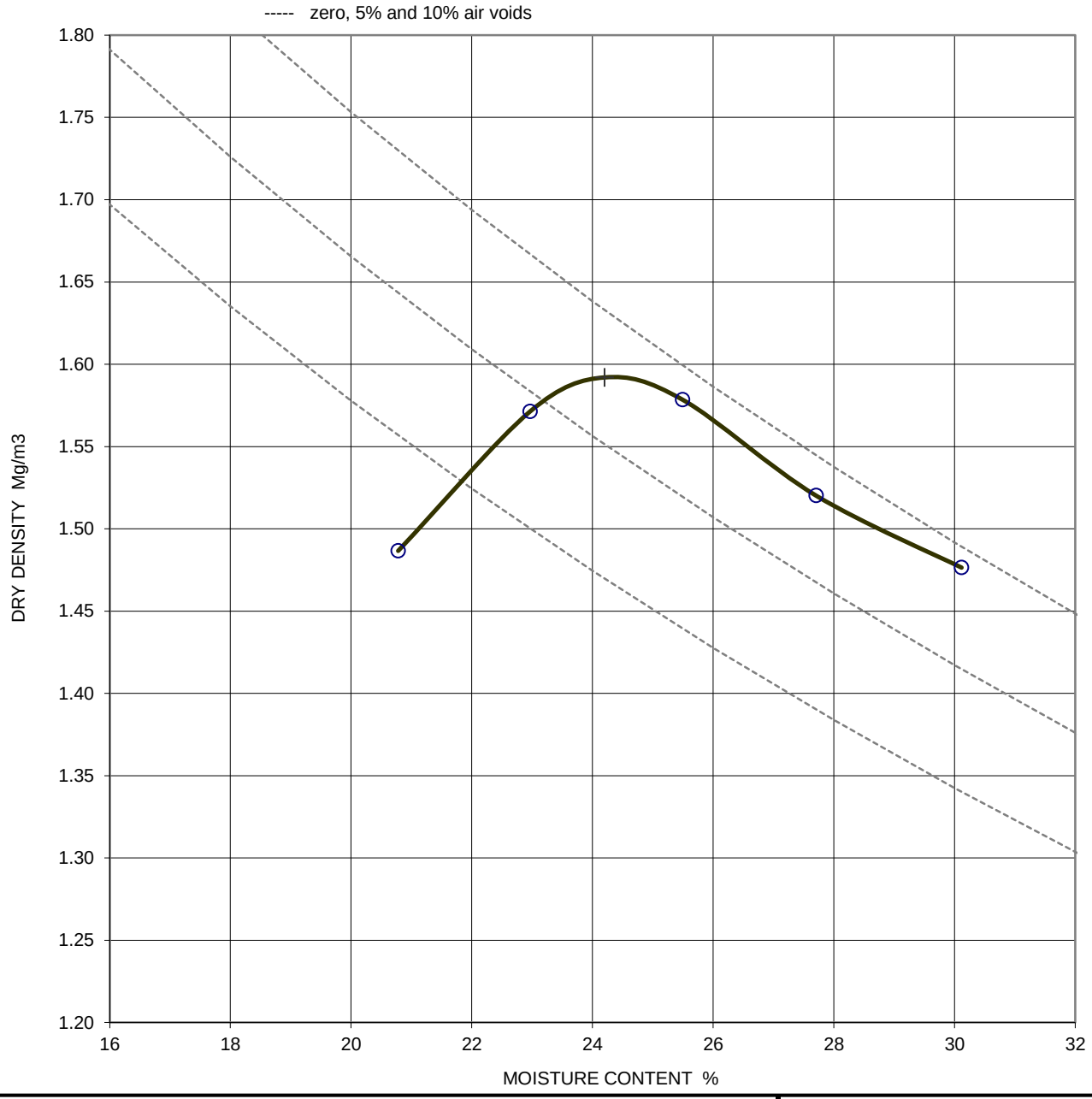
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204110904

Hole No	ATK-TPM-03
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B6
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.59**

Optimum moisture content, % **24**

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SLD 4, 3.3/4
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Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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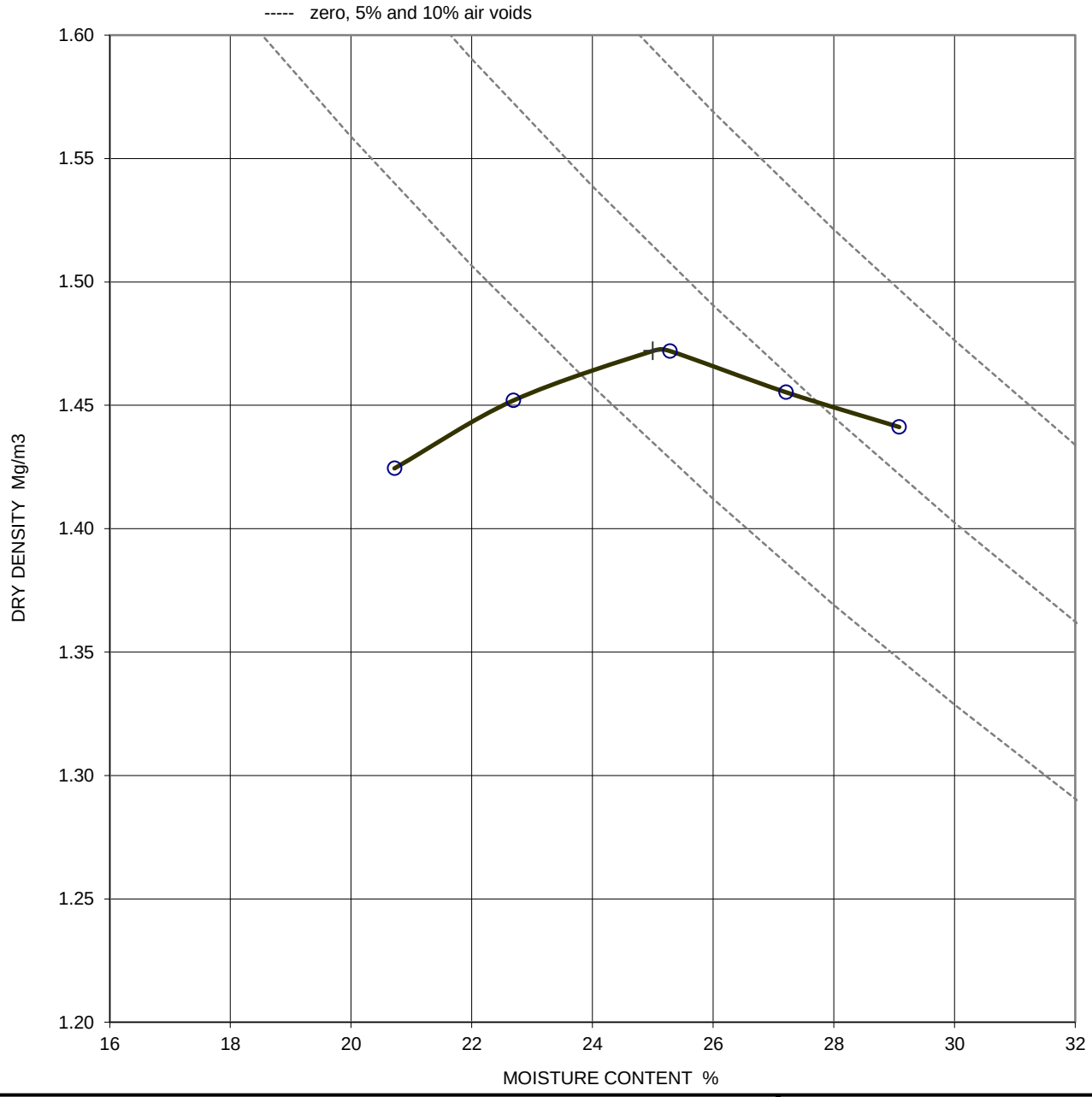
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204111005

Hole No	ATK-TPM-03
Sample Depth (m BGL)	3.60 - 3.70
Sample Type and No	B12
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.47**

Optimum moisture content, % **25**

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SLD 4, 3.3/4
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Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

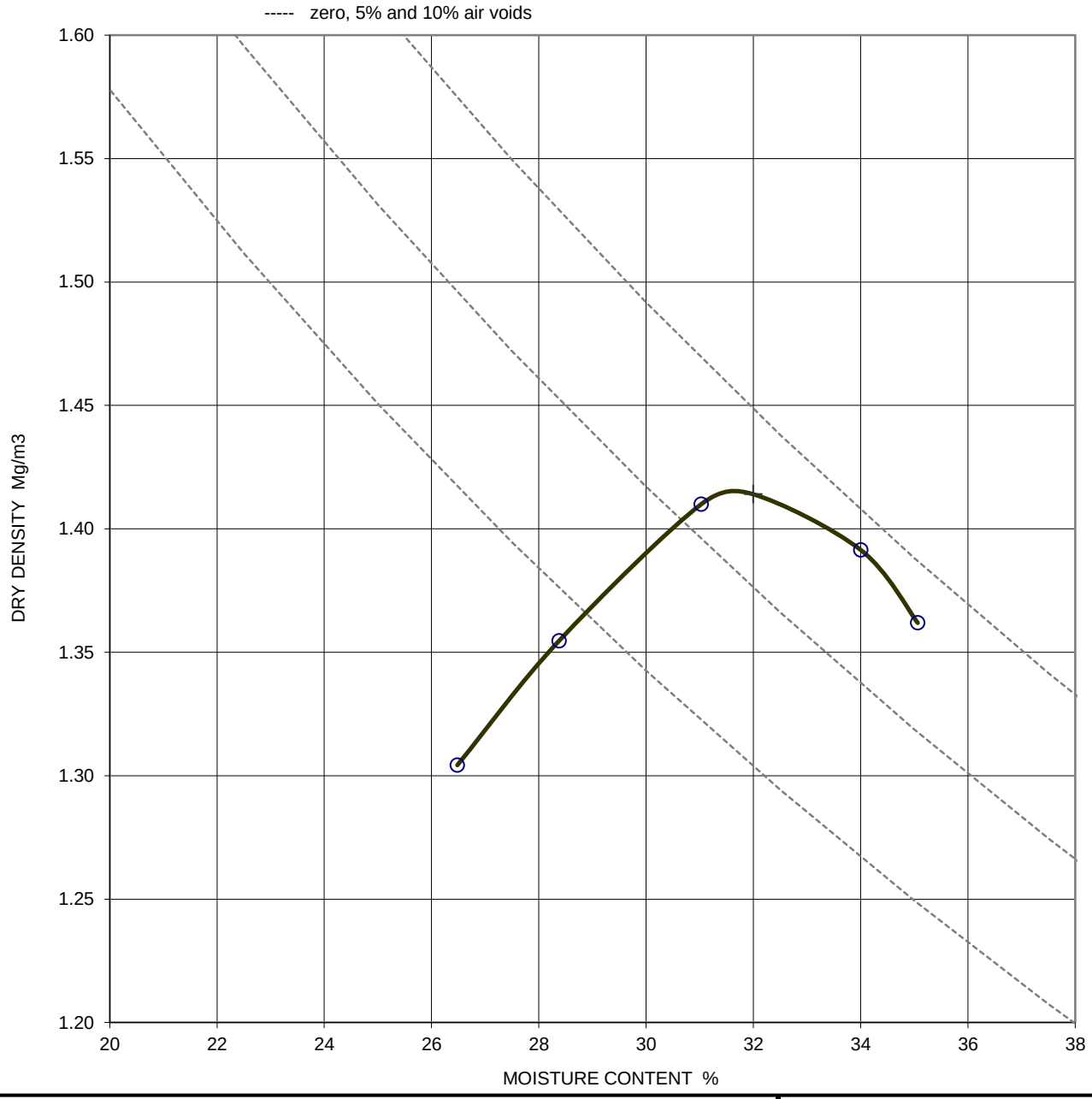
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204125051

Hole No	ATK-TPM-04
Sample Depth (m BGL)	0.50 - 0.60
Sample Type and No	B4
Specimen Ref	



Soil description	Brown CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.41**

Optimum moisture content, % **32**

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SLD 4, 3.3/4
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Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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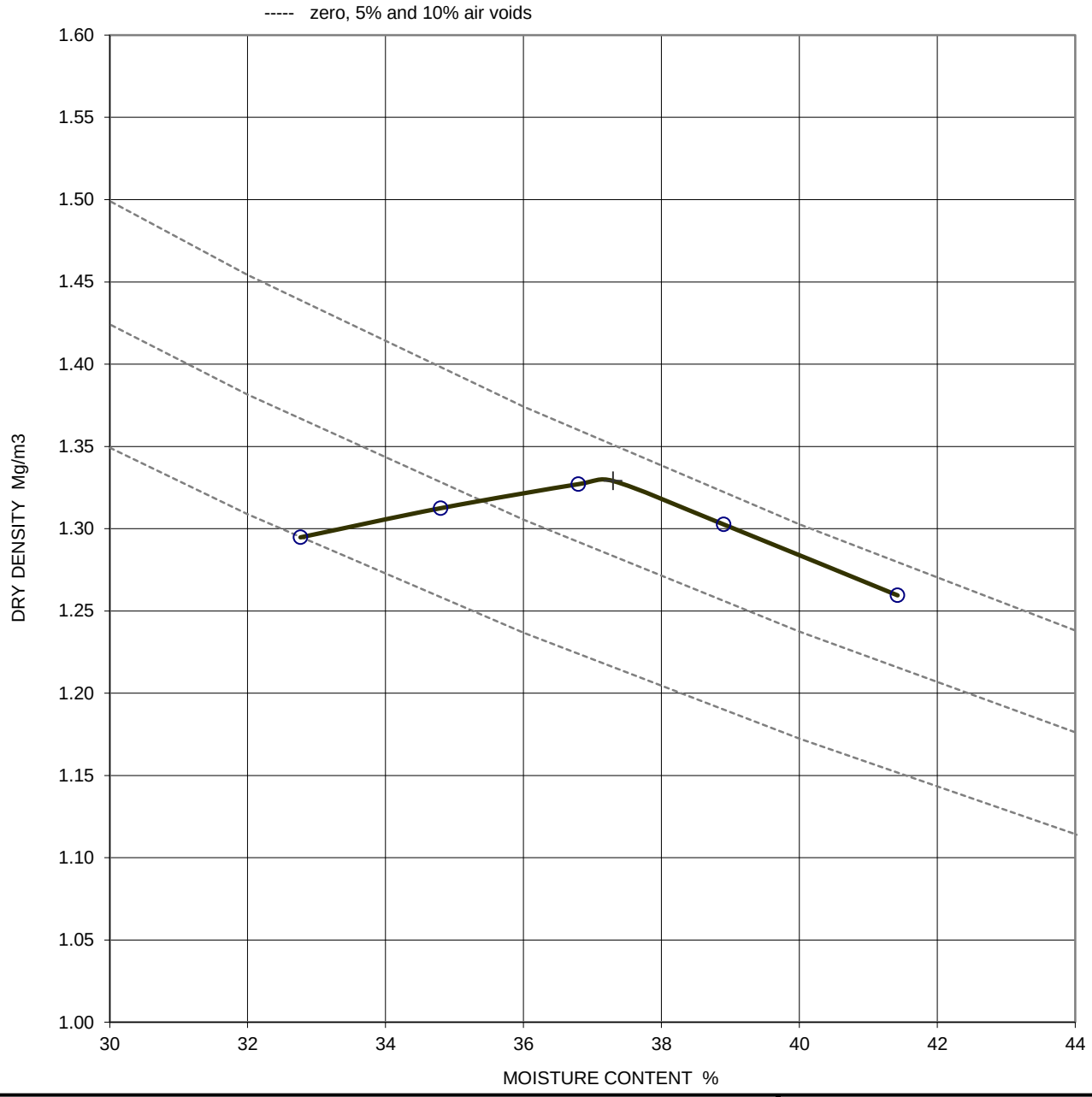
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191120031821

Hole No	ATK-TPM-05
Sample Depth (m BGL)	0.70 - 1.00
Sample Type and No	B4
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.33**

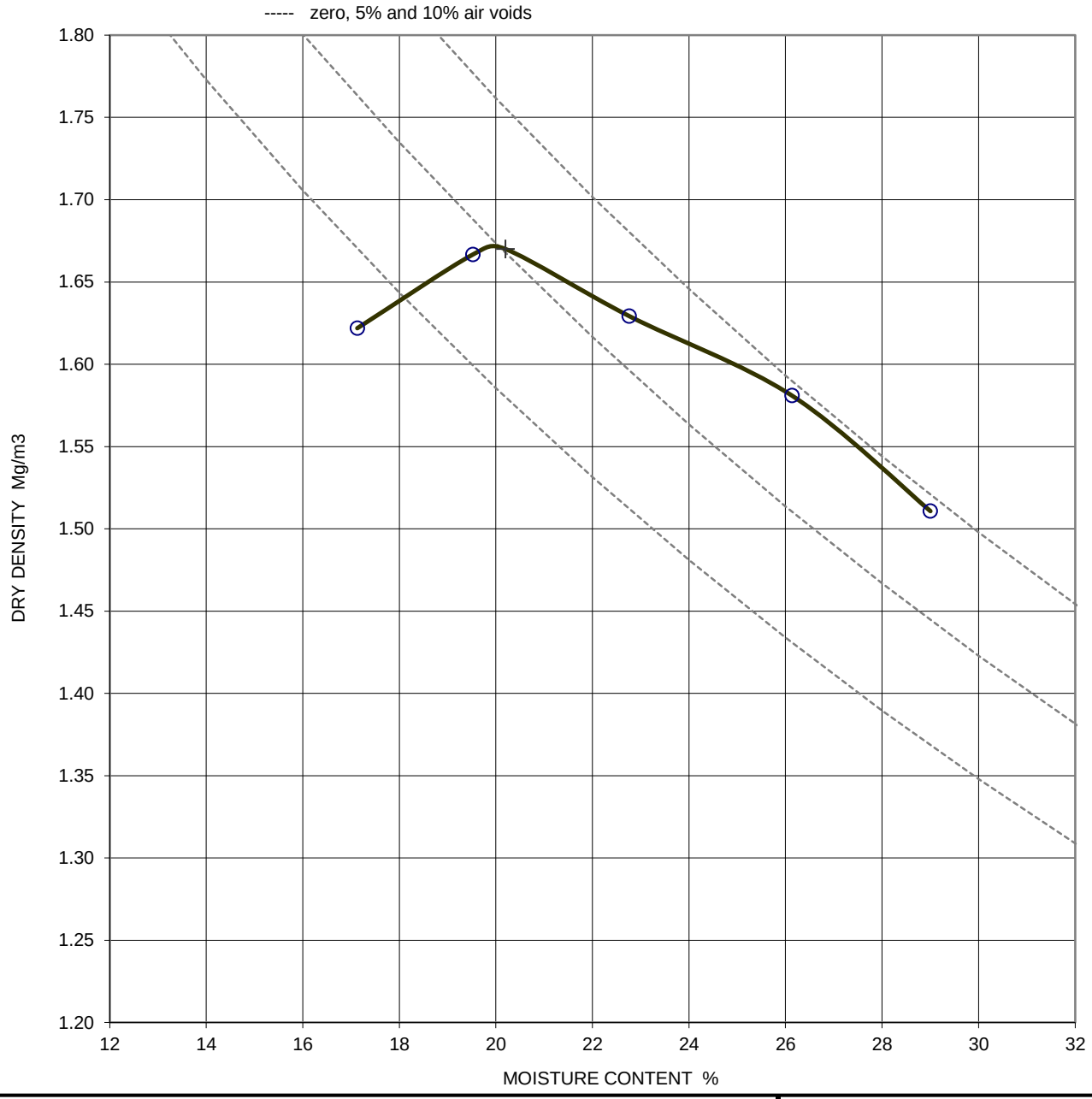
Optimum moisture content, % **37**

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191120032409

Hole No	ATK-TPM-05
Sample Depth (m BGL)	3.30 - 3.40
Sample Type and No	B15
Specimen Ref	



Soil description	Dark grey slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 2.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.72	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.67

Optimum moisture content, %
20

QA Ref
SLD 4, 3.3/4
Rev 2.5
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPL

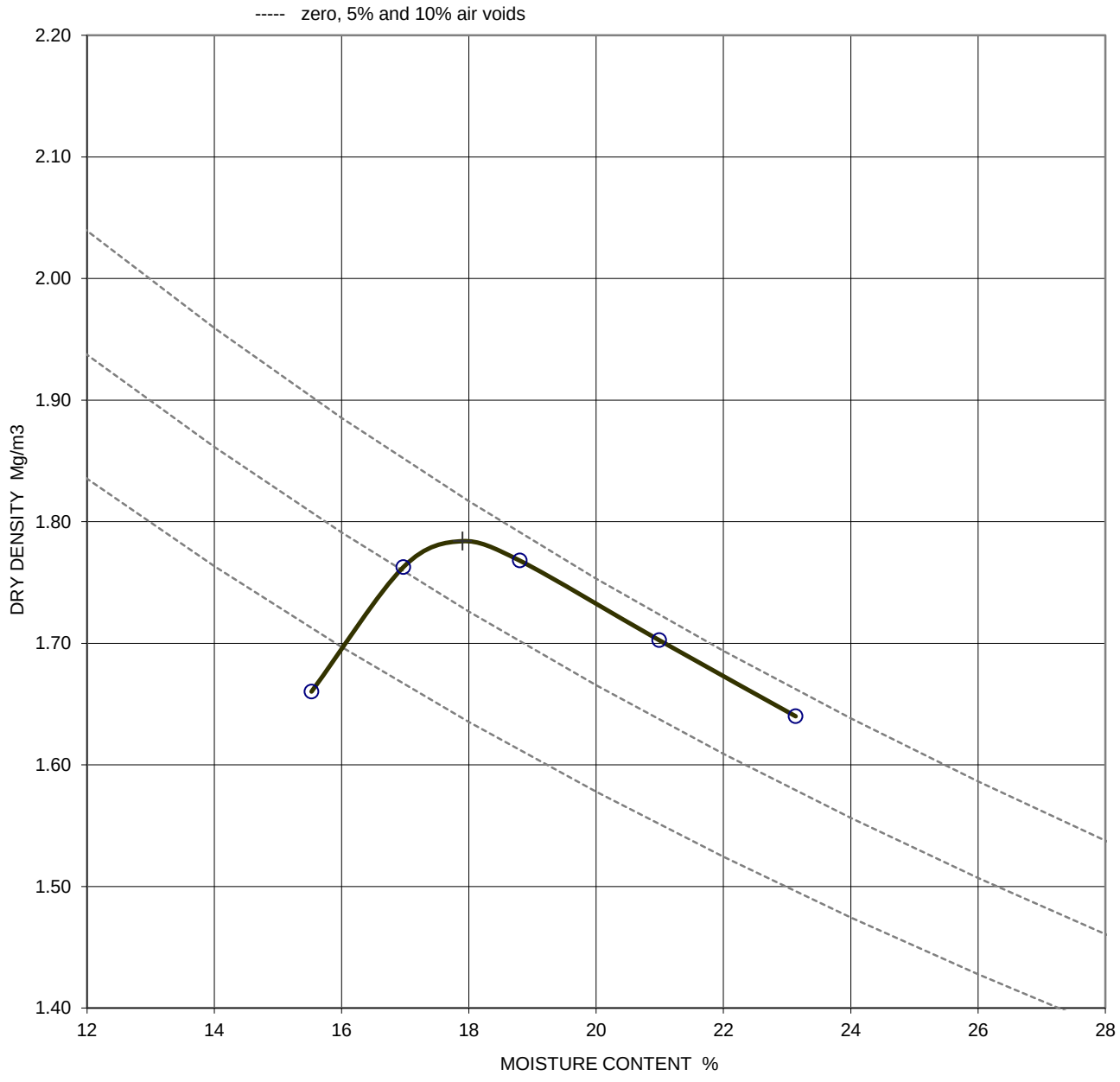
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191129111054

Hole No	ATK-CP-09
Sample Depth (m BGL)	7.65 - 8.20
Sample Type and No	B28
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.78**

Optimum moisture content, % **18**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

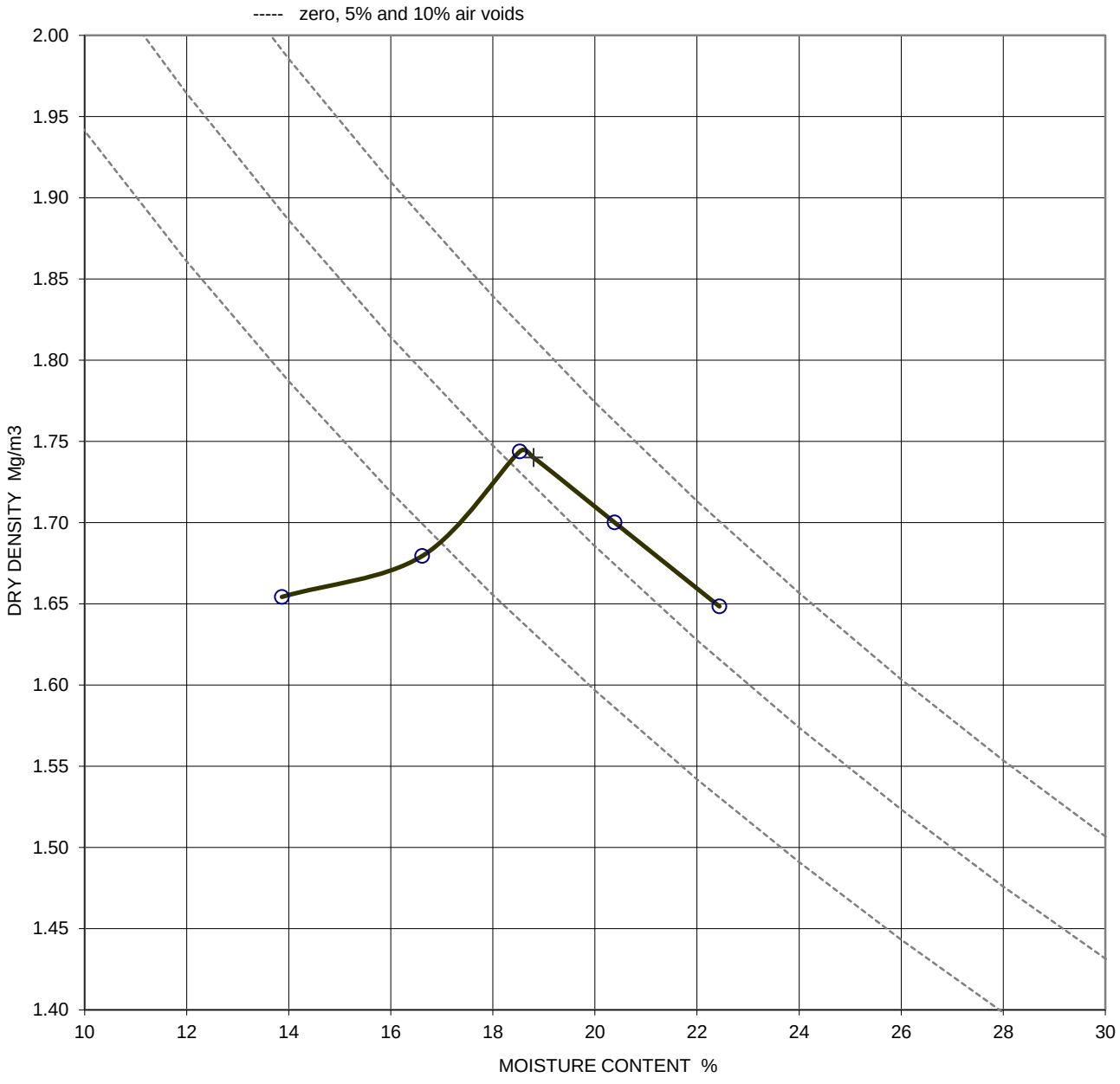
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191127033936

Hole No	ATK-CP-13A
Sample Depth (m BGL)	6.50 - 7.00
Sample Type and No	B29
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.75	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.74**

Optimum moisture content, % **19**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

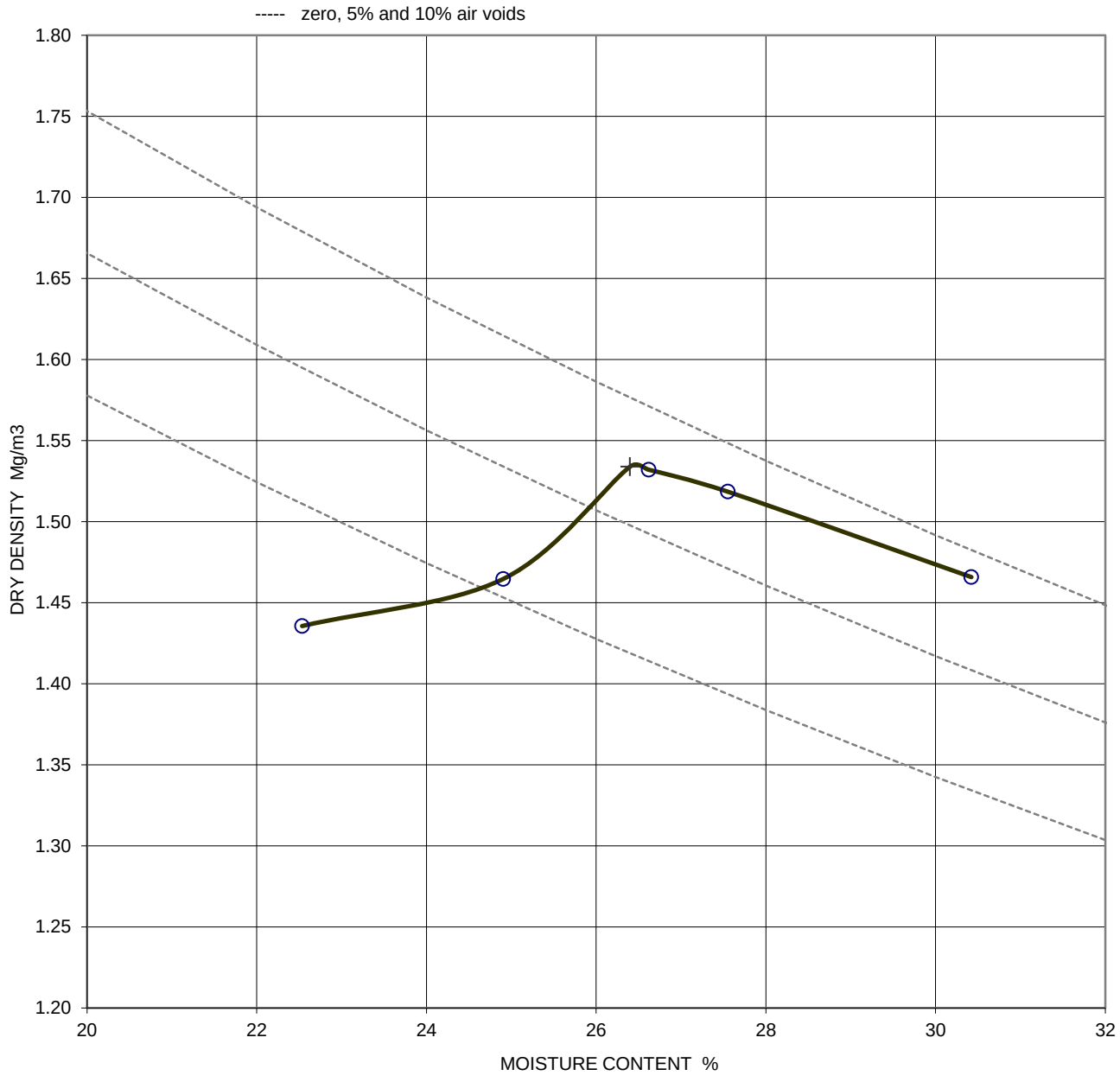
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191114114717

Hole No	ATK-TP-01
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B14
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.53**

Optimum moisture content, % **26**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

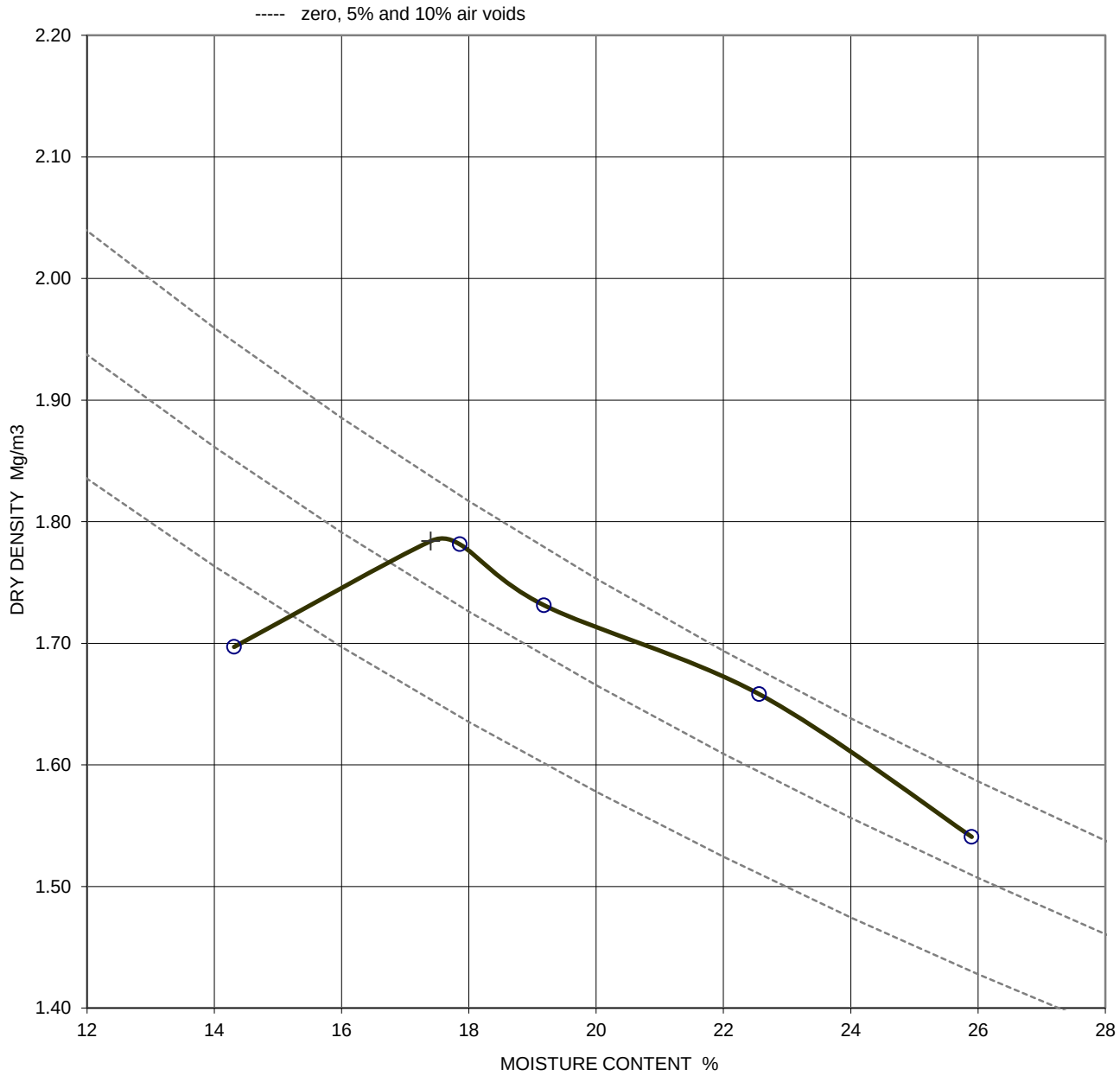
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191115080910

Hole No	ATK-TP-03
Sample Depth (m BGL)	3.10 - 3.20
Sample Type and No	B13
Specimen Ref	



Soil description	Dark grey slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.78**

Optimum moisture content, % **17**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

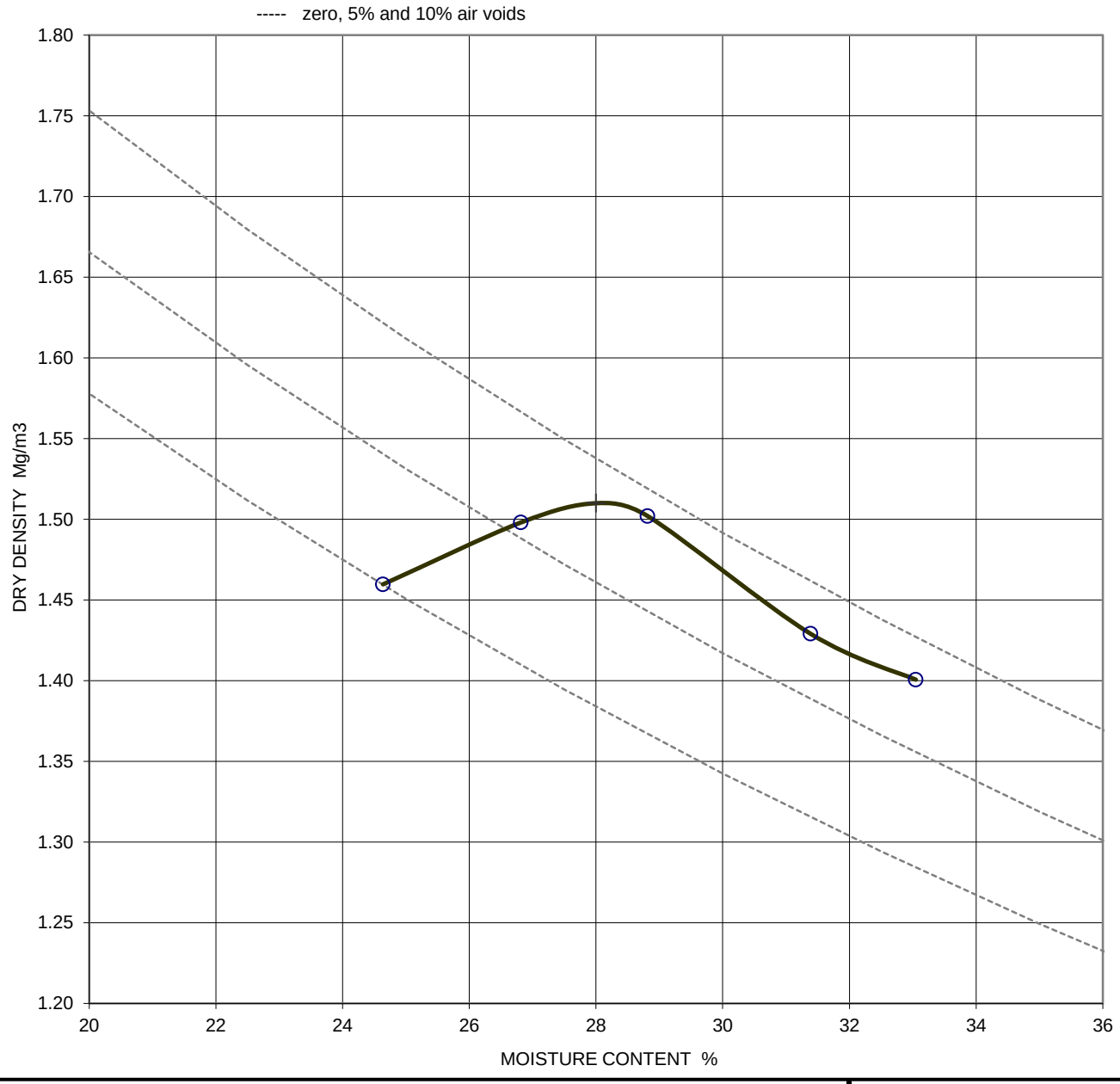
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191211040049

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.90 - 1.20
Sample Type and No	B8
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.70	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.51**

Optimum moisture content, % **28**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

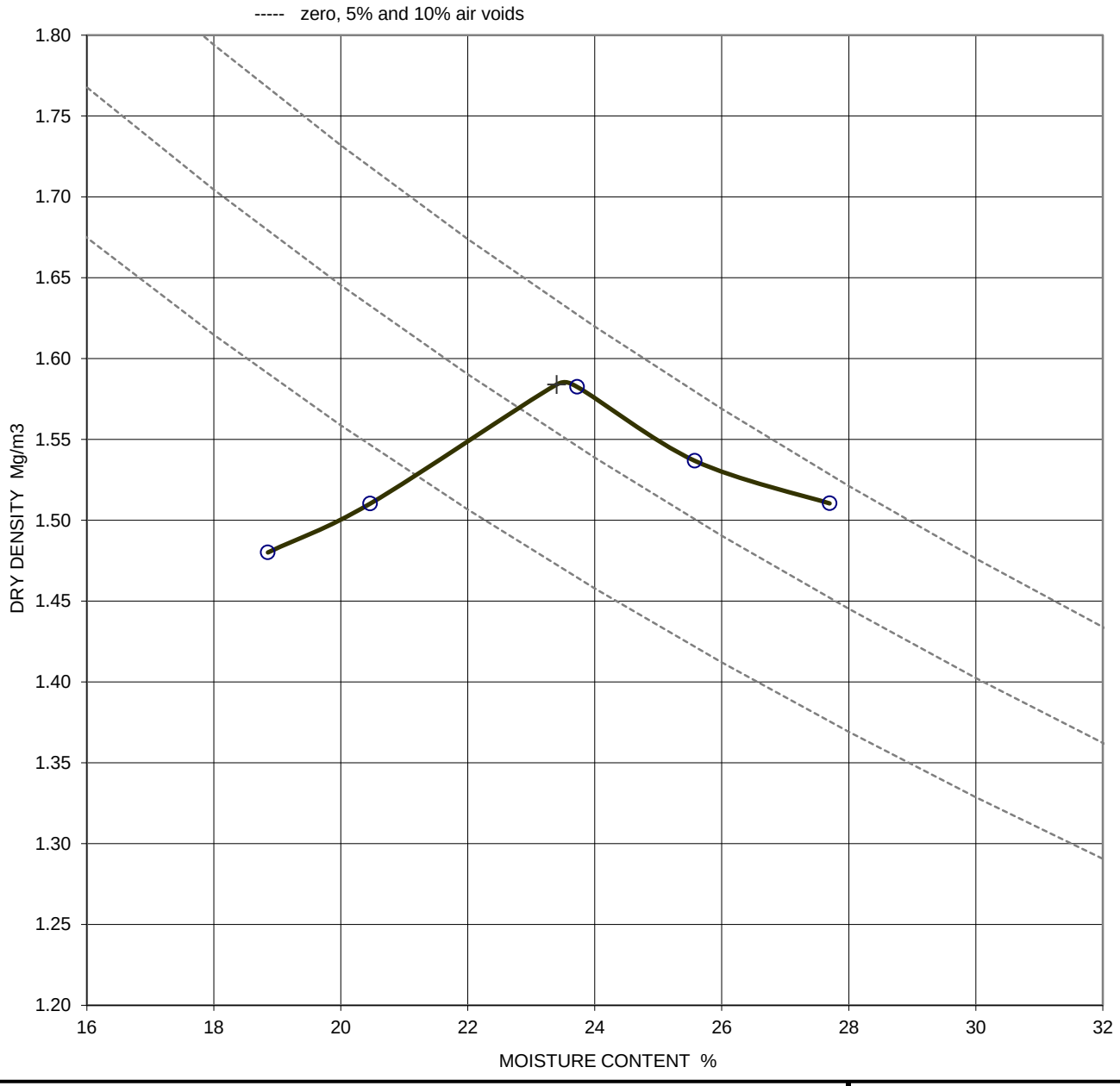
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191211040158

Hole No	ATK-TP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B13
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.58**

Optimum moisture content, % **23**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
COMPH

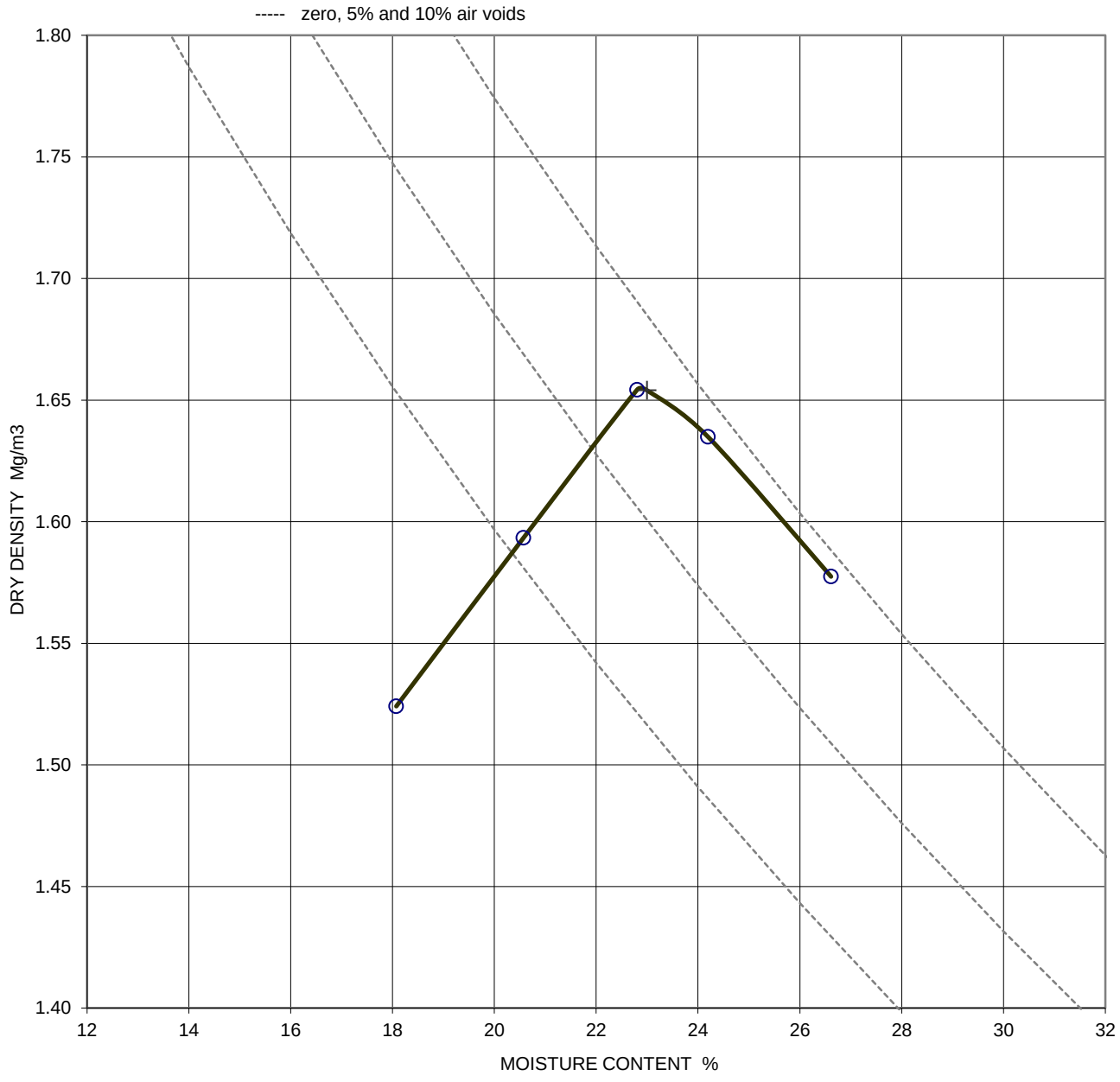
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-1920191204015240

Hole No	ATK-TPM-02
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B9
Specimen Ref	



Soil description	Brown slightly sandy CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.75	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.65**

Optimum moisture content, % **23**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

COMPH

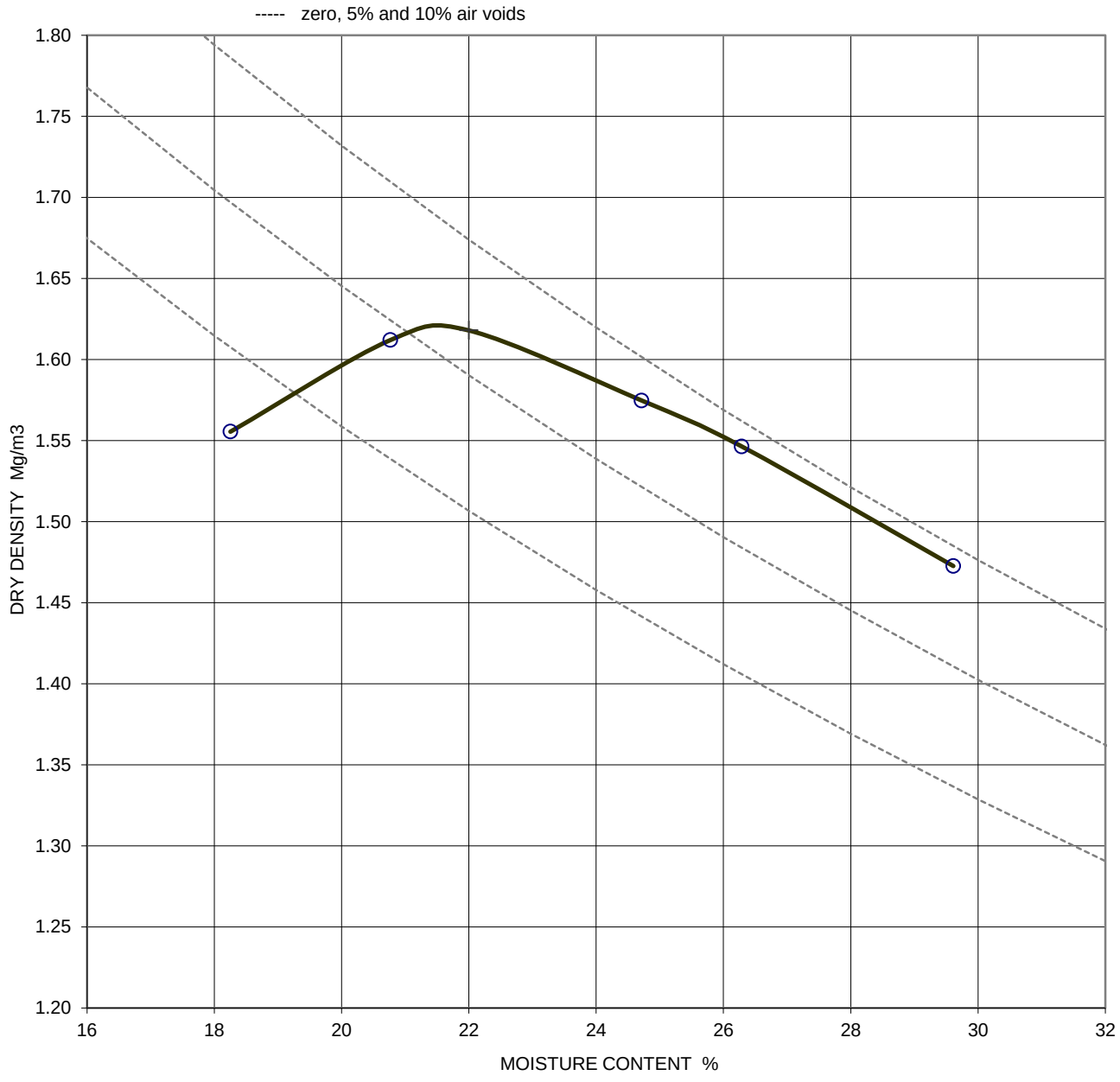
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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:
	A9031-19-20191120032149

Hole No	ATK-TPM-05
Sample Depth (m BGL)	2.00 - 2.20
Sample Type and No	B10
Specimen Ref	



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	0	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3 **1.62**

Optimum moisture content, % **22**

QA Ref
SLD 4, 3.5/6
Rev 2.8
Sep 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure
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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191118090111

Hole No	ATK-CP-04
Sample Depth (m BGL)	0.80 - 1.20
Sample Type and No	B6
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	111.7	20.0
2	104.7	14.5
3	93.6	4.0
4	91.7	
6	90.7	
8	90.2	
12	89.6	
16		
24		
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

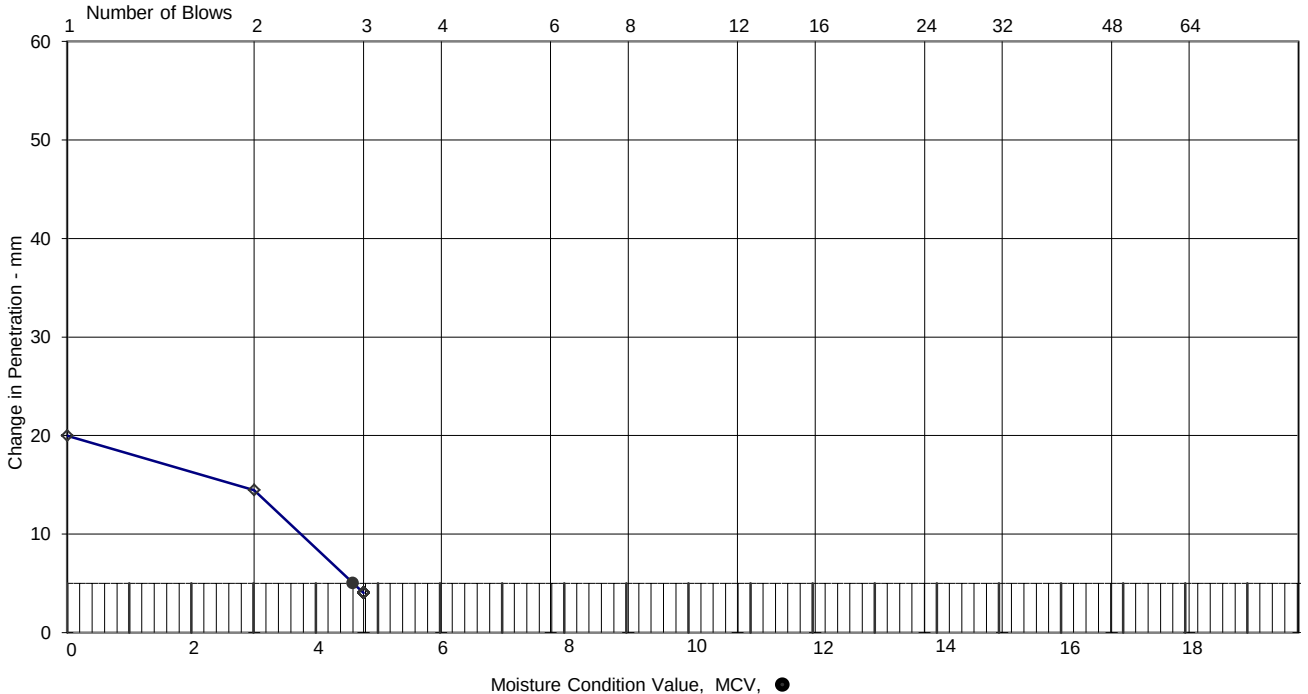
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	24	kPa
Bulk density	1.38	Mg/m3
Dry density	1.00	Mg/m3

Moisture Content	**39.0**	%
Moisture Condition Value, MCV	**5.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191205122237

Hole No	ATK-CP-06
Sample Depth (m BGL)	1
Sample Type and No	B7
Specimen Ref	

Soil Description	Light brown slightly sandy gravelly CLAY with two cobbles.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	108.8	35.9
2	90.1	35.6
3	79.8	33.3
4	72.9	28.4
6	60.7	16.3
8	54.5	10.1
12	46.5	2.2
16	44.5	
24	44.4	
32	44.4	
48	44.3	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

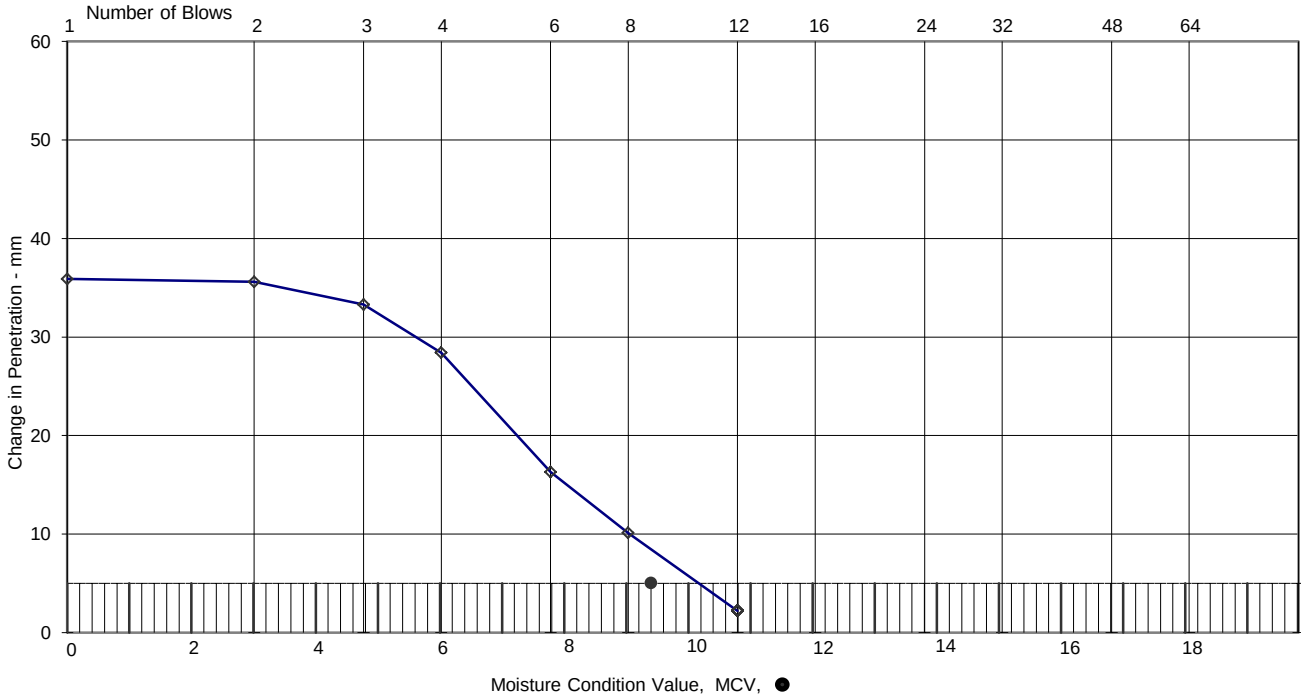
Retained on 20mm sieve, removed	33	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	68	kPa
Bulk density	2.01	Mg/m3
Dry density	1.68	Mg/m3

Moisture Content	**19.0**	%
Moisture Condition Value, MCV	**9.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191128091244

Hole No	ATK-CP-07
Sample Depth (m BGL)	2.00 - 2.45
Sample Type and No	UT7
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	79.4	6.2
2	76.3	4.8
3	74.4	
4	73.2	
6	72.4	
8	71.5	
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

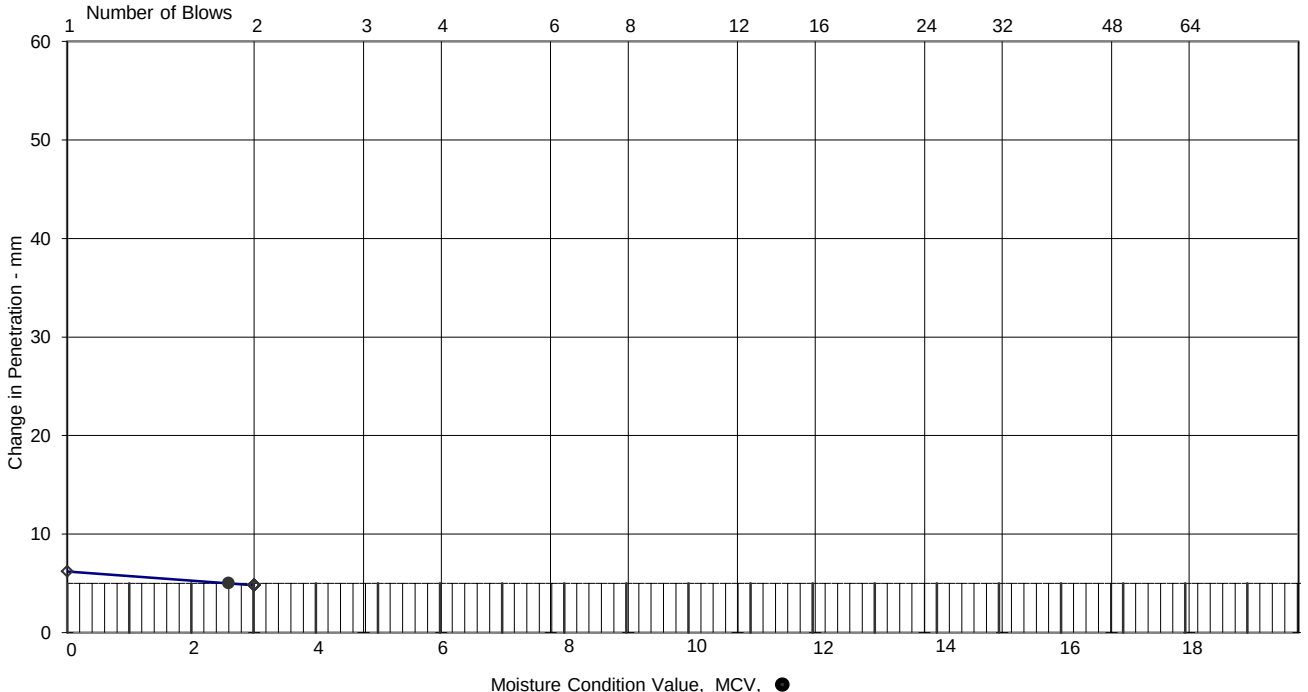
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	13	kPa
Bulk density	1.59	Mg/m3
Dry density	1.23	Mg/m3

Moisture Content	**29.0**	%
Moisture Condition Value, MCV	**3.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191209025616

Hole No	ATK-CP-07A
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B11
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	85.5	34.4
2	68.0	27.5
3	58.0	17.9
4	51.2	11.5
6	43.3	4.5
8	40.5	
12	40.1	
16	39.6	
24	38.8	
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

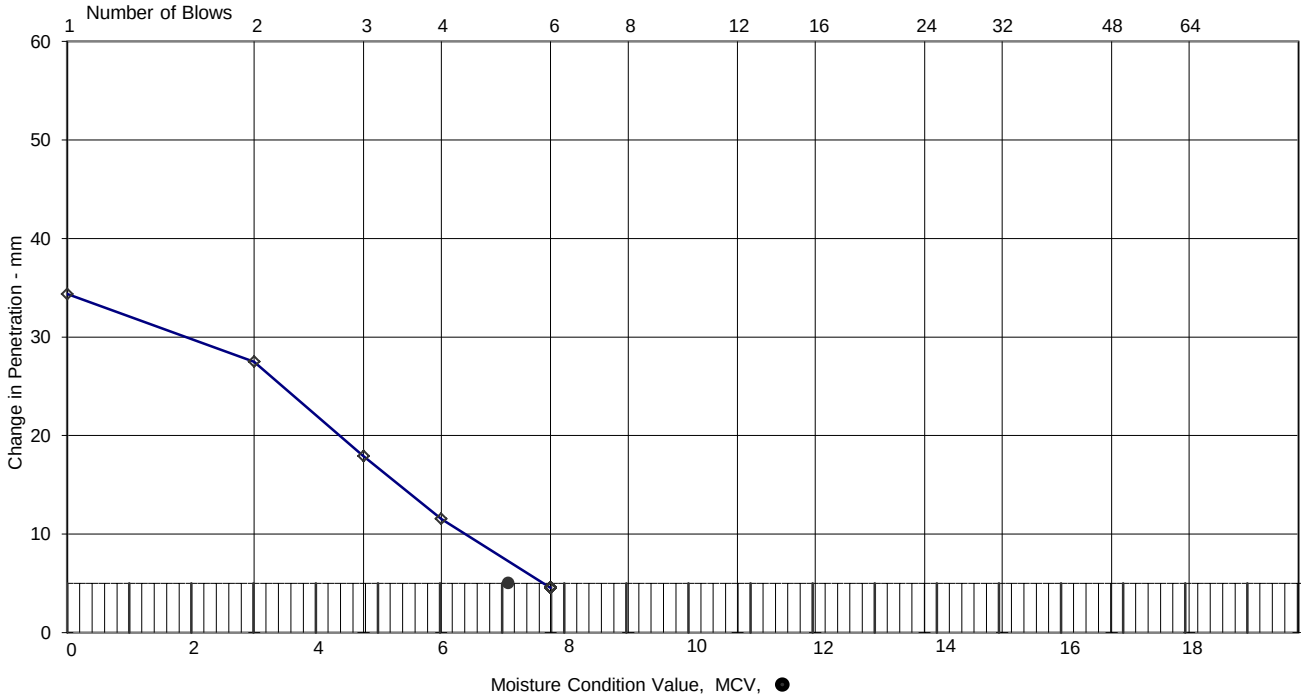
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	18	kPa
Bulk density	2.21	Mg/m3
Dry density	1.82	Mg/m3

Moisture Content	**21.0**	%
Moisture Condition Value, MCV	**7.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191209030447

Hole No	ATK-CP-07A
Sample Depth (m BGL)	9.50 - 10.00
Sample Type and No	B33
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	128.7	27.5
2	117.2	34.3
3	106.3	33.2
4	101.2	34.7
6	91.7	26.9
8	82.9	20.2
12	73.1	11.9
16	66.5	6.0
24	64.8	4.6
32	62.7	
48	61.2	
64	60.5	
96	60.2	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

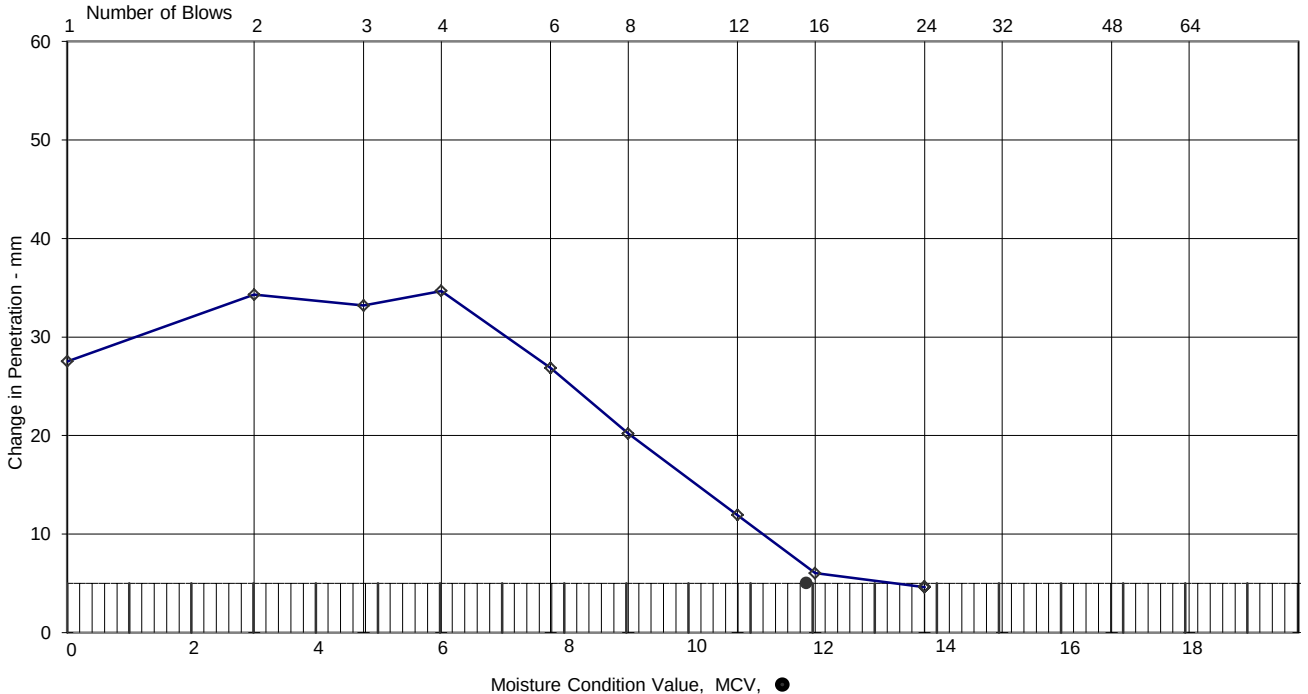
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	86	kPa
Bulk density	1.78	Mg/m3
Dry density	1.47	Mg/m3

Moisture Content	**21.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191126042202

Hole No	ATK-CP-08
Sample Depth (m BGL)	3.20 - 3.65
Sample Type and No	B13
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	120.9	30.3
2	106.4	31.5
3	97.6	30.7
4	90.6	28.0
6	80.7	19.1
8	74.9	13.7
12	66.9	6.1
16	62.7	2.3
24	61.6	
32	61.2	
48	60.9	
64	60.4	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

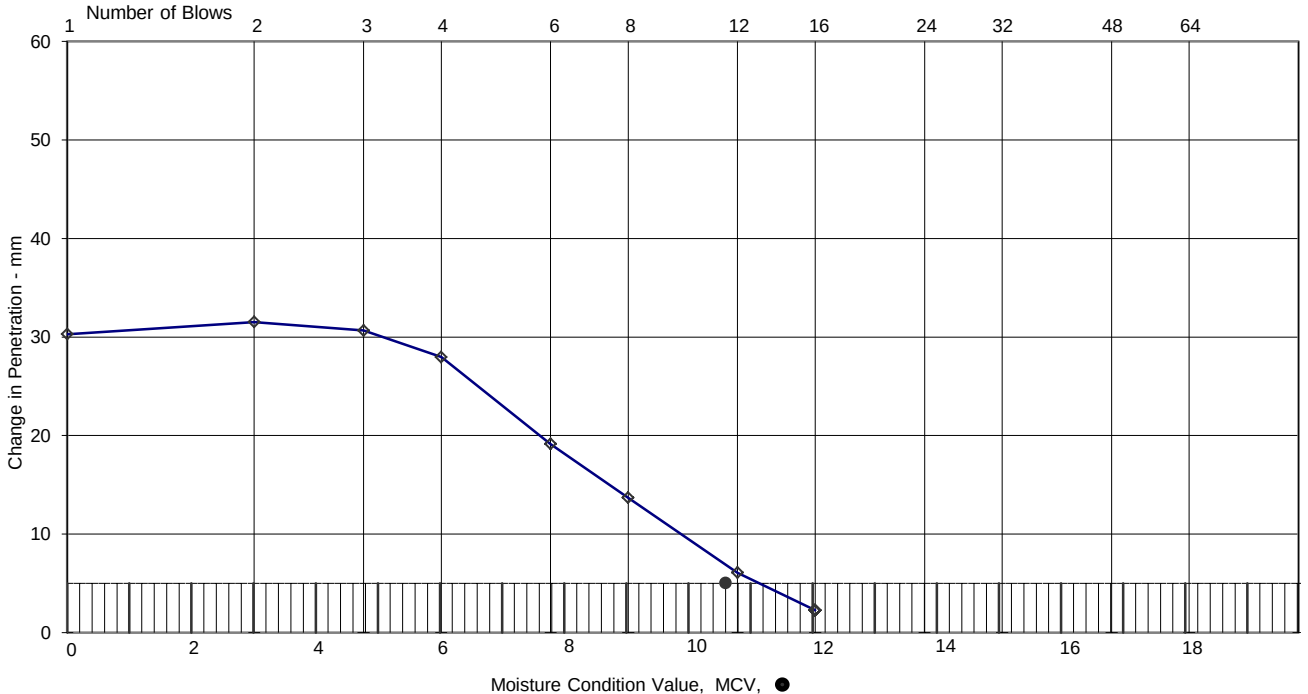
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	82	kPa
Bulk density	1.76	Mg/m3
Dry density	1.43	Mg/m3

Moisture Content	**23.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191126042408

Hole No	ATK-CP-08
Sample Depth (m BGL)	4.65 - 5.20
Sample Type and No	B17
Specimen Ref	

Soil Description	Grey and reddish brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	104.1	28.1
2	92.0	32.2
3	82.6	32.2
4	76.0	30.2
6	66.6	22.4
8	59.8	16.1
12	50.4	7.0
16	45.8	2.7
24	44.2	
32	43.7	
48	43.4	
64	43.1	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

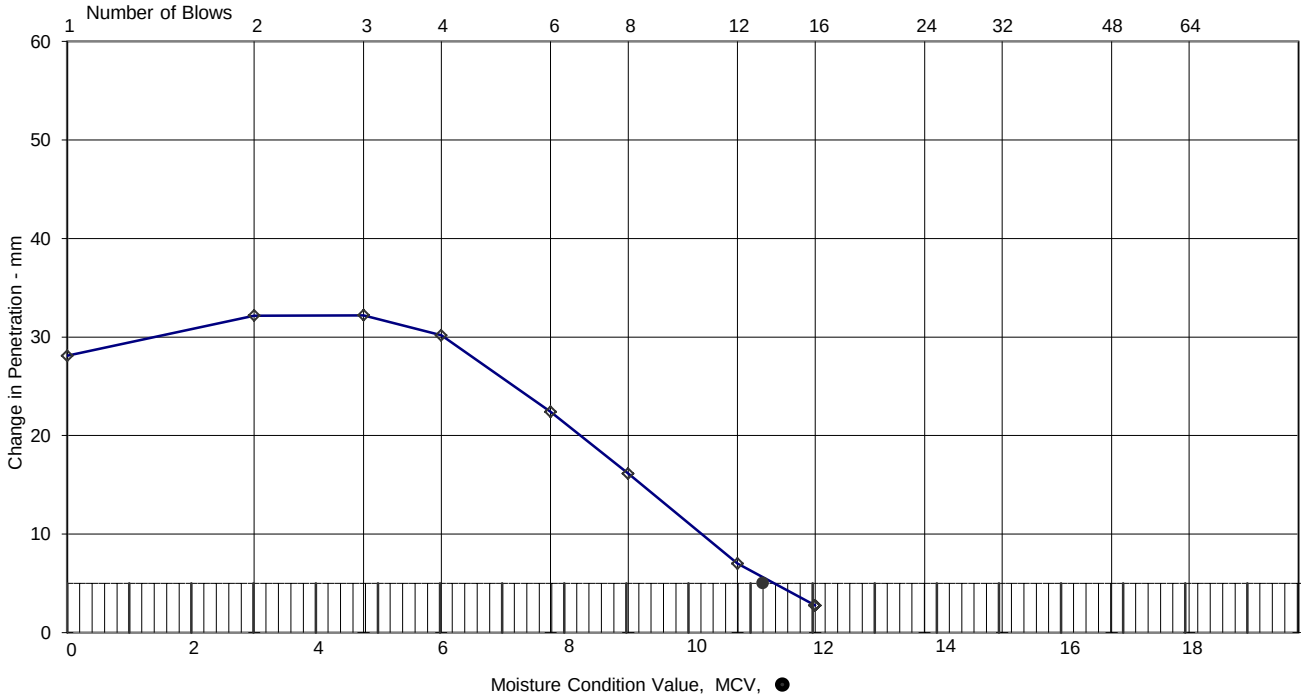
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	30	kPa
Bulk density	2.11	Mg/m3
Dry density	1.69	Mg/m3

Moisture Content	**25.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191205104621

Hole No	ATK-CP-08
Sample Depth (m BGL)	8.20 - 8.65
Sample Type and No	B29
Specimen Ref	

Soil Description	Brown mottled grey slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	115.0	38.0
2	93.0	33.3
3	84.8	33.8
4	77.0	31.4
6	66.4	23.0
8	59.7	17.1
12	51.0	8.6
16	45.6	3.5
24	43.4	
32	42.7	
48	42.4	
64	42.1	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

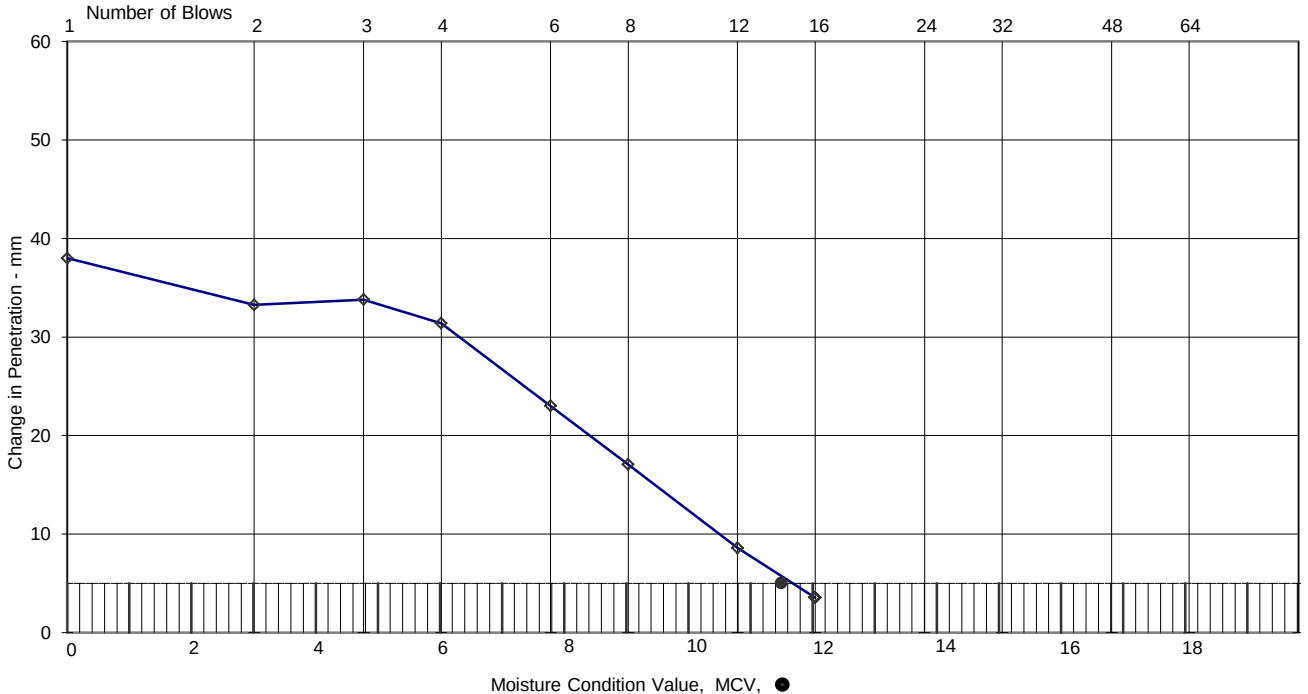
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	72	kPa
Bulk density	2.16	Mg/m3
Dry density	1.77	Mg/m3

Moisture Content	**22.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191129110857

Hole No	ATK-CP-09
Sample Depth (m BGL)	6.50 - 6.95
Sample Type and No	B24
Specimen Ref	

Soil Description	Reddish brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	102.0	25.8
2	90.3	35.9
3	81.8	37.3
4	76.2	35.0
6	61.9	21.5
8	54.4	14.3
12	44.5	4.8
16	41.2	
24	40.4	
32	40.1	
48	39.7	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

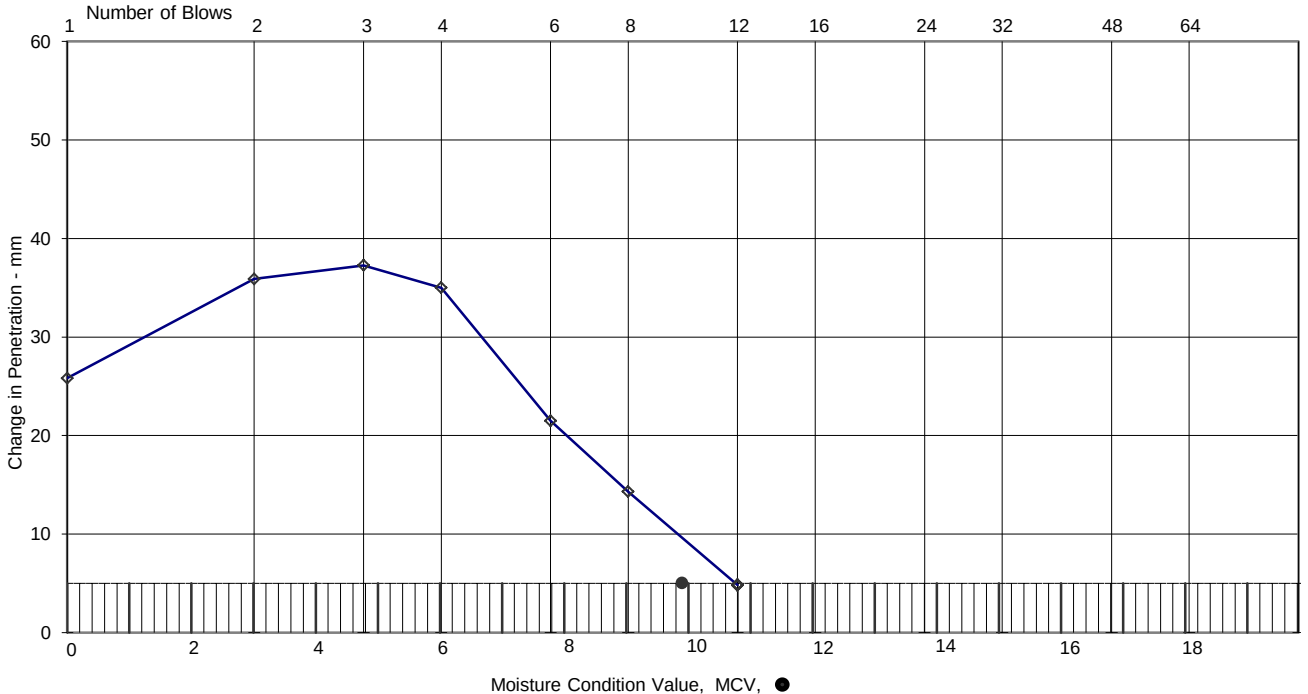
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	62	kPa
Bulk density	2.15	Mg/m3
Dry density	1.80	Mg/m3

Moisture Content	**20.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191129111230

Hole No	ATK-CP-09
Sample Depth (m BGL)	8.65 - 9.20
Sample Type and No	B31
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	130.8	39.3
2	113.5	40.8
3	101.7	37.6
4	91.5	30.3
6	80.0	19.6
8	72.8	13.0
12	64.1	4.8
16	61.2	
24	60.4	
32	59.8	
48	59.3	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

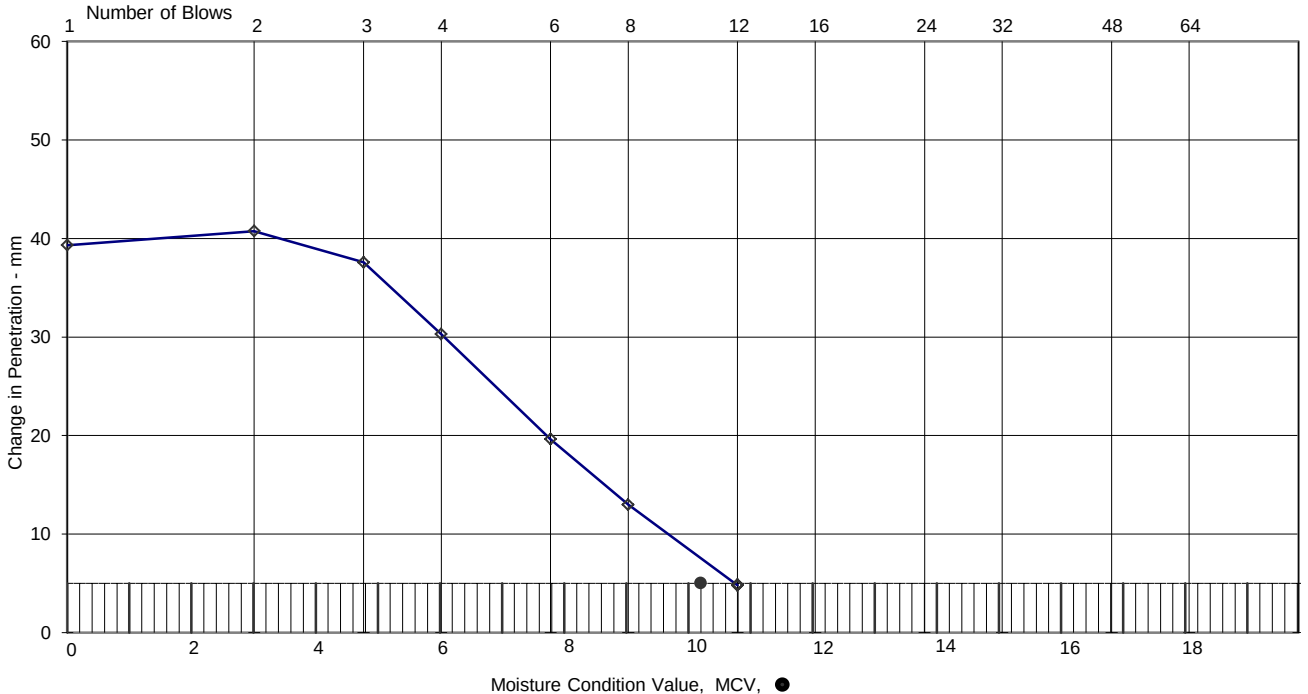
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	66	kPa
Bulk density	1.79	Mg/m3
Dry density	1.48	Mg/m3

Moisture Content	**21.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191122011622

Hole No	ATK-CP-10
Sample Depth (m BGL)	1.20 - 1.65
Sample Type and No	UT5
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	104.3	28.4
2	90.6	29.8
3	81.9	25.1
4	75.9	23.1
6	65.8	14.8
8	60.8	10.4
12	56.8	6.7
16	52.8	3.5
24	51.0	
32	50.4	
48	50.1	
64	49.4	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

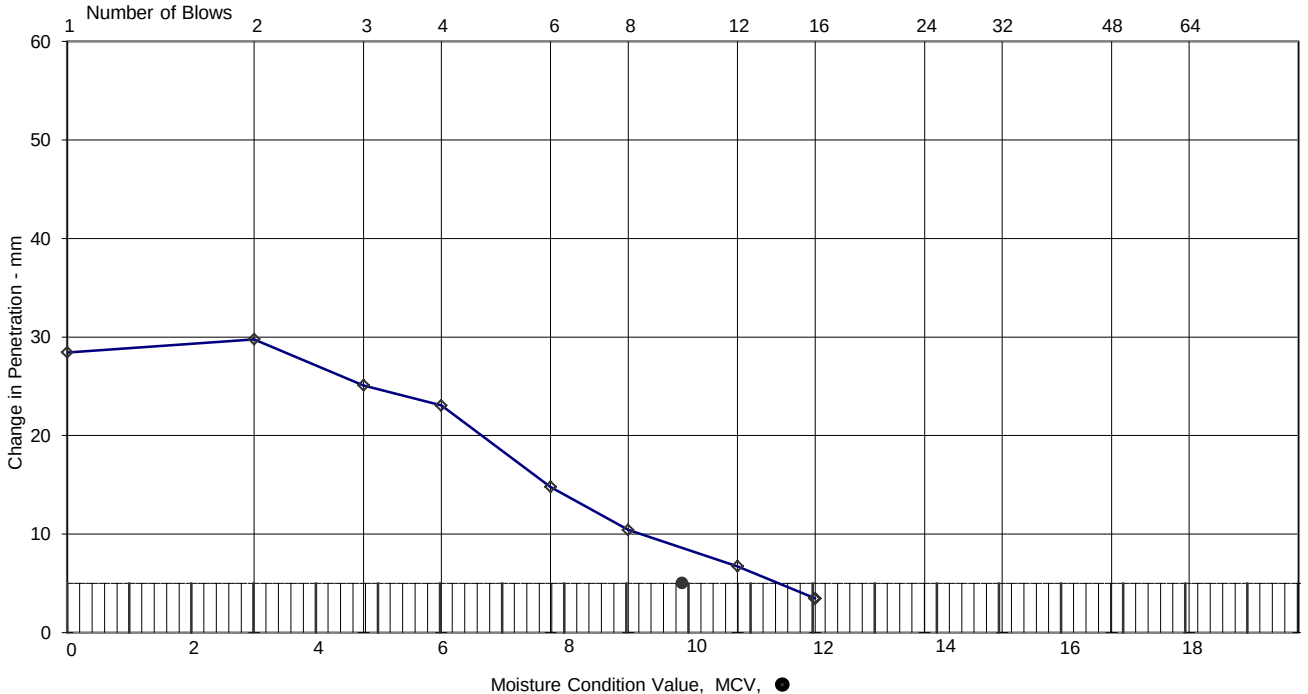
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	70	kPa
Bulk density	1.95	Mg/m3
Dry density	1.48	Mg/m3

Moisture Content	**32.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191121112306

Hole No	ATK-CP-12
Sample Depth (m BGL)	2.00 - 2.45
Sample Type and No	UT8
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	101.2	43.2
2	78.9	24.7
3	64.3	11.3
4	58.0	6.1
6	55.5	4.3
8	54.2	
12	53.0	
16	51.9	
24	51.2	
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

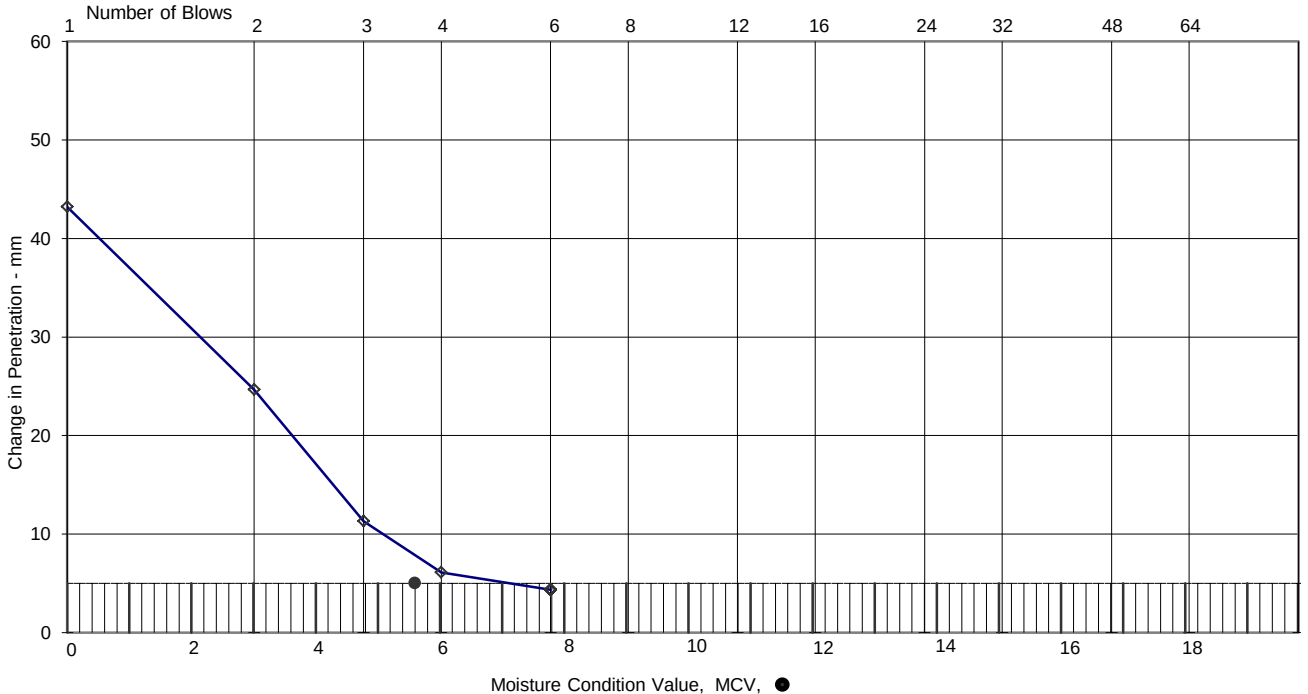
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	20	kPa
Bulk density	1.87	Mg/m3
Dry density	1.35	Mg/m3

Moisture Content	**39.0**	%
Moisture Condition Value, MCV	**6.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191121112417

Hole No	ATK-CP-12
Sample Depth (m BGL)	5.00 - 5.45
Sample Type and No	UT19
Specimen Ref	

Soil Description	Reddish brown mottled grey slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	119.0	32.9
2	103.4	34.4
3	93.1	31.6
4	86.1	28.1
6	75.4	20.4
8	68.9	15.6
12	61.5	8.8
16	58.0	5.8
24	55.0	3.8
32	53.3	
48	52.7	
64	52.2	
96	51.2	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

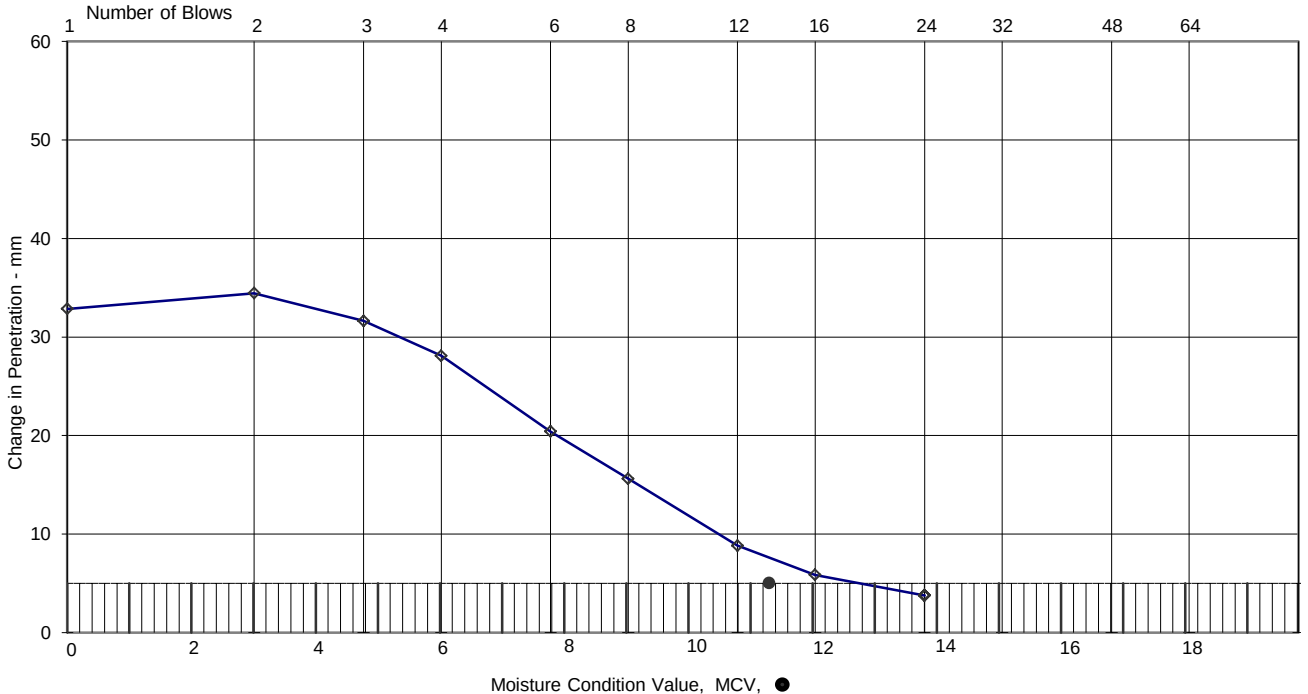
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	90	kPa
Bulk density	1.94	Mg/m3
Dry density	1.66	Mg/m3

Moisture Content	**17.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191127033323

Hole No	ATK-CP-13A
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	108.8	33.5
2	94.6	37.1
3	83.6	28.5
4	75.3	21.3
6	64.2	9.9
8	57.5	3.6
12	55.1	
16	54.0	
24	54.3	
32	53.9	
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

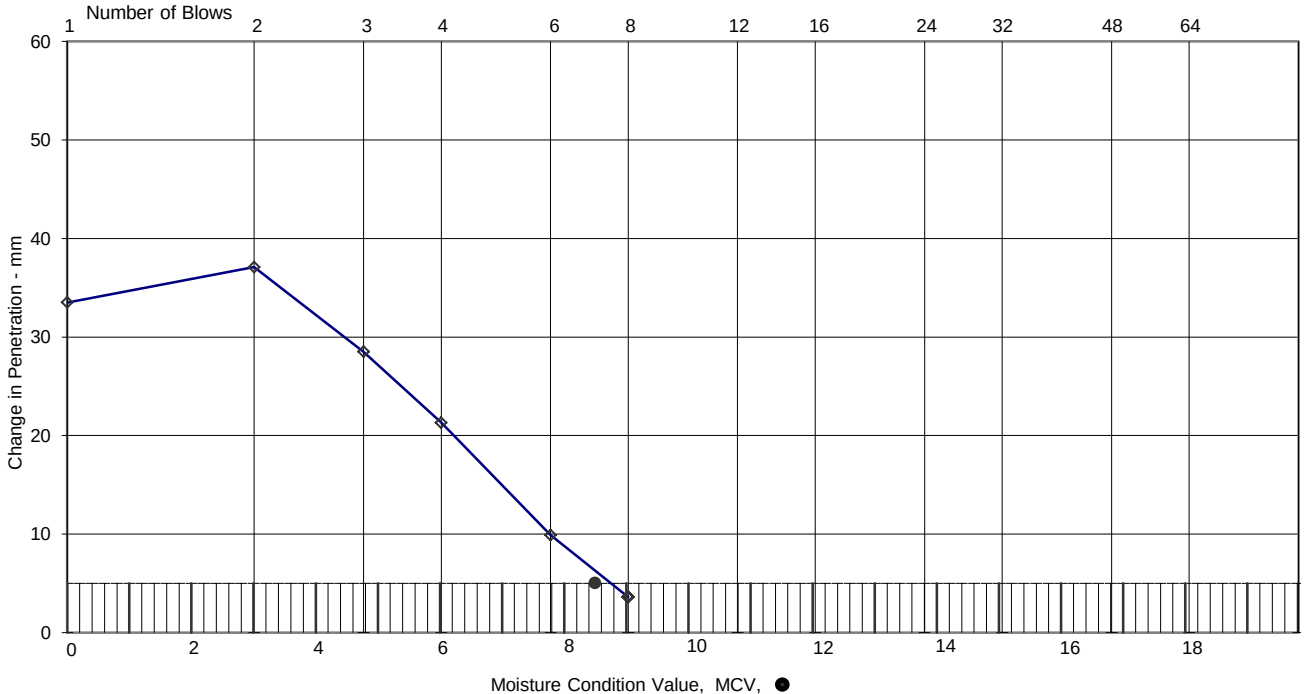
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured		kPa
Bulk density	1.85	Mg/m3
Dry density	1.37	Mg/m3

Moisture Content	**35.0**	%
Moisture Condition Value, MCV	**9.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191213110749

Hole No	ATK-CP-14
Sample Depth (m BGL)	0.50 - 1.00
Sample Type and No	B3
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	128.7	28.0
2	112.4	21.6
3	104.8	18.2
4	100.6	15.9
6	94.3	13.7
8	90.8	11.8
12	86.5	8.1
16	84.8	6.7
24	80.7	2.7
32	78.9	
48	78.4	
64	78.1	
96	77.9	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

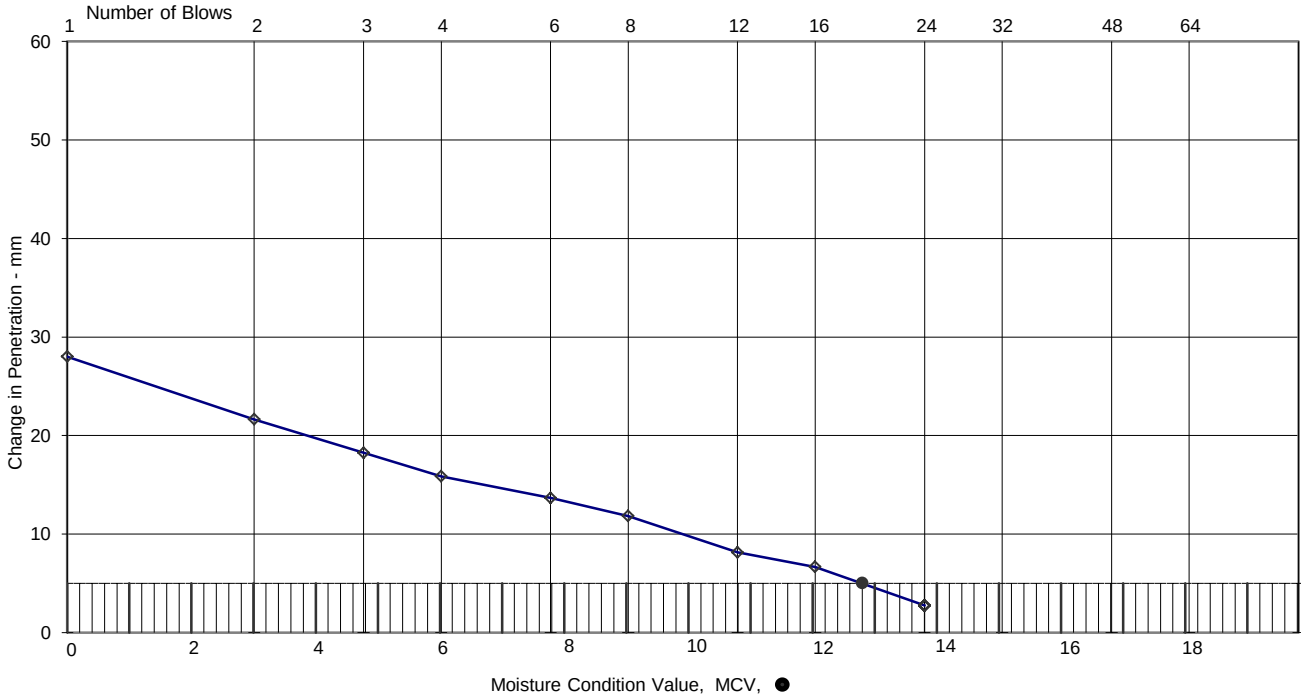
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	112	kPa
Bulk density	1.53	Mg/m3
Dry density	1.26	Mg/m3

Moisture Content	**21.0**	%
Moisture Condition Value, MCV	**13.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191212110228

Hole No	ATK-CP-15
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	117.3	34.0
2	101.8	43.6
3	89.5	35.0
4	83.3	29.2
6	70.0	15.8
8	58.2	4.8
12	54.5	
16	54.2	
24	54.1	
32	53.4	
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

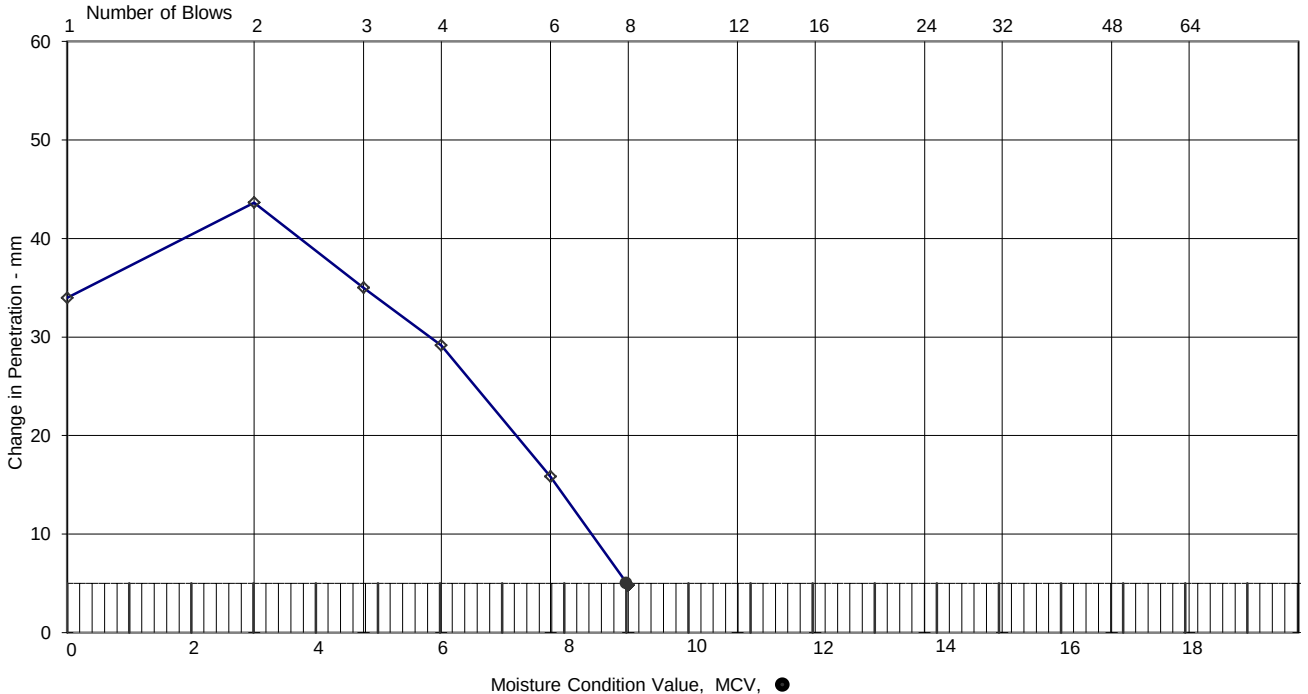
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	34	kPa
Bulk density	1.88	Mg/m3
Dry density	1.37	Mg/m3

Moisture Content	**38.0**	%
Moisture Condition Value, MCV	**9.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191219120110

Hole No	ATK-CP-16
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B8
Specimen Ref	

Soil Description	
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	97.0	29.7
2	81.2	26.9
3	75.9	28.7
4	67.3	20.3
6	55.3	8.7
8	54.3	7.9
12	47.2	1.4
16	47.0	
24	46.6	
32	46.4	
48	45.8	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

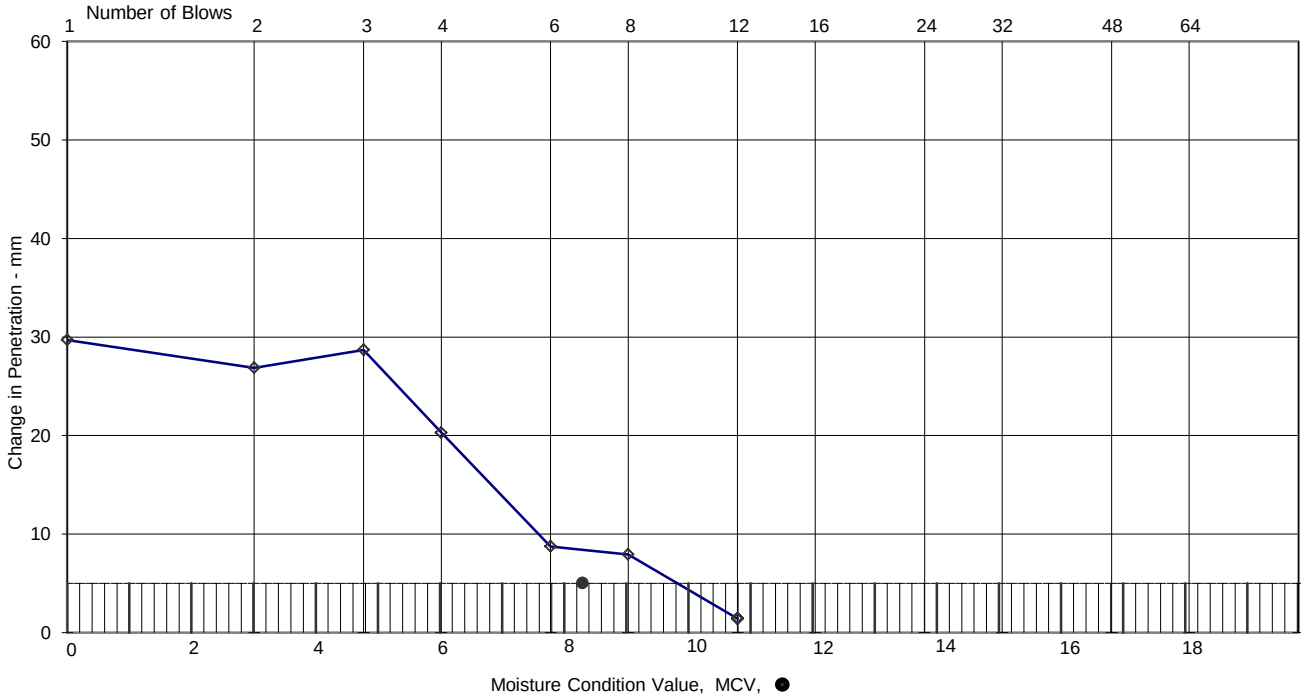
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	30	kPa
Bulk density	1.55	Mg/m3
Dry density	1.22	Mg/m3

Moisture Content	**27.0**	%
Moisture Condition Value, MCV	**8.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191219022241

Hole No	ATK-CP-16
Sample Depth (m BGL)	5.50 - 6.00
Sample Type and No	B16
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	113.0	25.4
2	101.7	26.5
3	92.9	26.1
4	87.6	25.3
6	79.7	26.1
8	75.2	26.2
12	66.8	22.0
16	62.3	18.1
24	53.6	9.7
32	49.0	5.5
48	44.8	
64	44.2	
96	43.9	
128	43.5	
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

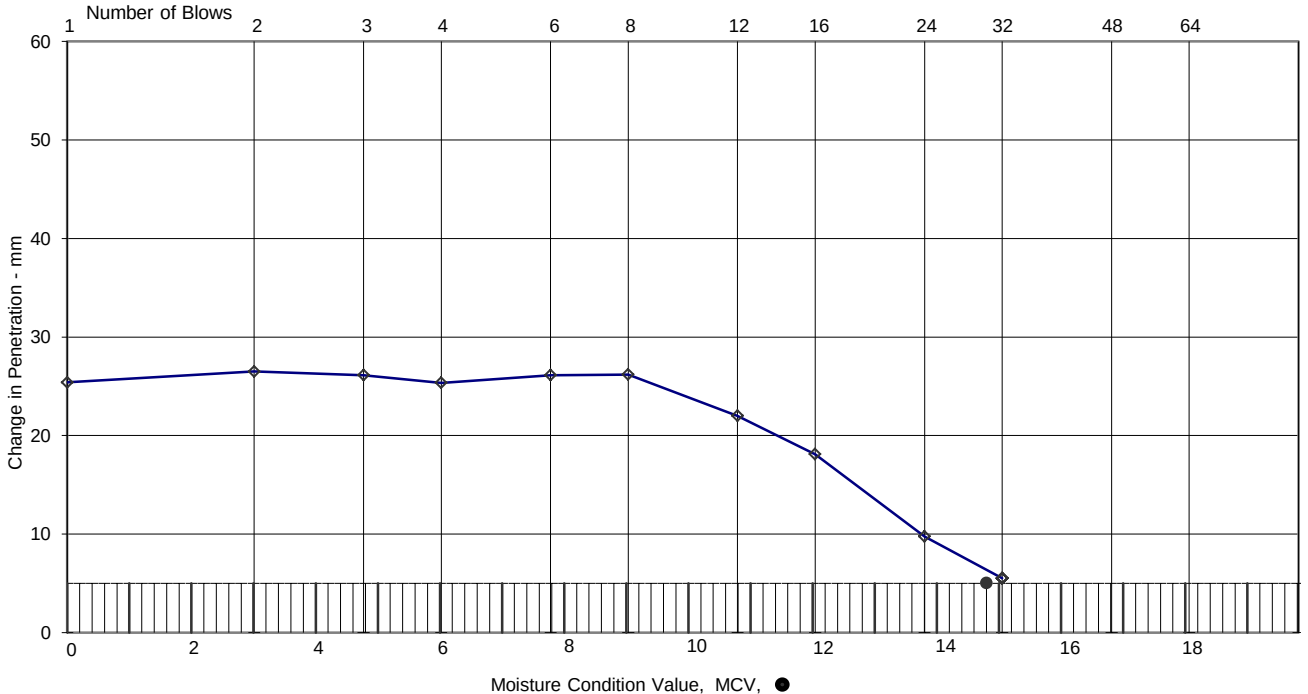
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	140	kPa
Bulk density	2.09	Mg/m3
Dry density	1.76	Mg/m3

Moisture Content	**19.0**	%
Moisture Condition Value, MCV	**15.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191114114654

Hole No	ATK-TP-01
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B8
Specimen Ref	

Soil Description	Brown slightly sandy silty CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	117.5	33.7
2	102.4	34.3
3	91.8	34.6
4	83.8	29.2
6	74.2	20.0
8	68.1	13.9
12	57.2	3.2
16	54.6	
24	54.2	
32	54.2	
48	54.0	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

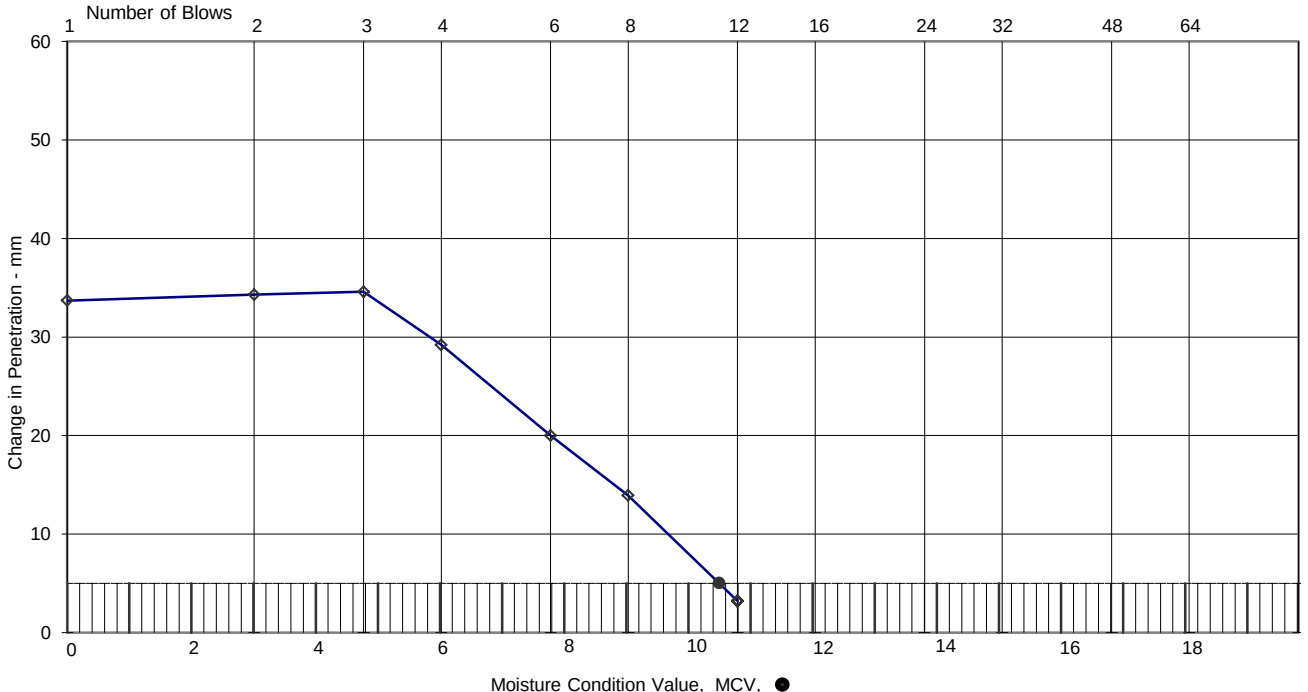
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	40	kPa
Bulk density	1.82	Mg/m3
Dry density	1.35	Mg/m3

Moisture Content	**35.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191114114711

Hole No	ATK-TP-01
Sample Depth (m BGL)	2.80 - 2.90
Sample Type and No	B12
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	124.5	24.3
2	114.2	25.4
3	106.9	27.6
4	100.2	24.7
6	93.1	22.9
8	88.8	19.5
12	79.3	10.8
16	75.5	7.9
24	70.2	3.0
32	69.3	
48	68.5	
64	67.6	
96	67.2	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

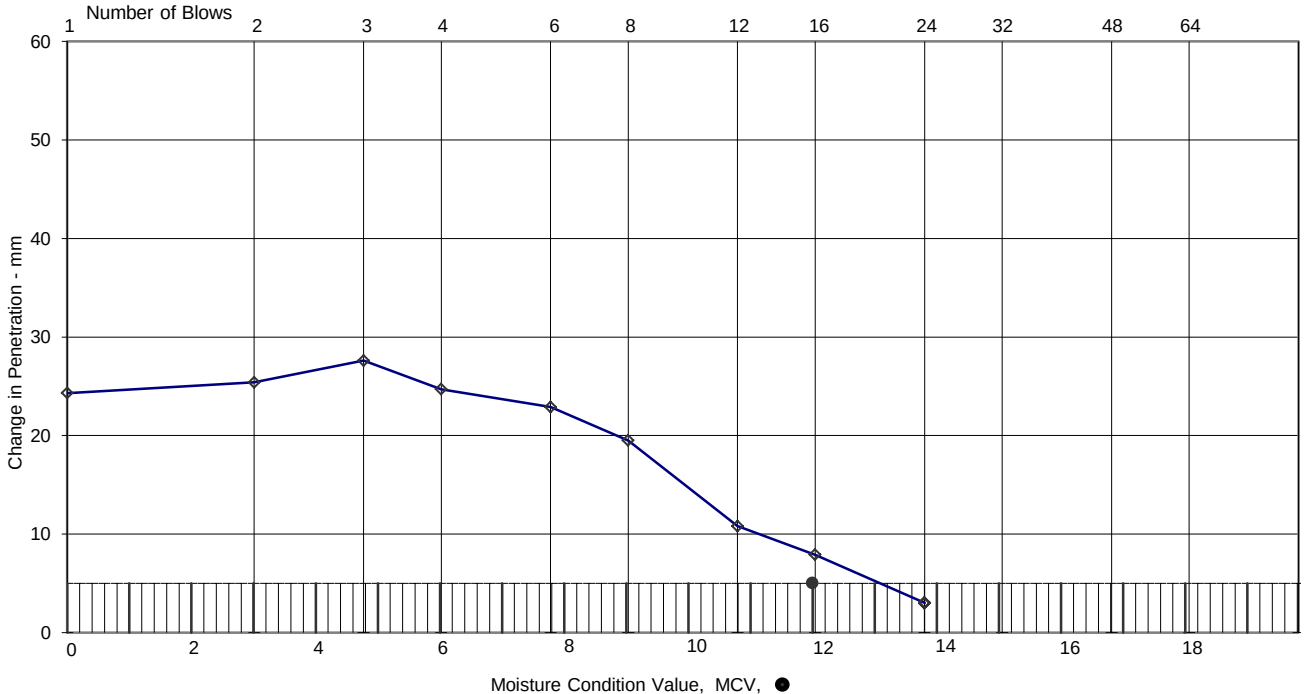
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	90	kPa
Bulk density	1.62	Mg/m3
Dry density	1.24	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191114114717

Hole No	ATK-TP-01
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B14
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	119.9	31.6
2	105.5	32.4
3	96.4	25.2
4	88.3	17.2
6	78.3	7.3
8	73.1	2.2
12	71.2	
16	71.1	
24	71.0	
32	70.9	
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

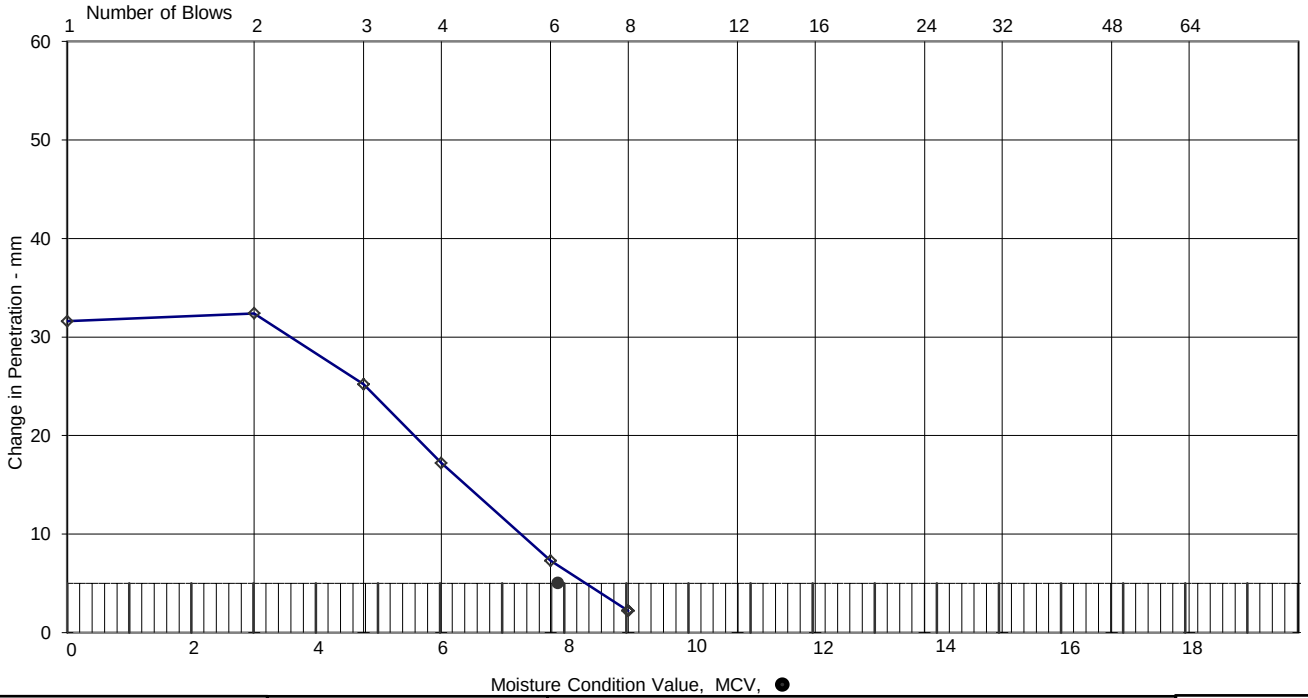
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	52	kPa
Bulk density	1.57	Mg/m3
Dry density	1.19	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**8.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191113101600

Hole No	ATK-TP-02
Sample Depth (m BGL)	0.50 - 0.70
Sample Type and No	B3
Specimen Ref	

Soil Description	Brown slightly sandy CLAY
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	113.7	34.3
2	99.3	40.4
3	89.0	33.9
4	79.4	25.0
6	64.7	10.4
8	58.9	4.8
12	55.1	
16	54.4	
24	54.4	
32	54.1	
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

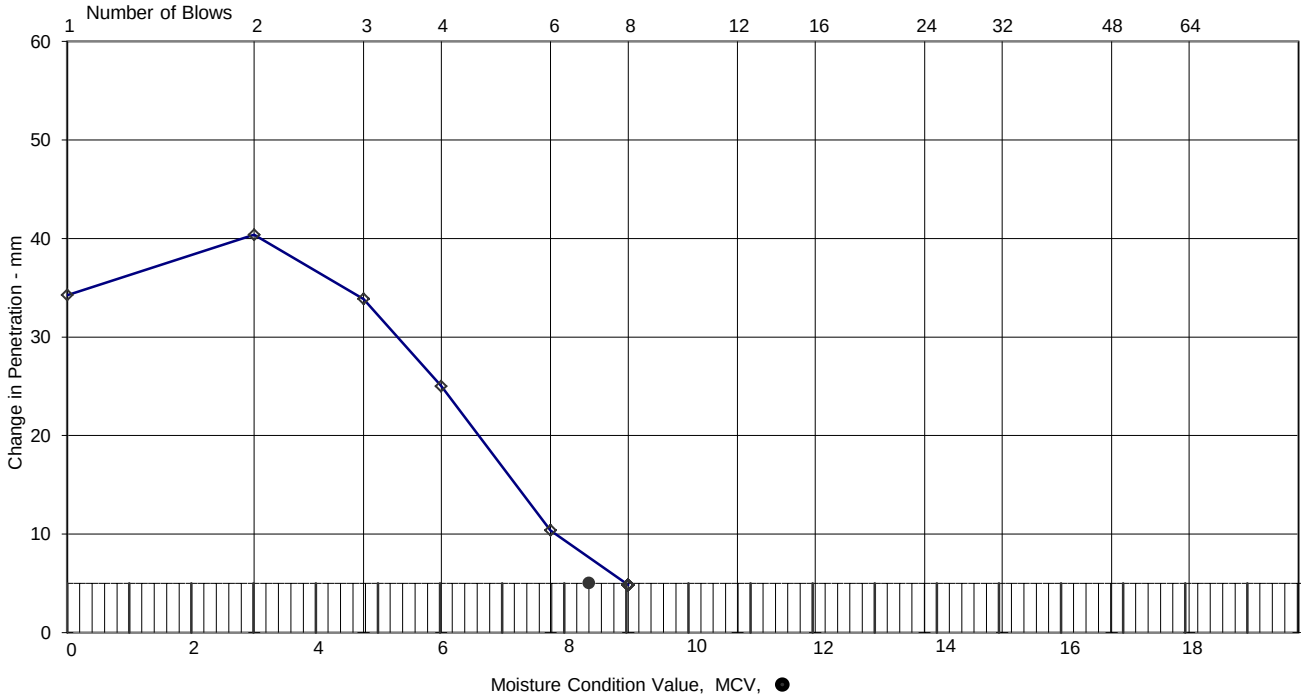
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	54	kPa
Bulk density	1.85	Mg/m3
Dry density	1.36	Mg/m3

Moisture Content	**37.0**	%
Moisture Condition Value, MCV	**8.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191113101637

Hole No	ATK-TP-02
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B8
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	112.2	35.1
2	95.0	36.3
3	85.0	33.0
4	77.0	25.6
6	66.1	14.9
8	58.7	7.7
12	52.0	1.4
16	51.5	
24	51.2	
32	51.1	
48	50.6	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

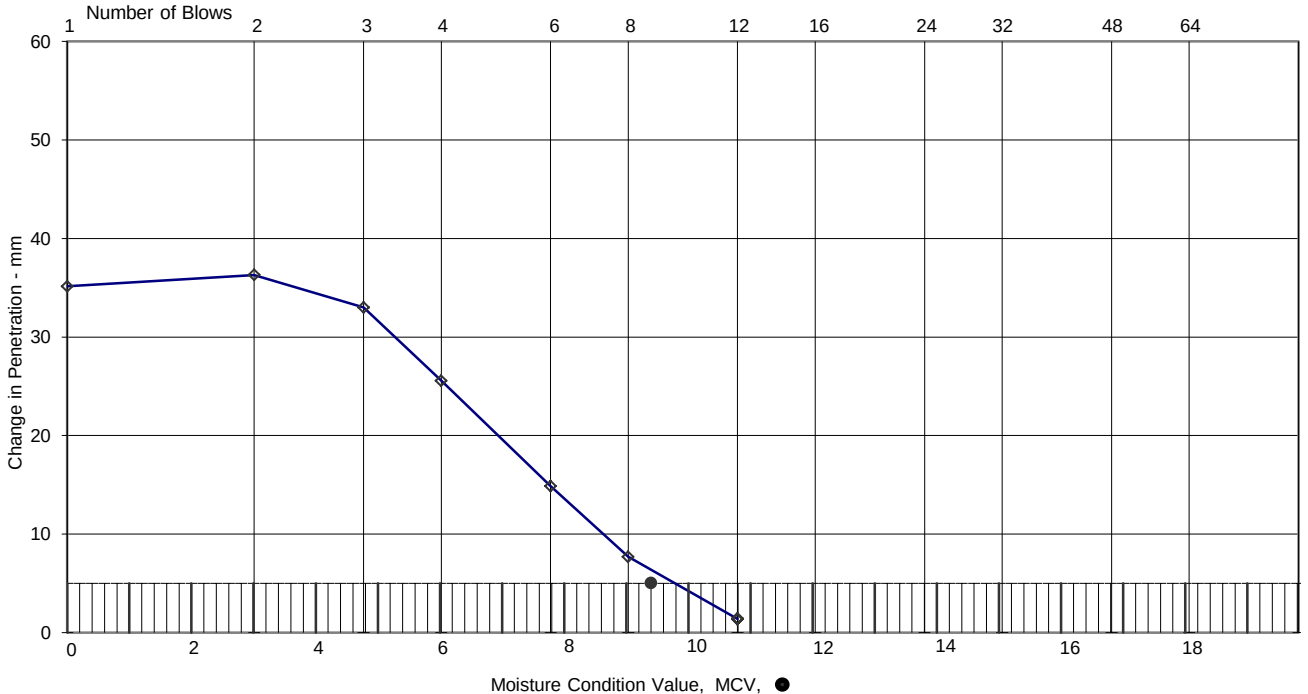
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	40	kPa
Bulk density	1.97	Mg/m3
Dry density	1.50	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**9.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191115080831

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.50 - 0.60
Sample Type and No	B4
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	117.7	37.9
2	99.2	42.6
3	90.6	39.3
4	79.9	28.6
6	66.7	16.1
8	56.6	6.4
12	51.3	2.1
16	51.2	
24	50.6	
32	50.2	
48	49.2	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

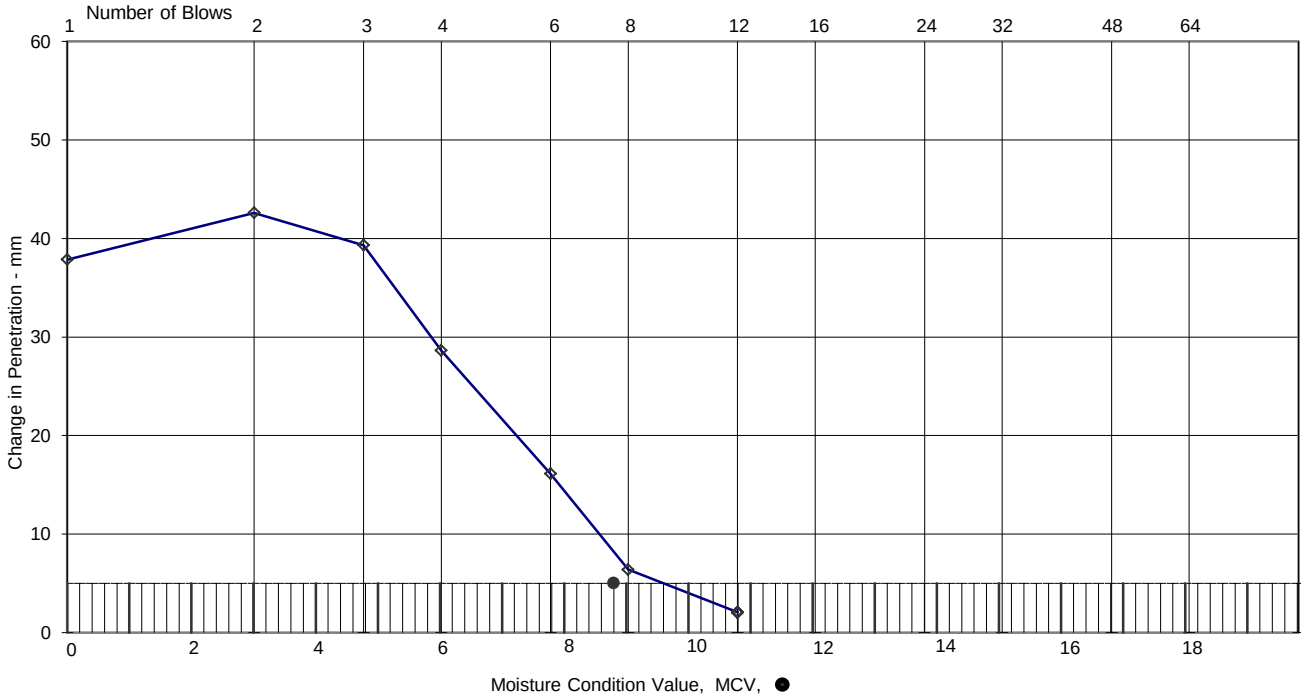
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	28	kPa
Bulk density	1.95	Mg/m3
Dry density	1.49	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**9.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191115080841

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	124.5	34.7
2	101.3	35.6
3	97.2	39.0
4	89.8	32.1
6	75.7	18.3
8	65.7	8.8
12	58.2	1.5
16	57.7	
24	57.4	
32	56.9	
48	56.7	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

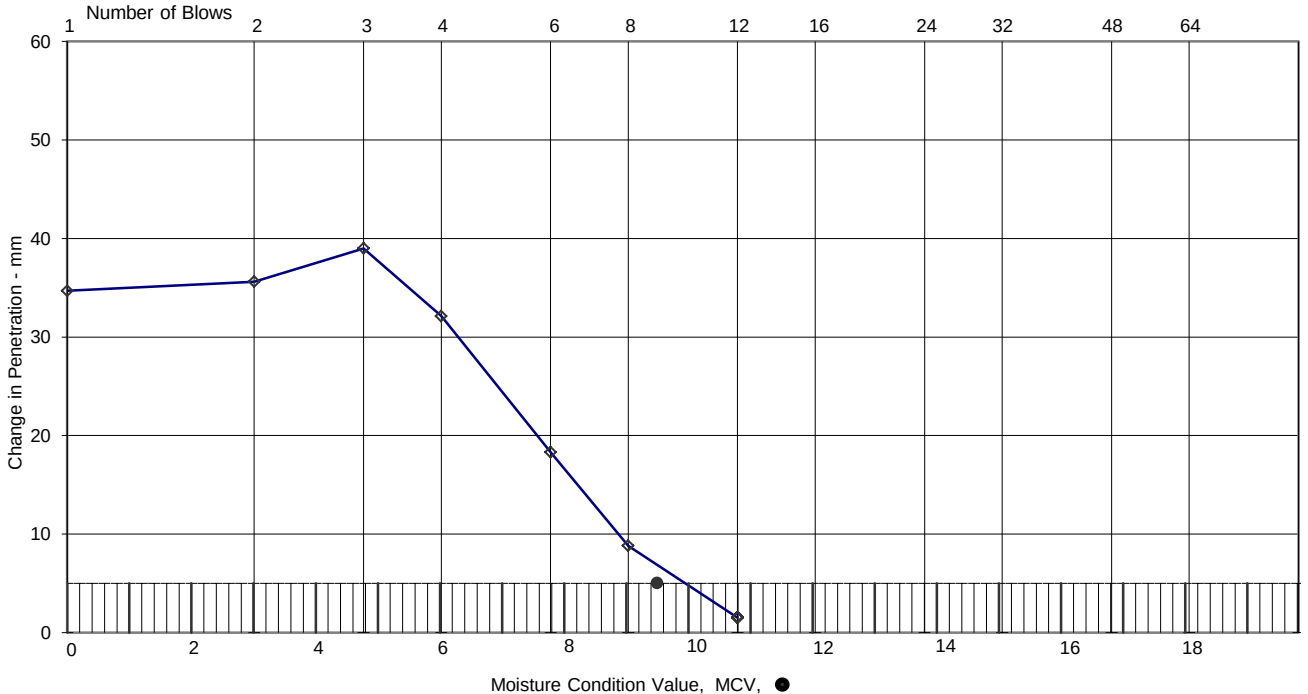
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	32	kPa
Bulk density	1.73	Mg/m3
Dry density	1.29	Mg/m3

Moisture Content	**34.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191115080910

Hole No	ATK-TP-03
Sample Depth (m BGL)	3.10 - 3.20
Sample Type and No	B13
Specimen Ref	

Soil Description	Dark grey slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	115.0	39.2
2	95.7	40.6
3	86.6	38.0
4	75.7	30.1
6	63.1	17.6
8	55.1	9.7
12	48.6	3.7
16	45.6	
24	45.6	
32	45.5	
48	44.9	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

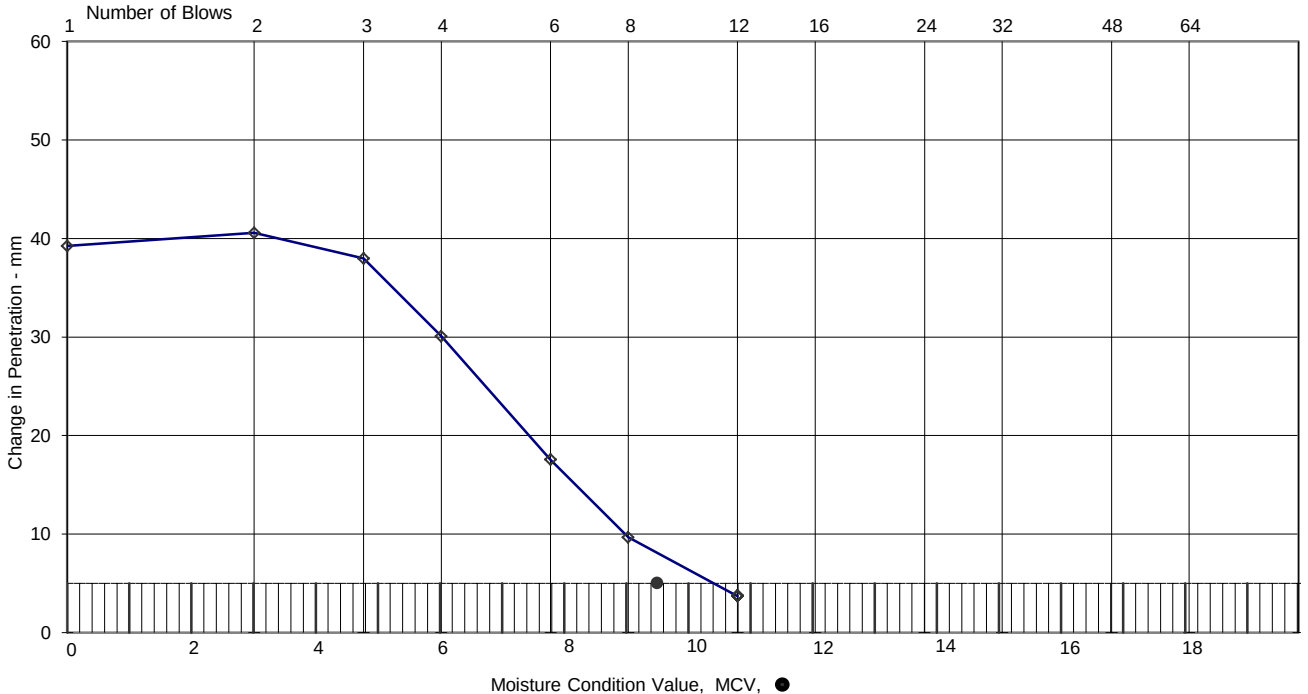
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured		kPa
Bulk density	1.99	Mg/m3
Dry density	1.55	Mg/m3

Moisture Content	**28.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191127041354

Hole No	ATK-TP-04
Sample Depth (m BGL)	0.30 - 0.40
Sample Type and No	B3
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	63.8	8.5
2	58.0	6.2
3	55.6	4.9
4	55.3	
6	52.5	
8	51.8	
12	50.7	
16		
24		
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

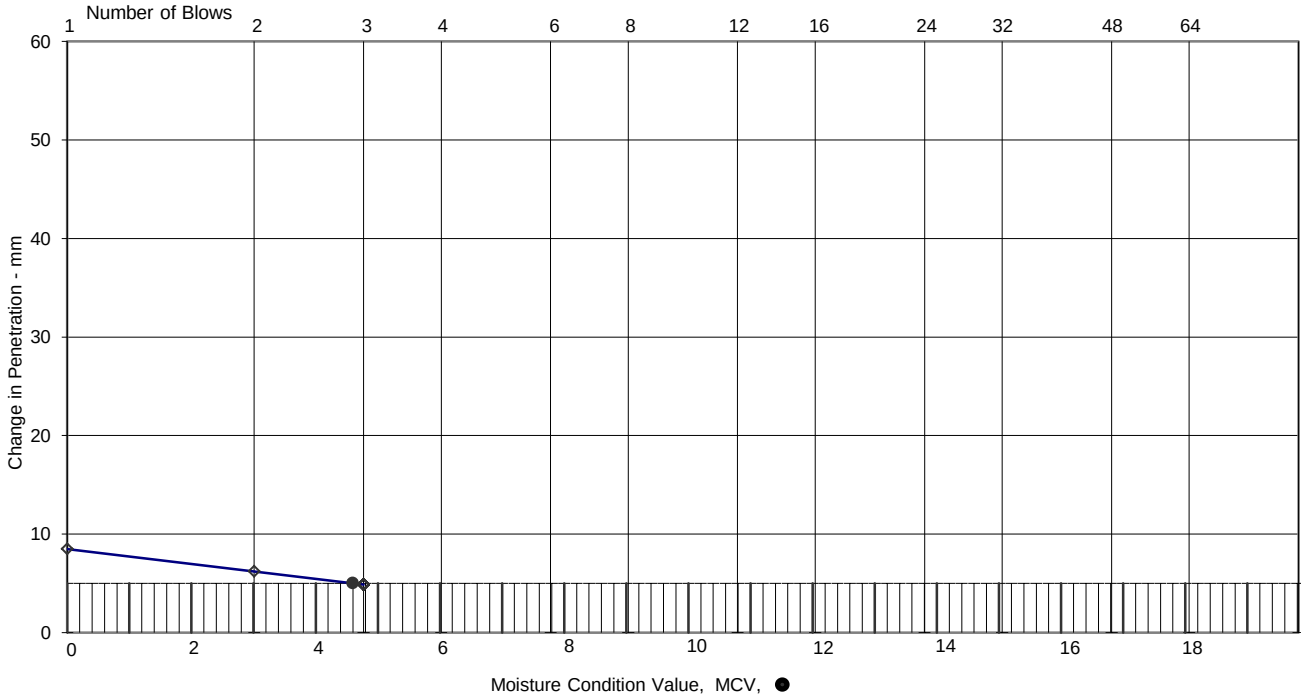
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	6	kPa
Bulk density	1.80	Mg/m3
Dry density	1.31	Mg/m3

Moisture Content	**38.0**	%
Moisture Condition Value, MCV	**5.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191127041439

Hole No	ATK-TP-04
Sample Depth (m BGL)	1.40 - 1.50
Sample Type and No	B8
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	117.8	32.9
2	102.6	32.6
3	92.1	37.6
4	84.9	33.8
6	73.4	22.8
8	70.0	19.8
12	54.5	4.4
16	51.1	
24	50.6	
32	50.2	
48	50.1	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

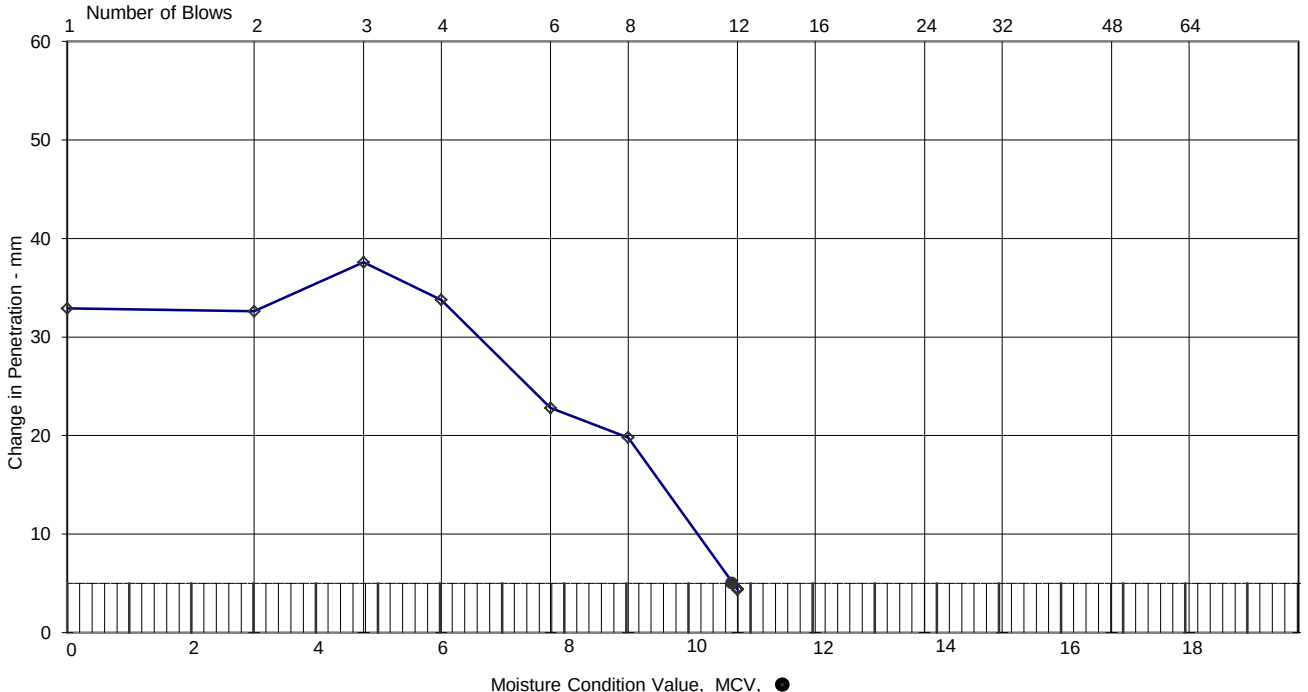
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	46	kPa
Bulk density	1.87	Mg/m3
Dry density	1.42	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191127041449

Hole No	ATK-TP-04
Sample Depth (m BGL)	1.80 - 2.00
Sample Type and No	B10
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	120.0	38.8
2	100.8	39.2
3	89.5	38.9
4	81.2	35.0
6	70.9	24.8
8	61.6	15.9
12	50.6	4.9
16	46.2	
24	46.1	
32	45.8	
48	45.7	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

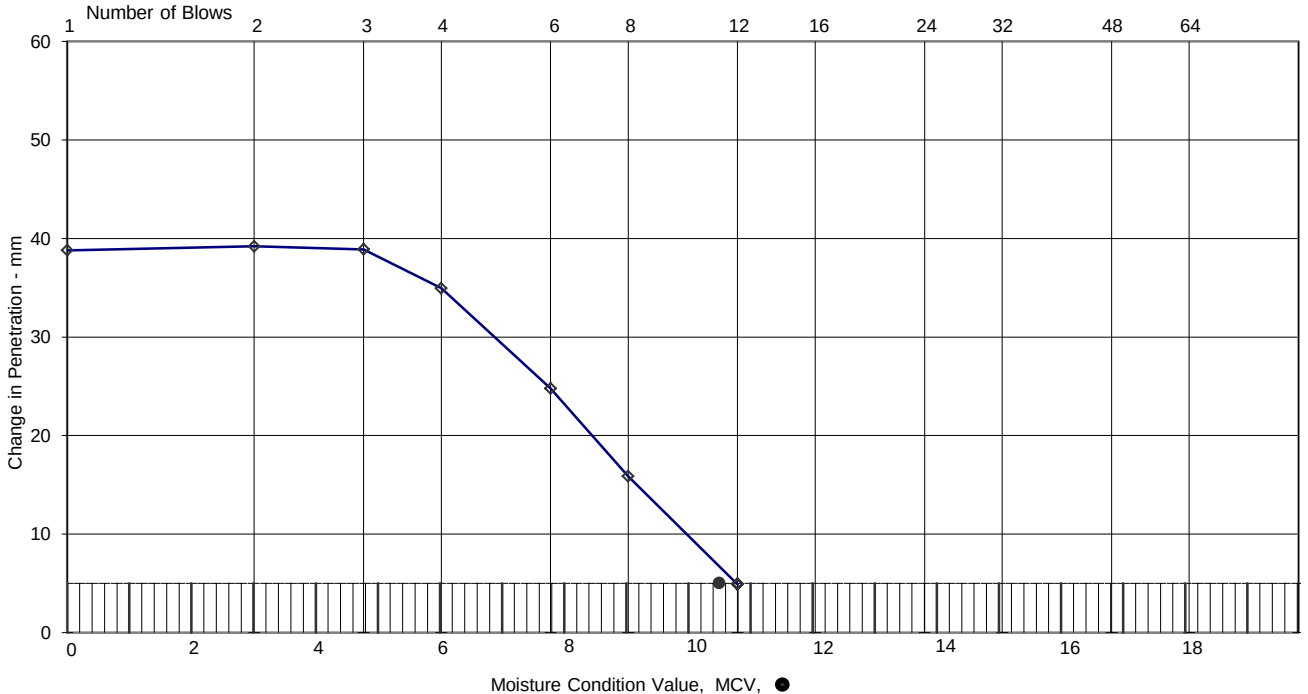
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	50	kPa
Bulk density	2.00	Mg/m3
Dry density	1.60	Mg/m3

Moisture Content	**25.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No	A9031-19
Project Name	HAVANT THICKET WATER STORAGE

Figure
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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191127041518

Hole No	ATK-TP-04
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B12
Specimen Ref	

Soil Description	Reddish brown mottled grey slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	112.8	31.9
2	97.8	35.7
3	87.4	36.5
4	80.9	35.3
6	70.0	25.2
8	62.1	17.7
12	50.9	6.7
16	45.6	1.6
24	44.8	
32	44.4	
48	44.3	
64	44.0	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

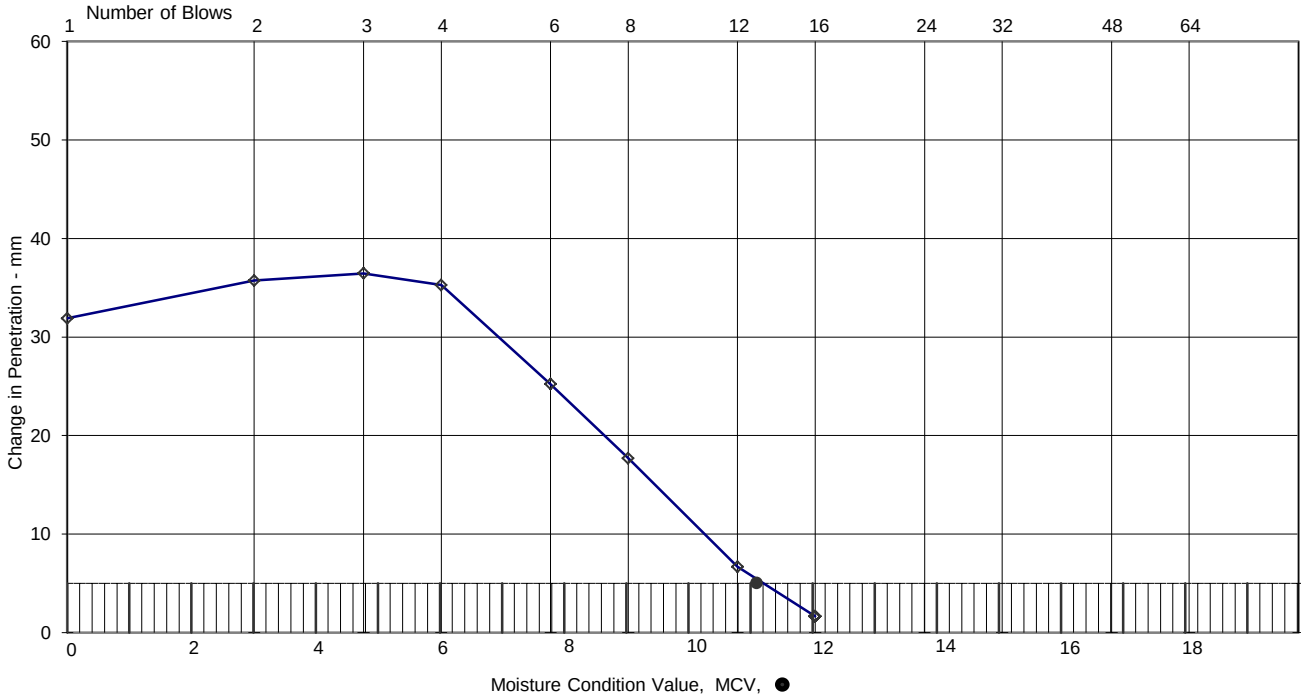
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	60	kPa
Bulk density	2.07	Mg/m3
Dry density	1.65	Mg/m3

Moisture Content	**25.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191211040013

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.30 - 0.80
Sample Type and No	B4
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	96.3	21.7
2	84.3	10.8
3	77.4	4.3
4	74.7	
6	73.9	
8	73.5	
12	73.1	
16		
24		
32		
48		
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

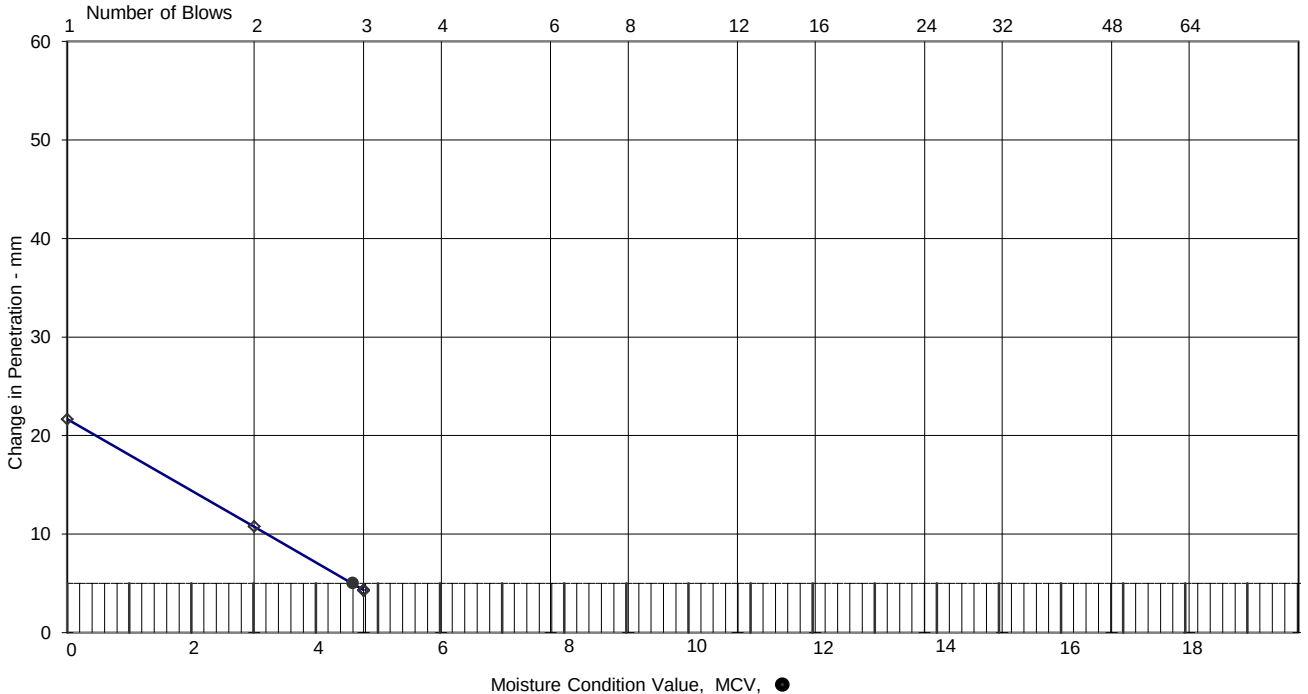
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	22	kPa
Bulk density	1.58	Mg/m3
Dry density	1.17	Mg/m3

Moisture Content	**35.0**	%
Moisture Condition Value, MCV	**5.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191211040049

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.90 - 1.20
Sample Type and No	B8
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	125.8	30.7
2	112.5	41.6
3	103.6	47.3
4	95.0	42.5
6	81.7	29.6
8	70.9	19.0
12	56.2	4.7
16	52.5	
24	52.1	
32	51.8	
48	51.5	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

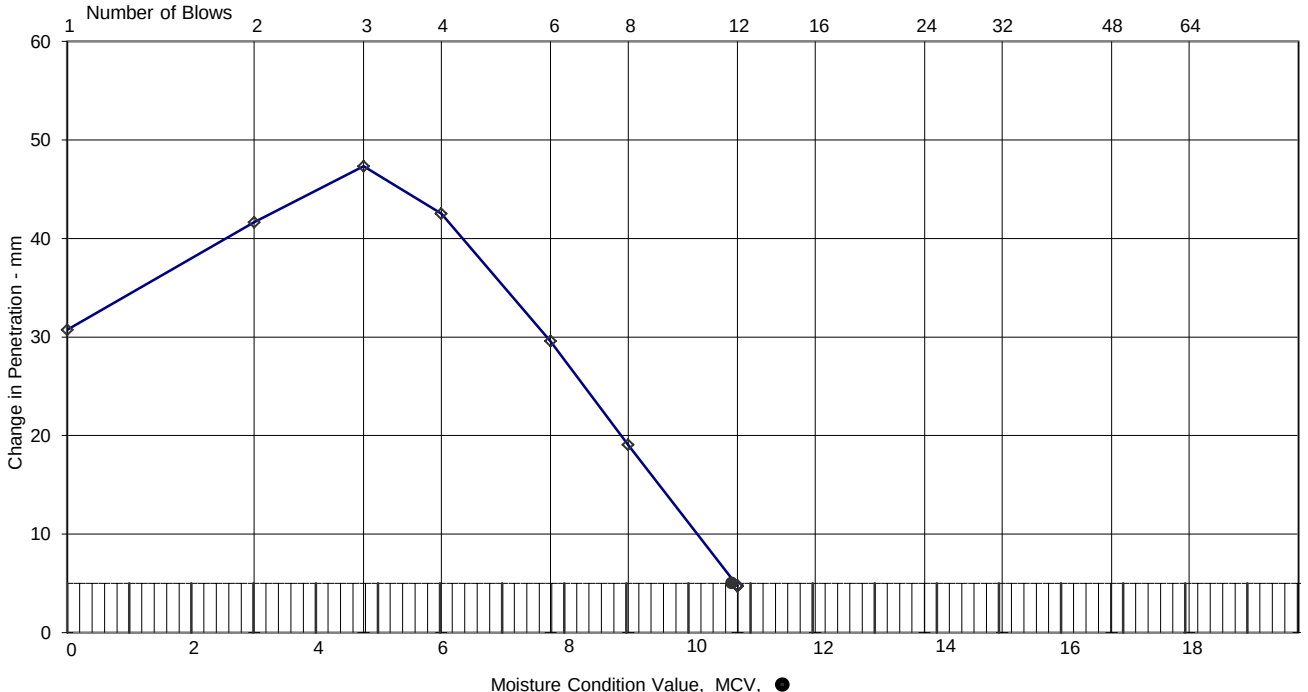
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	48	kPa
Bulk density	1.85	Mg/m3
Dry density	1.37	Mg/m3

Moisture Content	**35.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191211040141

Hole No	ATK-TP-06
Sample Depth (m BGL)	2.00 - 2.40
Sample Type and No	B11
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	135.7	21.5
2	126.4	19.8
3	120.8	20.4
4	114.2	18.0
6	110.7	15.9
8	106.6	13.9
12	100.4	10.0
16	96.2	6.0
24	94.8	4.7
32	92.7	
48	90.4	
64	90.2	
96	90.1	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

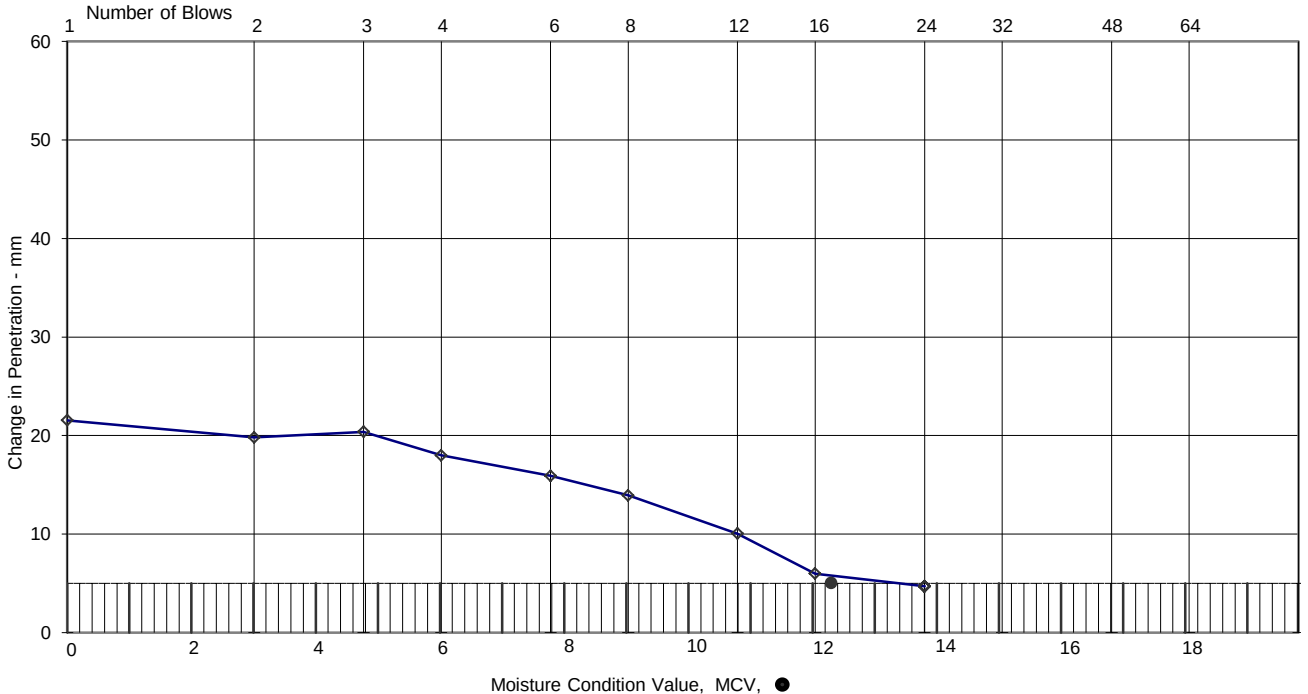
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	32	kPa
Bulk density	1.39	Mg/m3
Dry density	1.06	Mg/m3

Moisture Content	**32.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191211040158

Hole No	ATK-TP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B13
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	121.4	30.7
2	106.8	30.7
3	97.4	28.1
4	90.7	23.5
6	82.0	15.2
8	76.1	10.7
12	69.3	4.5
16	67.2	
24	66.8	
32	65.4	
48	64.8	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

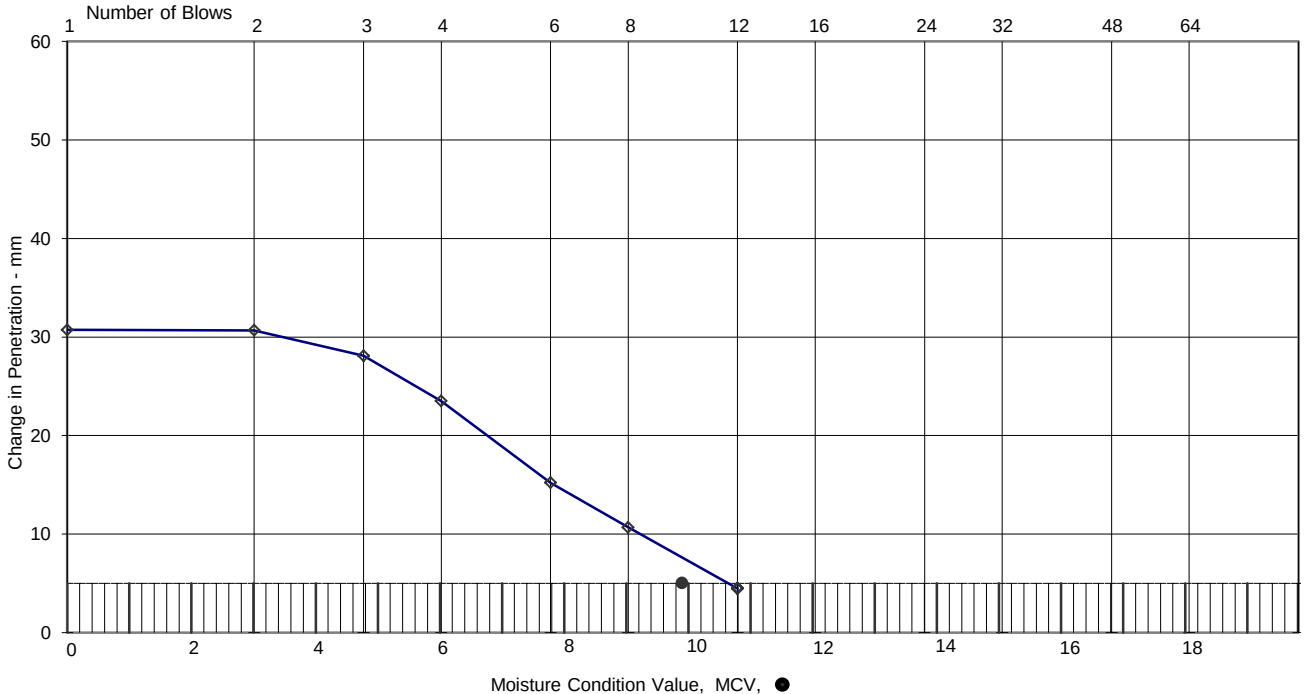
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	78	kPa
Bulk density	1.68	Mg/m3
Dry density	1.33	Mg/m3

Moisture Content	**27.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191204104300

Hole No	ATK-TPM-03
Sample Depth (m BGL)	0.40 - 0.50
Sample Type and No	B3A
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	117.9	33.3
2	103.7	39.6
3	92.8	37.9
4	84.6	32.4
6	71.2	19.4
8	64.1	12.3
12	54.9	3.1
16	52.2	
24	51.8	
32	51.8	
48	51.8	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

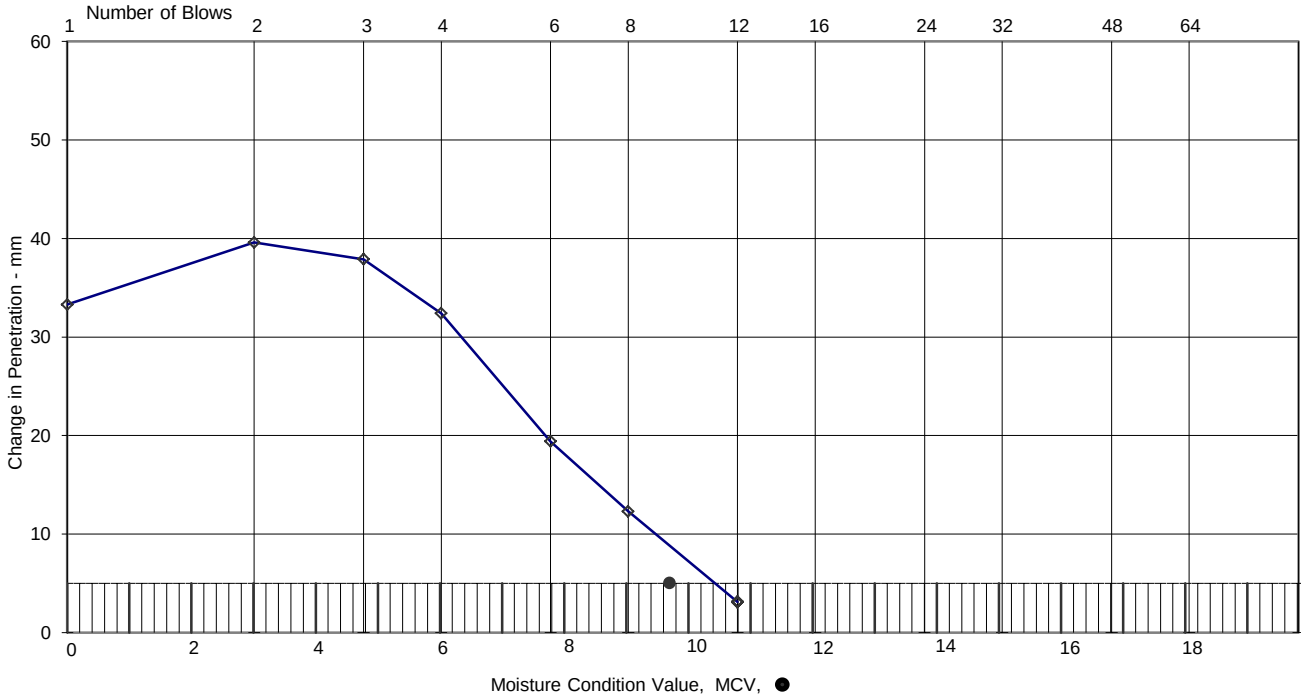
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	32	kPa
Bulk density	1.85	Mg/m3
Dry density	1.39	Mg/m3

Moisture Content	**33.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCV

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191204110904

Hole No	ATK-TPM-03
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B6
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	114.3	24.5
2	96.2	15.5
3	92.4	18.3
4	89.8	19.4
6	84.2	15.8
8	80.7	14.3
12	74.2	9.9
16	70.3	6.2
24	68.4	4.4
32	66.4	
48	64.3	
64	64.1	
96	64.0	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

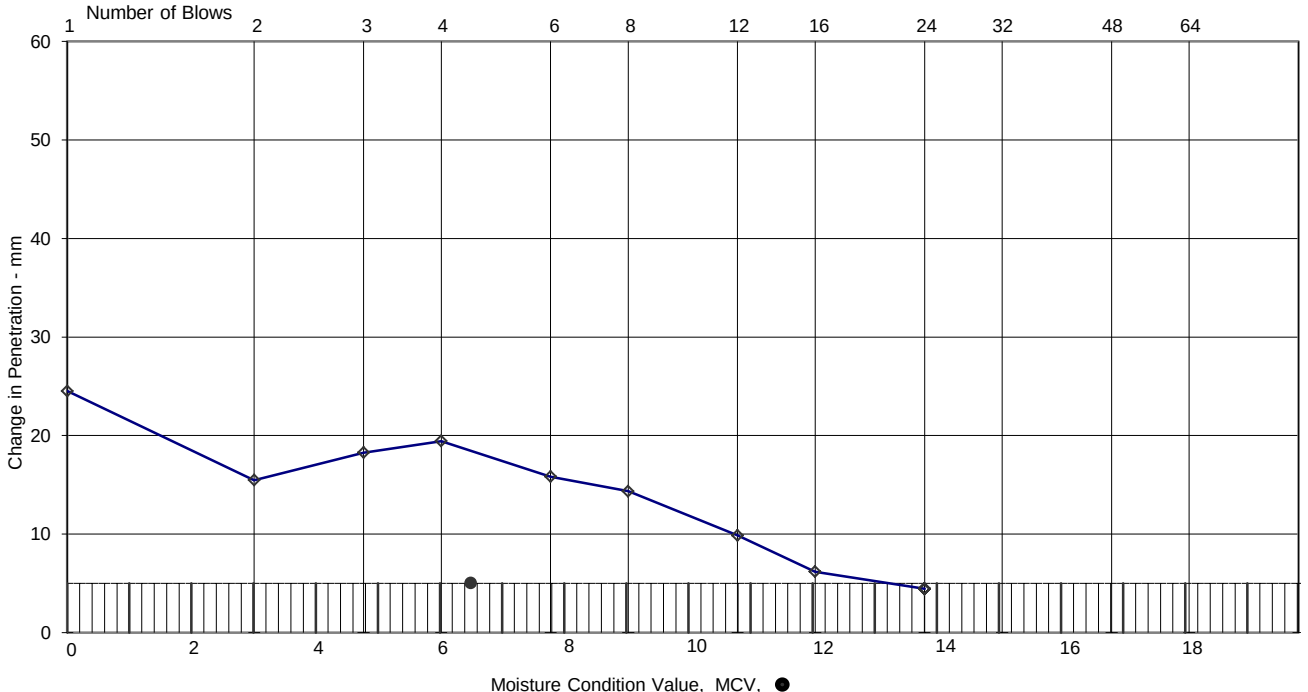
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	72	kPa
Bulk density	1.72	Mg/m3
Dry density	1.37	Mg/m3

Moisture Content	**25.0**	%
Moisture Condition Value, MCV	**7.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-1920191204111005

Hole No	ATK-TPM-03
Sample Depth (m BGL)	3.60 - 3.70
Sample Type and No	B12
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	141.0	28.0
2	129.3	31.5
3	120.2	36.8
4	113.0	37.2
6	103.9	32.3
8	97.8	26.9
12	83.4	13.9
16	75.8	7.2
24	71.6	4.6
32	70.9	
48	69.5	
64	68.6	
96	67.0	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

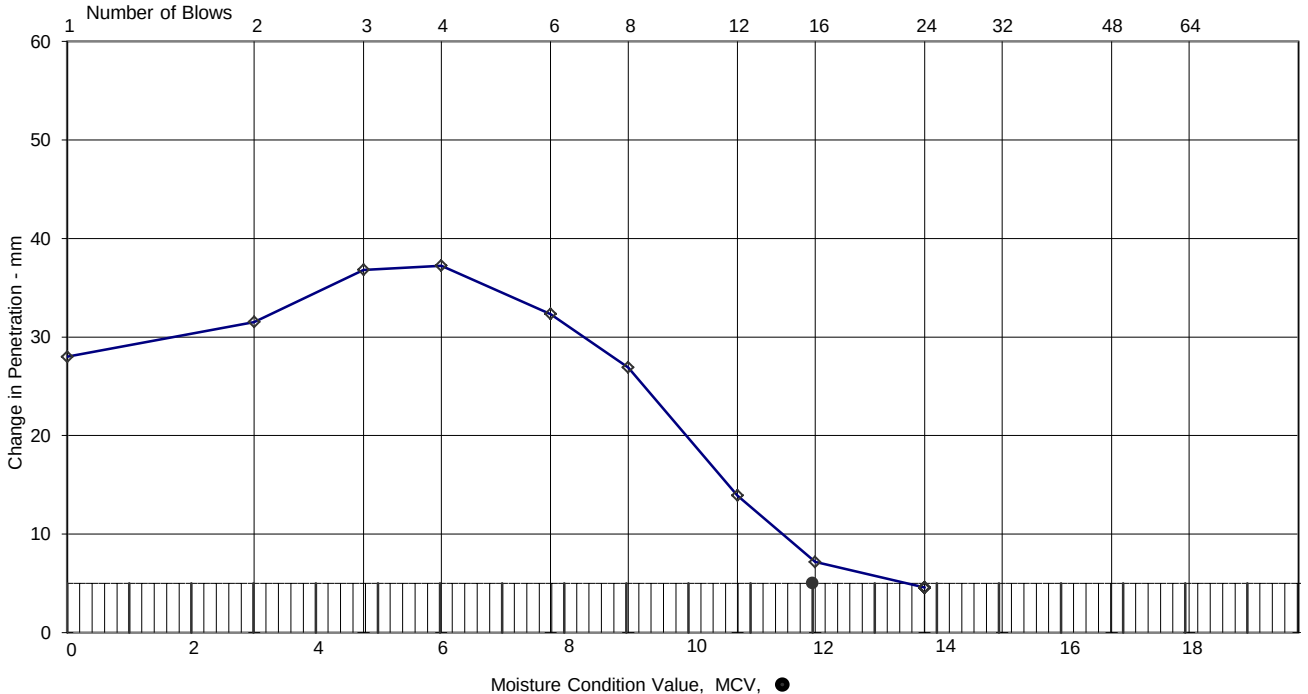
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	100	kPa
Bulk density	1.65	Mg/m3
Dry density	1.23	Mg/m3

Moisture Content	**34.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191120031821

Hole No	ATK-TPM-05
Sample Depth (m BGL)	0.70 - 1.00
Sample Type and No	B4
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	116.0	28.6
2	109.0	43.6
3	94.5	36.6
4	87.4	30.0
6	76.7	20.0
8	65.4	8.8
12	57.9	2.3
16	57.4	
24	56.7	
32	56.6	
48	55.6	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

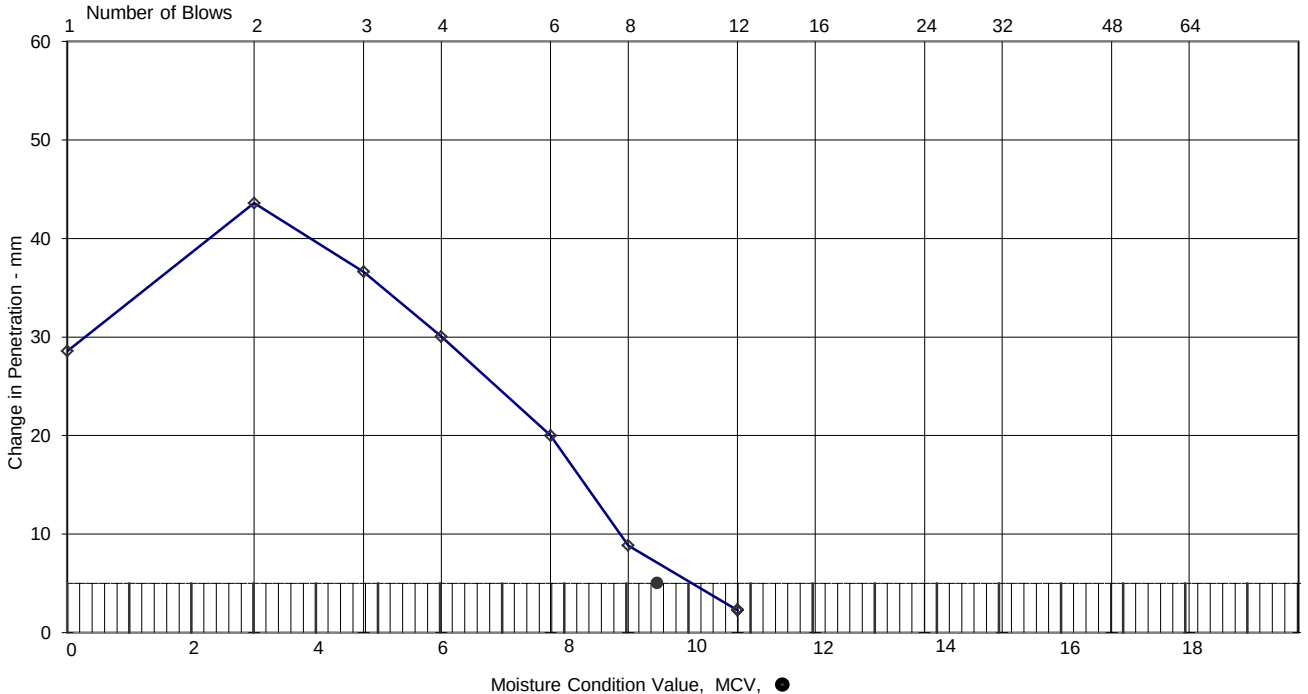
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured		kPa
Bulk density	1.80	Mg/m3
Dry density	1.26	Mg/m3

Moisture Content	**43.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



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SLR 4, 5.4
Rev 2.7
Feb 17

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Project Name HAVANT THICKET WATER STORAGE

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191120032002

Hole No	ATK-TPM-05
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B8
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	128.8	30.4
2	113.7	32.8
3	104.5	30.9
4	98.4	27.9
6	88.6	18.3
8	80.9	10.6
12	73.6	3.8
16	70.5	
24	70.3	
32	70.3	
48	69.8	
64		
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

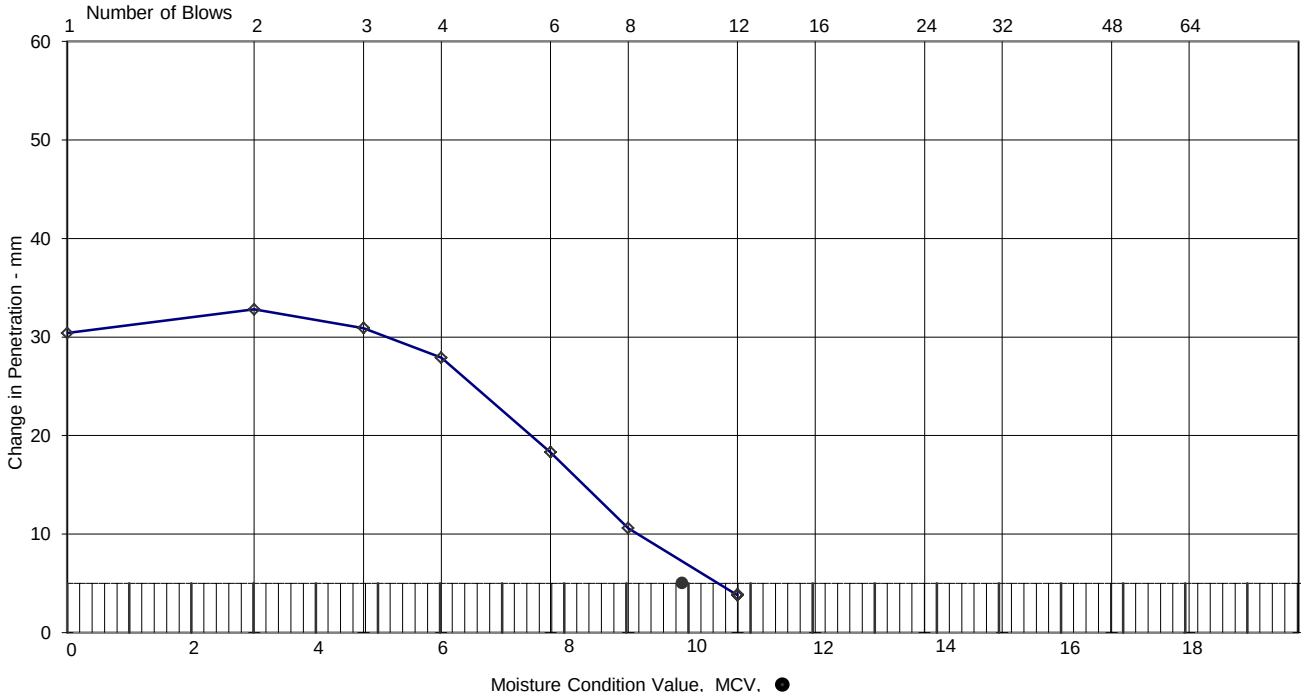
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	58	kPa
Bulk density	1.57	Mg/m3
Dry density	1.20	Mg/m3

Moisture Content	**31.0**	%
Moisture Condition Value, MCV	**10.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191120032311

Hole No	ATK-TPM-05
Sample Depth (m BGL)	2.90 - 3.00
Sample Type and No	B12
Specimen Ref	

Soil Description	Brown slightly sandy slightly gravelly CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	118.8	27.8
2	112.8	38.2
3	100.5	36.6
4	91.0	33.0
6	79.2	27.1
8	74.6	23.7
12	63.8	13.6
16	58.0	8.2
24	52.1	3.2
32	50.8	
48	50.3	
64	49.8	
96	48.9	
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

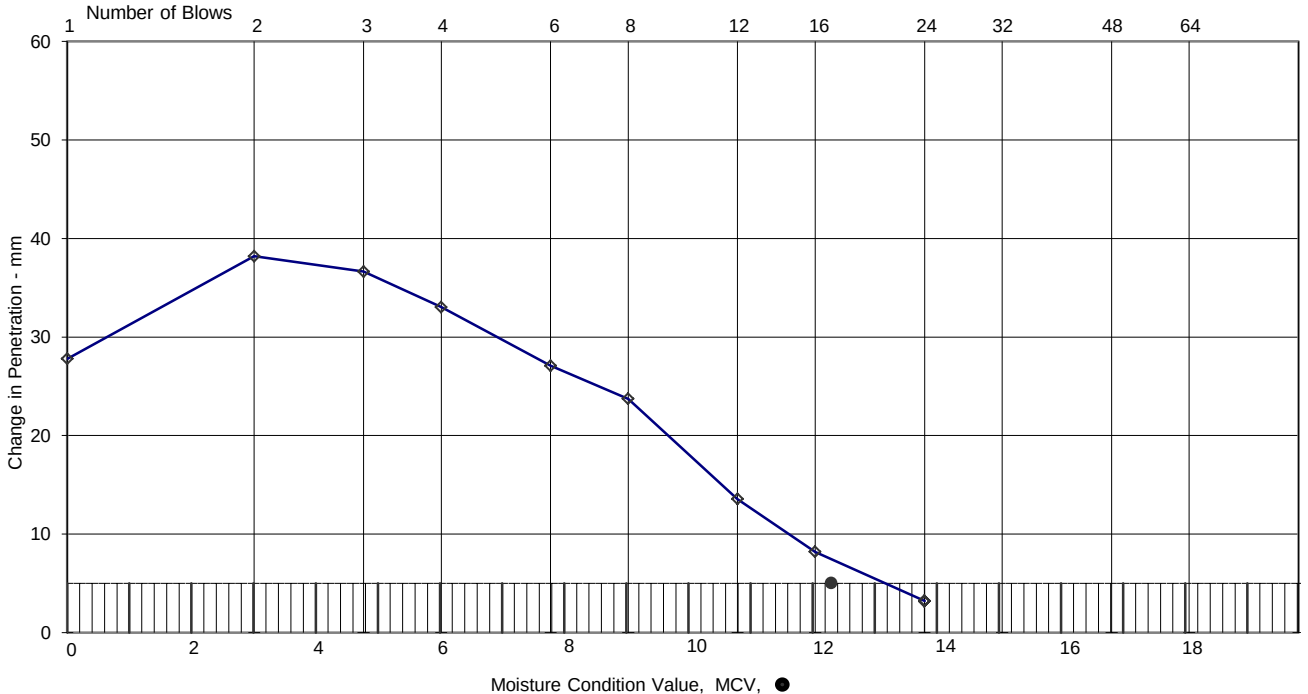
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	56	kPa
Bulk density	1.92	Mg/m3
Dry density	1.44	Mg/m3

Moisture Content	**33.0**	%
Moisture Condition Value, MCV	**12.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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MOISTURE CONDITION VALUE (MCV) TEST

Sample Details:	SAMPLE ID:
	A9031-19-20191120032444

Hole No	ATK-TPM-05
Sample Depth (m BGL)	4.40 - 4.50
Sample Type and No	B17
Specimen Ref	

Soil Description	Brown slightly sandy CLAY.
Preparation procedure and Remarks	BS1377:Part 1 and Part 4, clause 5.4 at natural moisture content

Test Data

Blows n	Penetration/ protrusion mm	Change in Penetration n to 4n mm
1	100.5	28.1
2	86.7	27.0
3	77.9	24.6
4	72.4	23.2
6	65.6	20.0
8	59.7	14.7
12	53.3	8.8
16	49.3	5.0
24	45.7	
32	45.0	
48	44.5	
64	44.3	
96		
128		
192		
256		

Equipment

Mould diameter	100	mm
Height of drop	250	mm
Mass of rammer	7	kg

Sample data

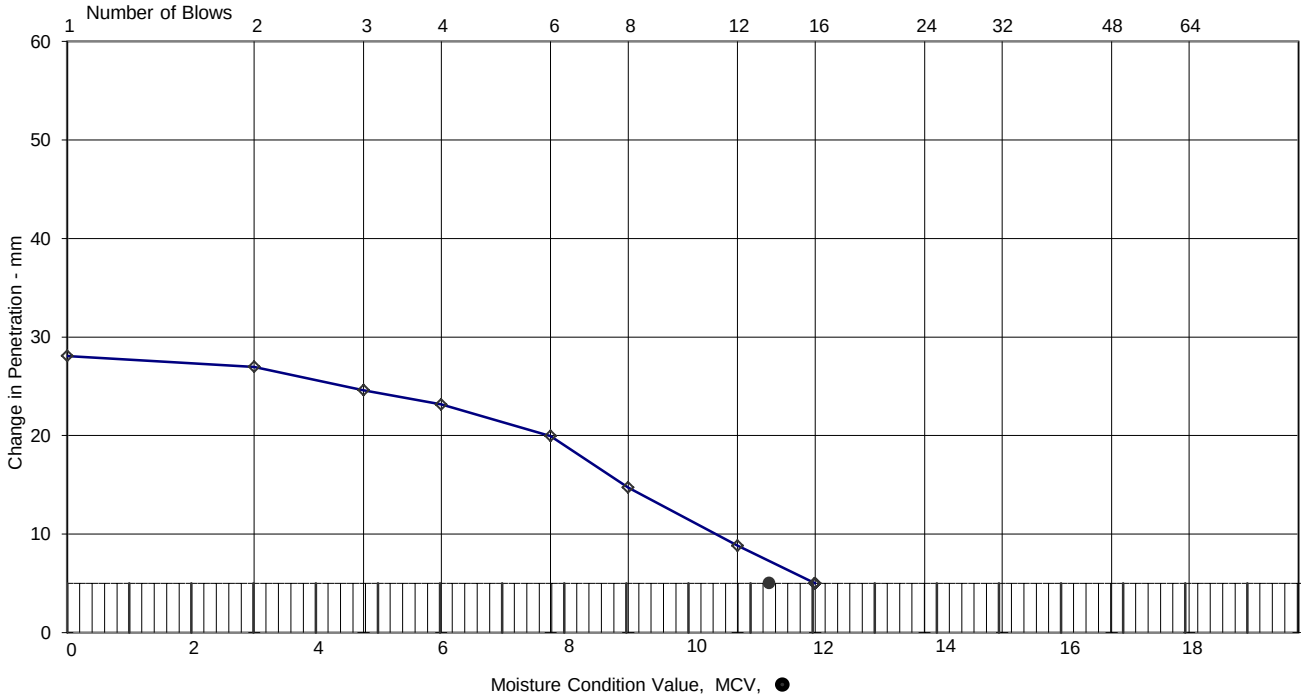
Retained on 20mm sieve, removed	0	%
Mass of specimen used in test	1500	g

Specimen after test

Vane shear strength, if measured	85	kPa
Bulk density	2.06	Mg/m3
Dry density	1.66	Mg/m3

Moisture Content	**24.0**	%
Moisture Condition Value, MCV	**11.0**	

Method of interpretation Steepest straight line



QA Ref
SLR 4, 5.4
Rev 2.7
Feb 17

UKAS TESTING
0001

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Project No A9031-19

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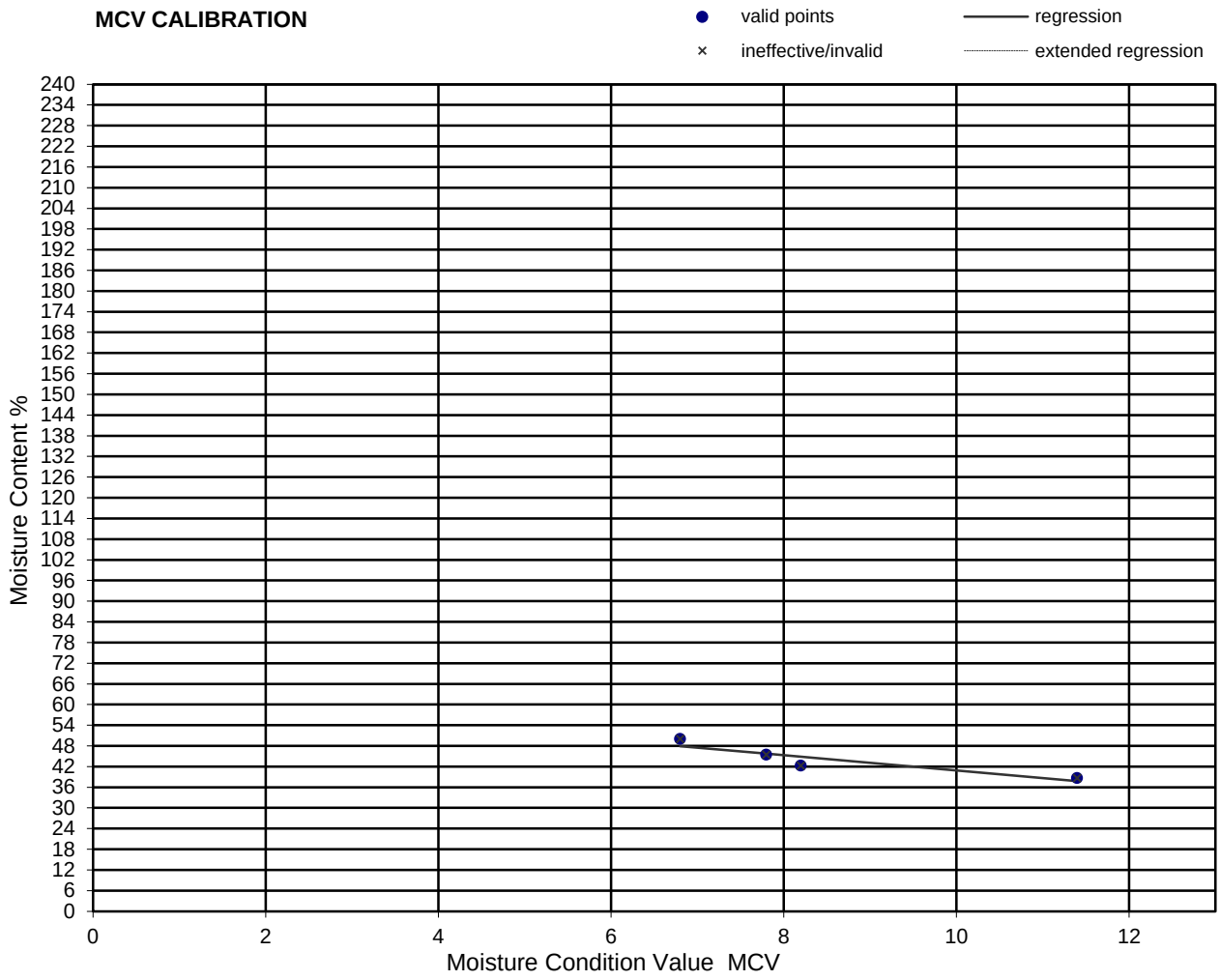
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191121112036

Hole No	ATK-CP-05
Sample Depth (m BGL)	0.80 - 1.20
Sample Type and No	B6
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	63.0
Slope	-2.22
Sensitivity (Change in MCV per 1% moisture content)	0.45
Correlation (proximity of test points to regression line)	-0.91
Method of interpretation of MCV	Steepest straight line

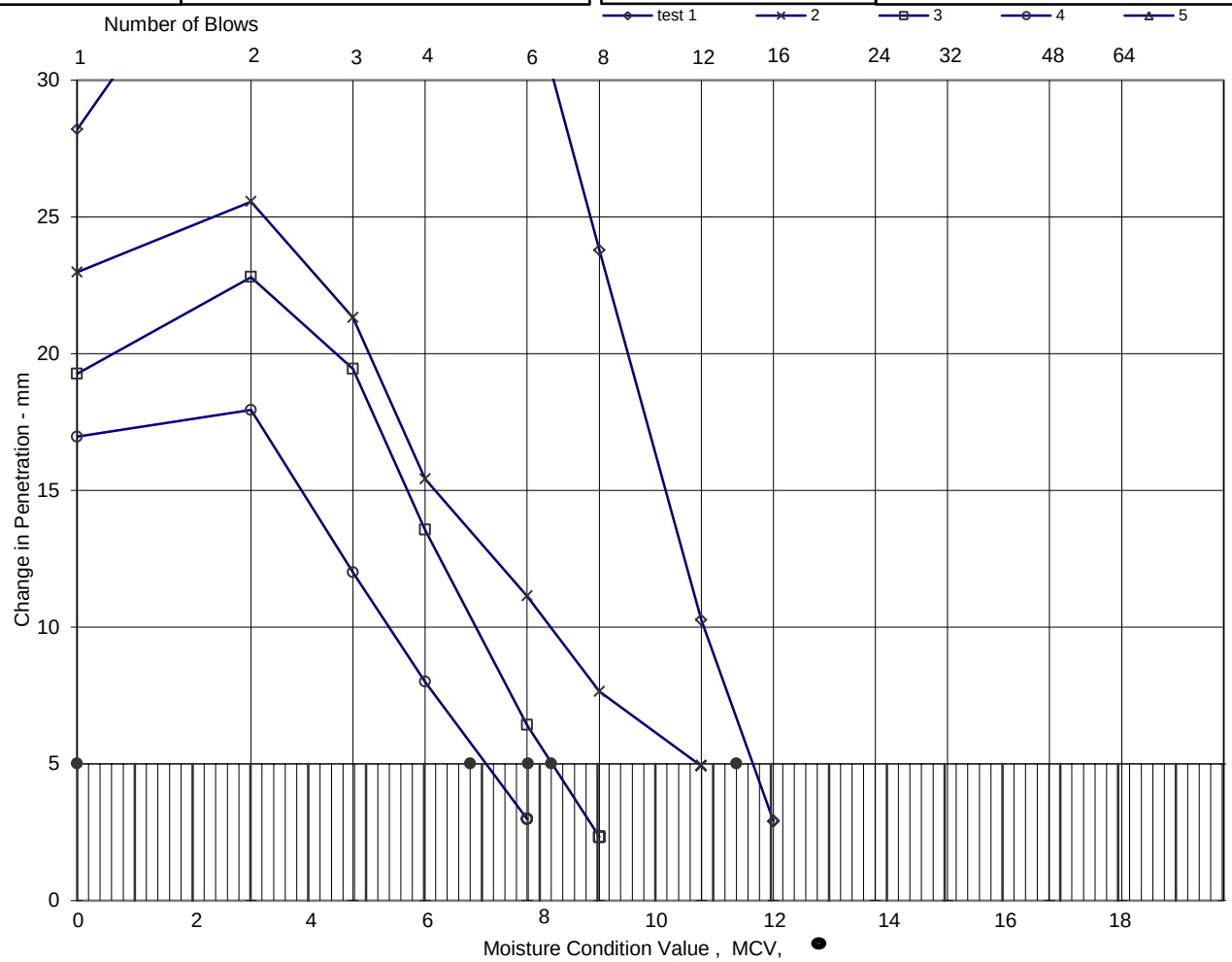
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191121112036

Hole No	ATK-CP-05
Sample Depth (m BGL)	0.80 - 1.20
Sample Type and No	B6
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.4	8.2	7.8	6.8	
Moisture Content	%	39.0	42.0	45.0	50.0	
Bulk density after test	Mg/m³	1.56	1.25	1.24	1.28	
Dry density after test	Mg/m³	1.13	0.88	0.85	0.85	
Vane shear strength	kPa	80	72	60	44	

Soil description	Brown slightly sandy slightly gravelly CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	38.6
Material retained on 20mm sieve	%	0

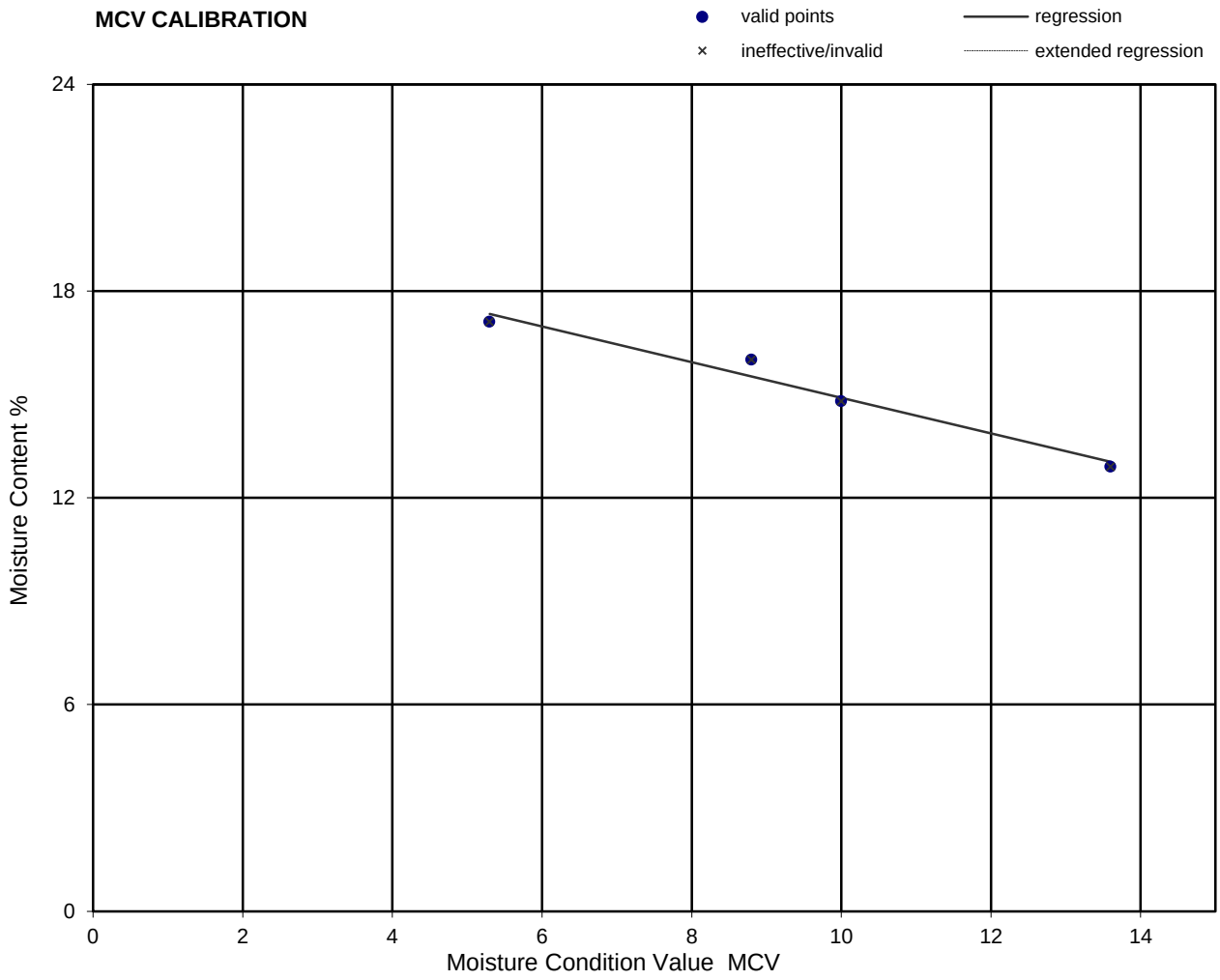
Method of determining MCV
Steepest straight line

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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191205122237

Hole No	ATK-CP-06
Sample Depth (m BGL)	1
Sample Type and No	B7
Specimen Ref	



Characteristics of calibration line (determined using linear regression)	
Intercept	20.1
Slope	-0.52
Sensitivity (Change in MCV per 1% moisture content)	1.94
Correlation (proximity of test points to regression line)	-0.98
Method of interpretation of MCV	Steepest straight line

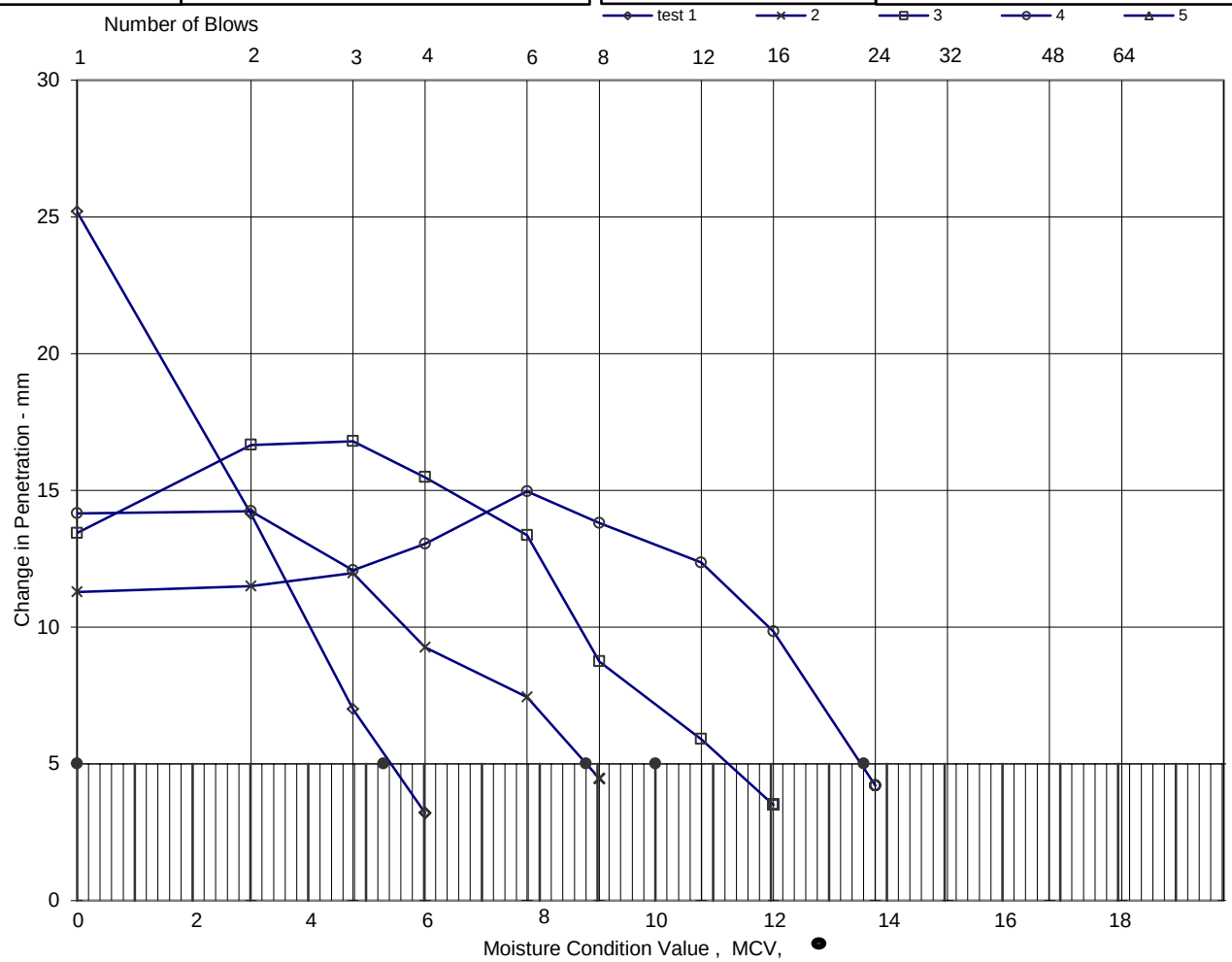
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191205122237

Hole No	ATK-CP-06
Sample Depth (m BGL)	1
Sample Type and No	B7
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		5.3	8.8	10.0	13.6	
Moisture Content	%	17.0	16.0	15.0	13.0	
Bulk density after test	Mg/m³	1.71	1.65	1.72	1.78	
Dry density after test	Mg/m³	1.46	1.42	1.50	1.58	
Vane shear strength	kPa	60	72	80	94	

Soil description	Light brown slightly sandy gravelly CLAY with two cobbles.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	17
Material retained on 20mm sieve	%	33

Method of determining MCV
Steepest straight line

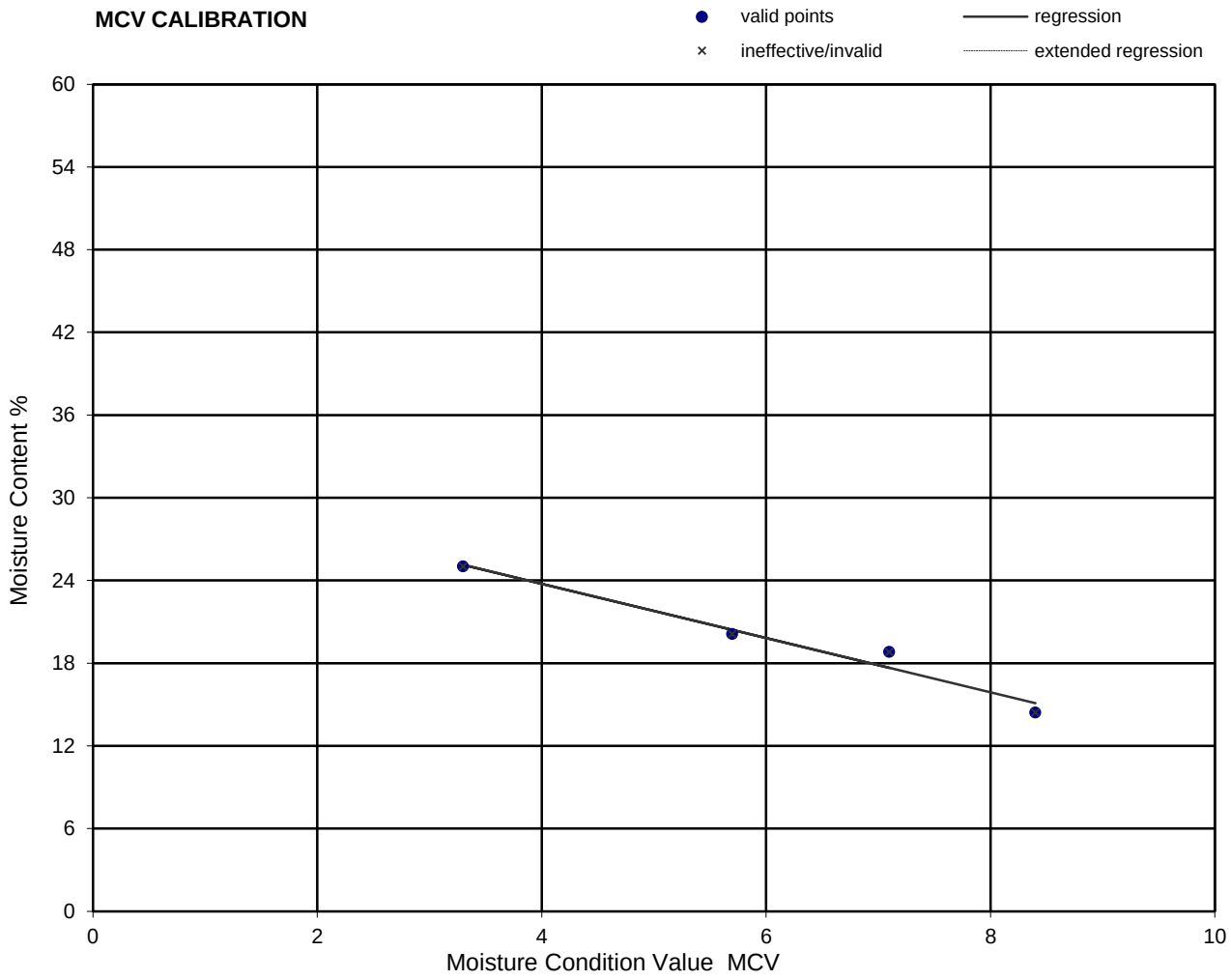
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191209025616

Hole No	ATK-CP-07A
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B11
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	31.6
Slope	-1.97
Sensitivity (Change in MCV per 1% moisture content)	0.51
Correlation (proximity of test points to regression line)	-0.98
Method of interpretation of MCV	Steepest straight line

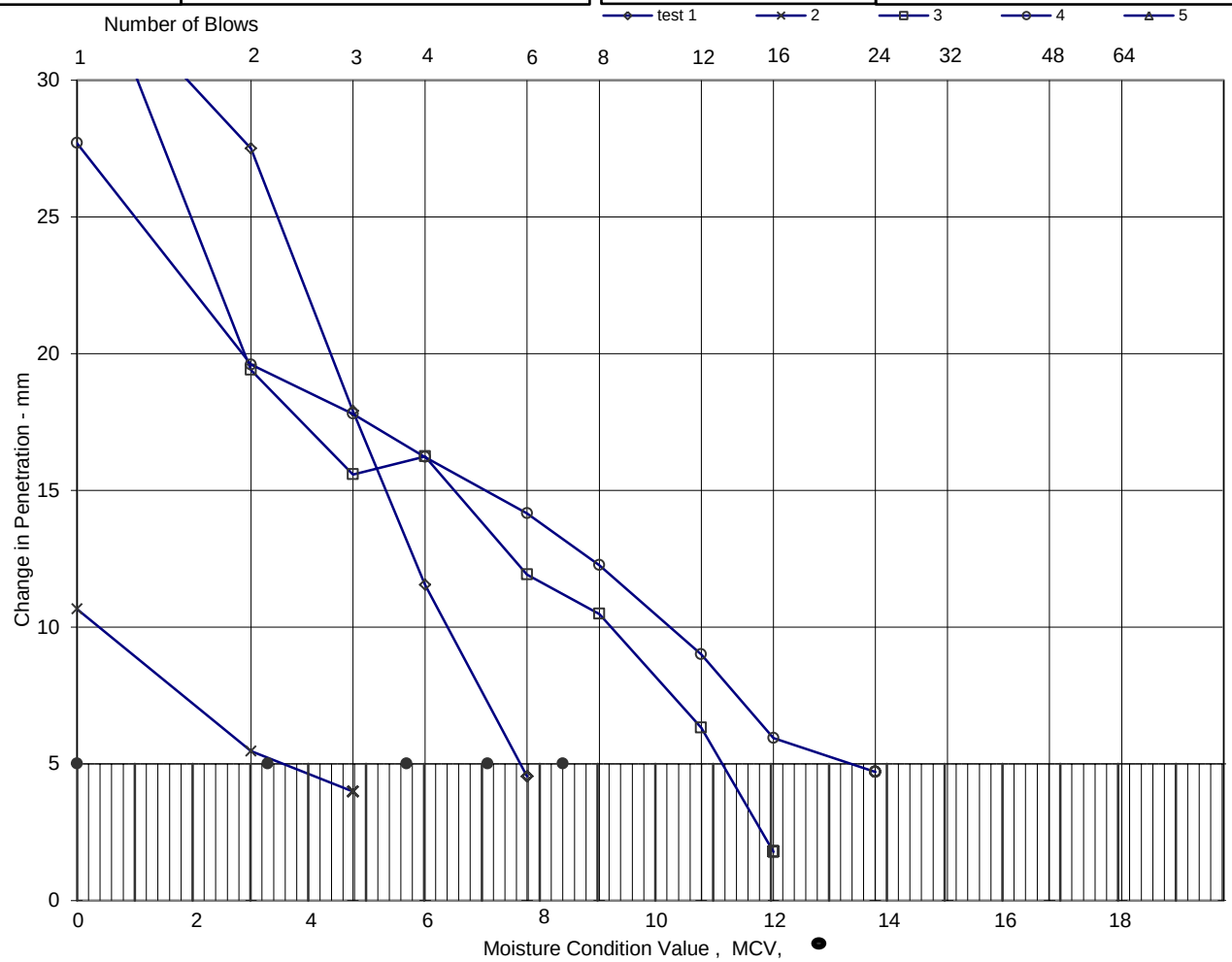
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191209025616

Hole No	ATK-CP-07A
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B11
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		7.1	3.3	5.7	8.4	
Moisture Content	%	19.0	25.0	20.0	14.0	
Bulk density after test	Mg/m³	2.20	1.66	2.15	1.89	
Dry density after test	Mg/m³	1.85	1.33	1.79	1.65	
Vane shear strength	kPa	18	24	32	46	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	21.4
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

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0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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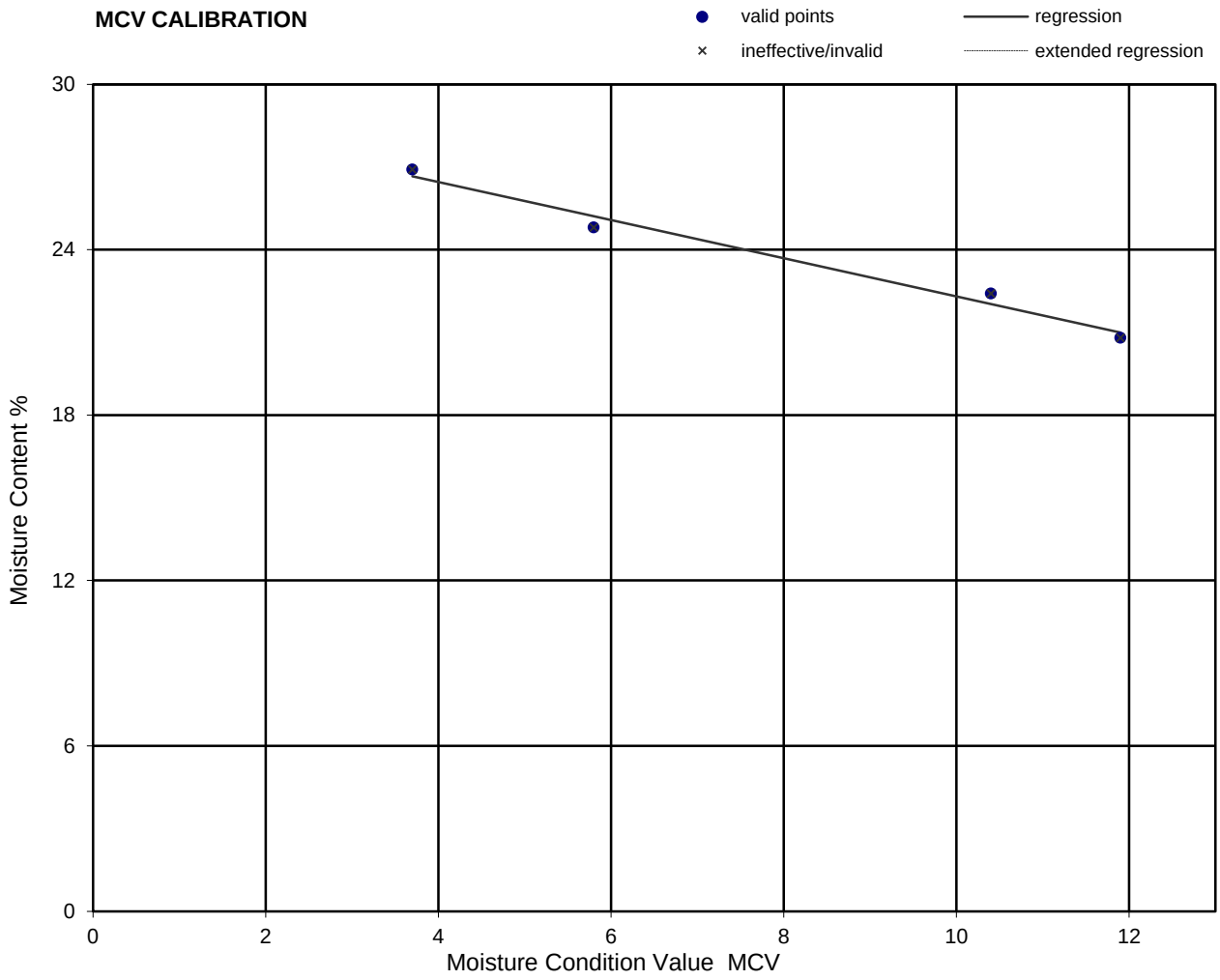
Printed:28/02/2020 08:55

MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191209030447

Hole No	ATK-CP-07A
Sample Depth (m BGL)	9.50 - 10.00
Sample Type and No	B33
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	29.2
Slope	-0.69
Sensitivity (Change in MCV per 1% moisture content)	1.45
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

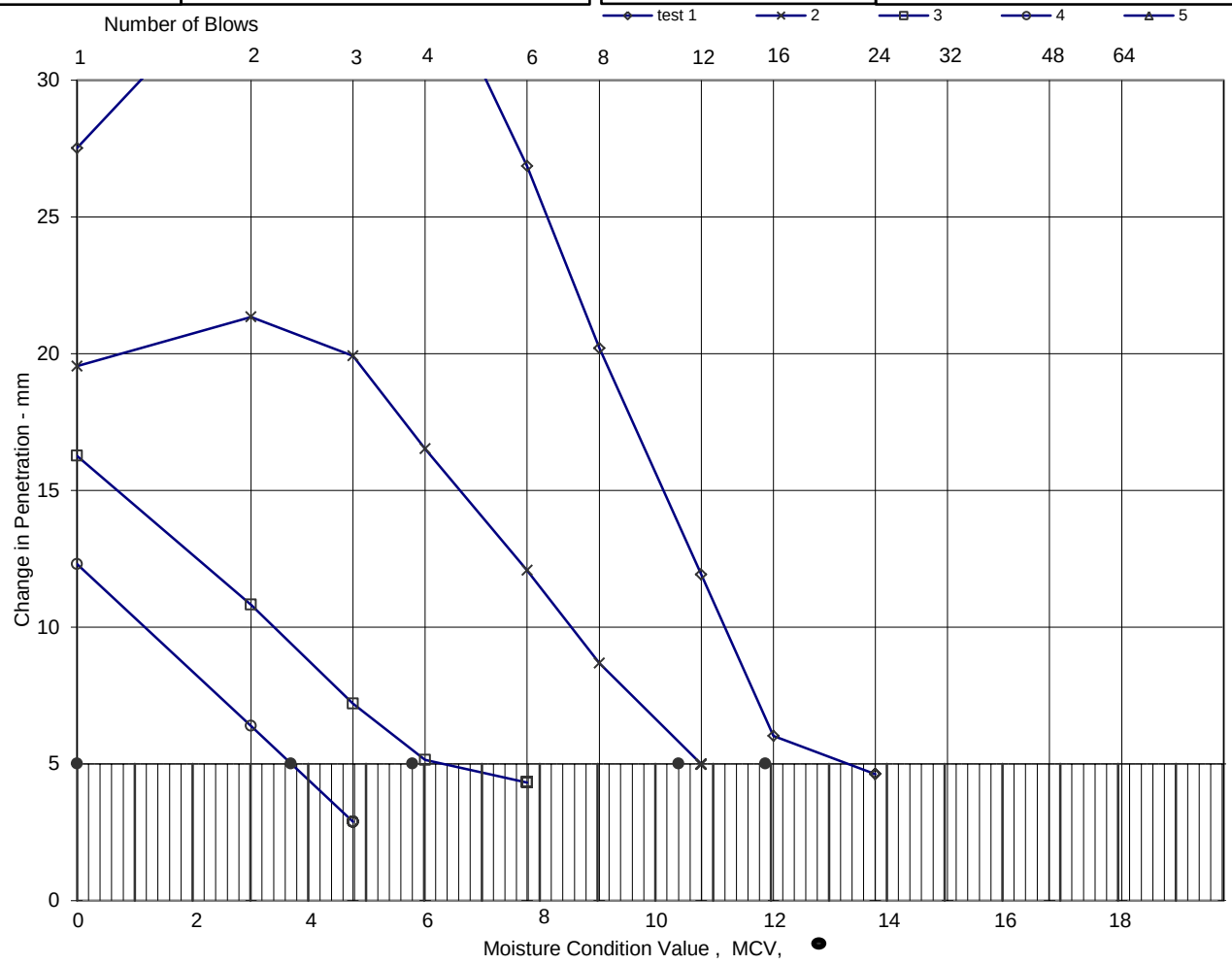
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191209030447

Hole No	ATK-CP-07A
Sample Depth (m BGL)	9.50 - 10.00
Sample Type and No	B33
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.9	10.4	5.8	3.7	
Moisture Content	%	21.0	22.0	25.0	27.0	
Bulk density after test	Mg/m³	1.78	1.46	1.35	1.31	
Dry density after test	Mg/m³	1.47	1.19	1.08	1.03	
Vane shear strength	kPa	86	80	70	62	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	20.8
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCVREL

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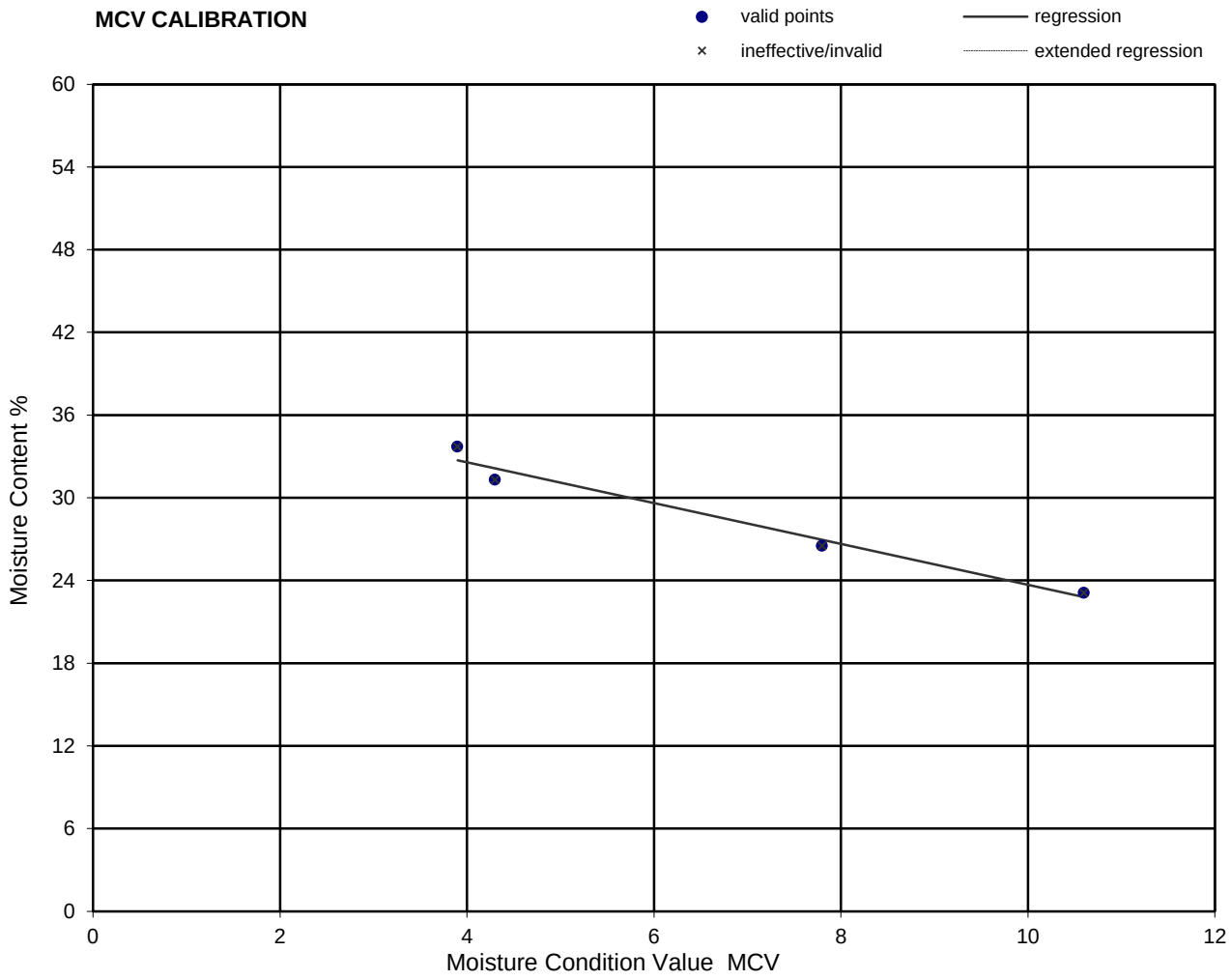
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191126042202

Hole No	ATK-CP-08
Sample Depth (m BGL)	3.20 - 3.65
Sample Type and No	B13
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	38.5
Slope	-1.48
Sensitivity (Change in MCV per 1% moisture content)	0.67
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

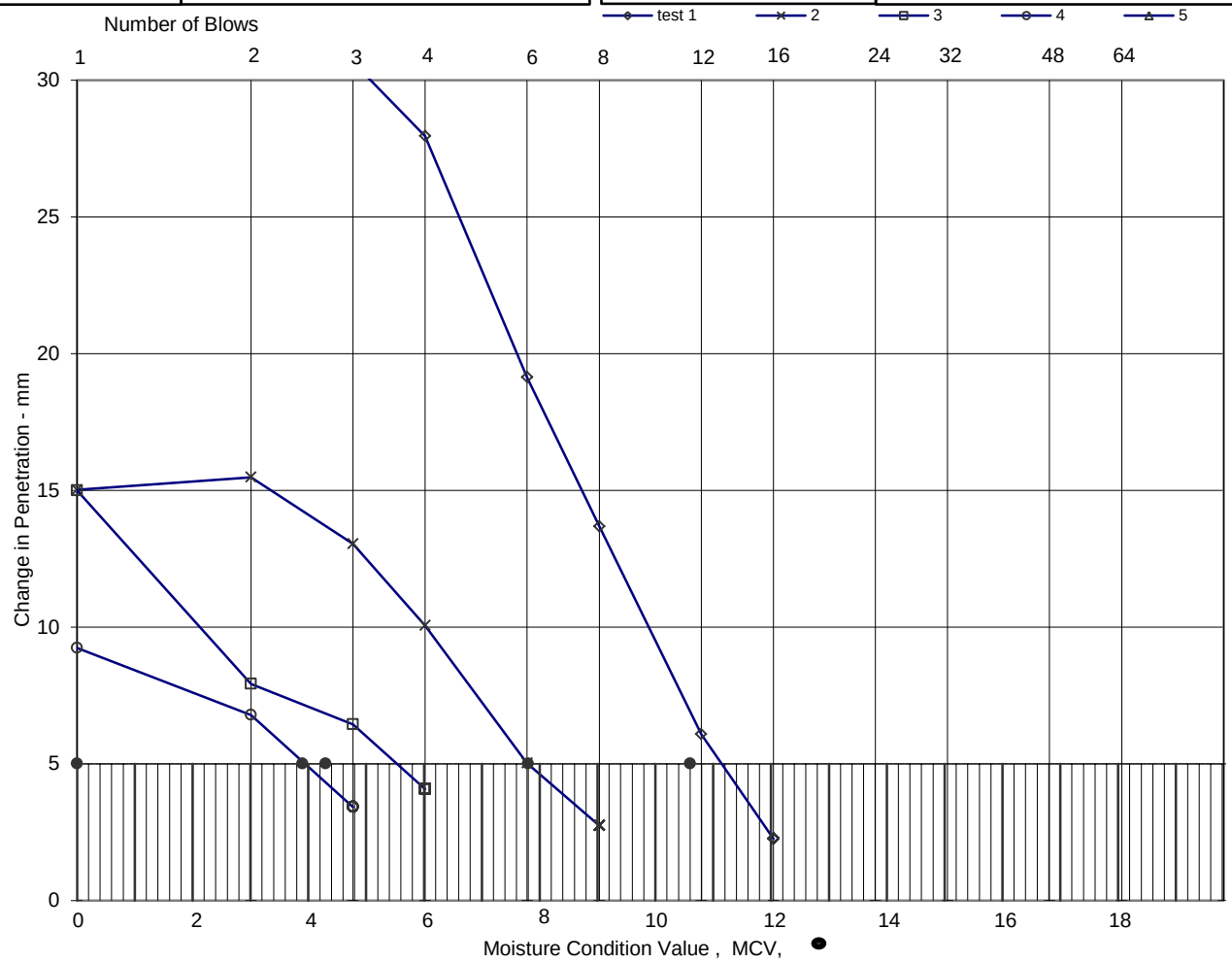
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191126042202

Hole No	ATK-CP-08
Sample Depth (m BGL)	3.20 - 3.65
Sample Type and No	B13
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		10.6	7.8	4.3	3.9	
Moisture Content	%	23.0	27.0	31.0	34.0	
Bulk density after test	Mg/m³	1.76	1.37	1.36	1.31	
Dry density after test	Mg/m³	1.43	1.08	1.04	0.98	
Vane shear strength	kPa	82	76	72	66	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	23.1
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

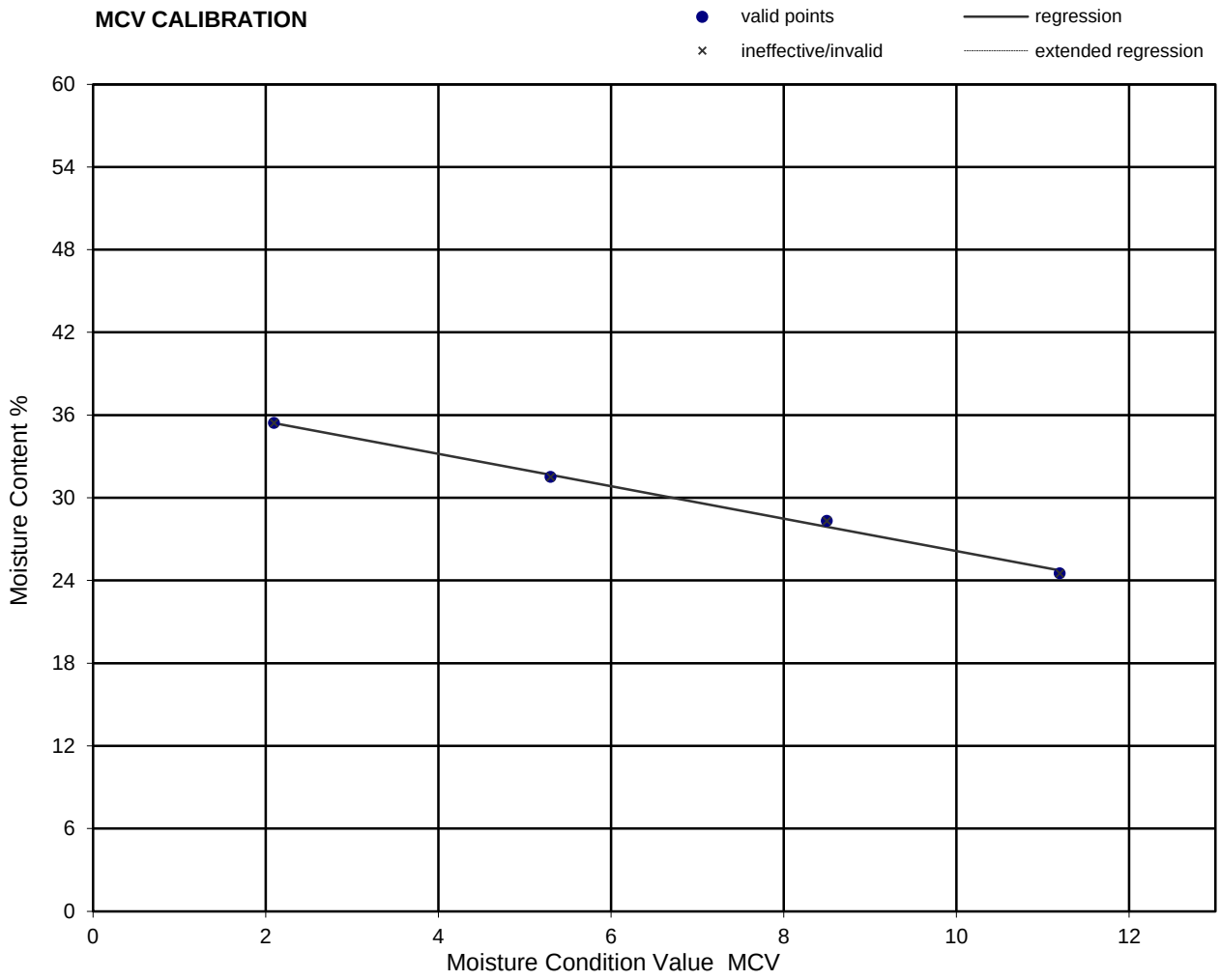
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191126042408

Hole No	ATK-CP-08
Sample Depth (m BGL)	4.65 - 5.20
Sample Type and No	B17
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	37.9
Slope	-1.17
Sensitivity (Change in MCV per 1% moisture content)	0.85
Correlation (proximity of test points to regression line)	-1.00
Method of interpretation of MCV	Steepest straight line

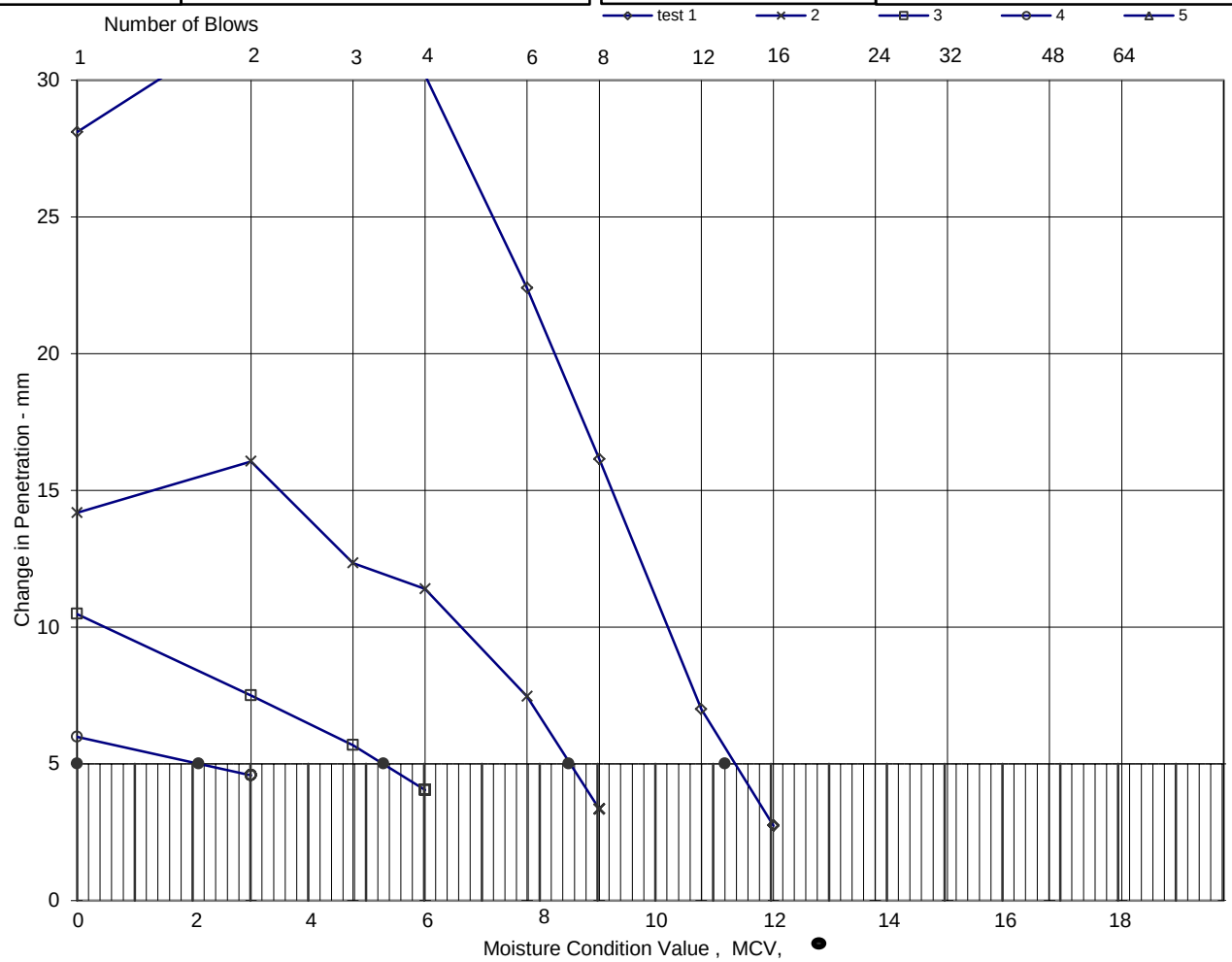
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191126042408

Hole No	ATK-CP-08
Sample Depth (m BGL)	4.65 - 5.20
Sample Type and No	B17
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.2	8.5	5.3	2.1	
Moisture Content	%	25.0	28.0	32.0	35.0	
Bulk density after test	Mg/m³	2.11	1.58	1.50	1.44	
Dry density after test	Mg/m³	1.69	1.23	1.14	1.06	
Vane shear strength	kPa	30	28	24	20	

Soil description	Grey and reddish brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	24.5
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

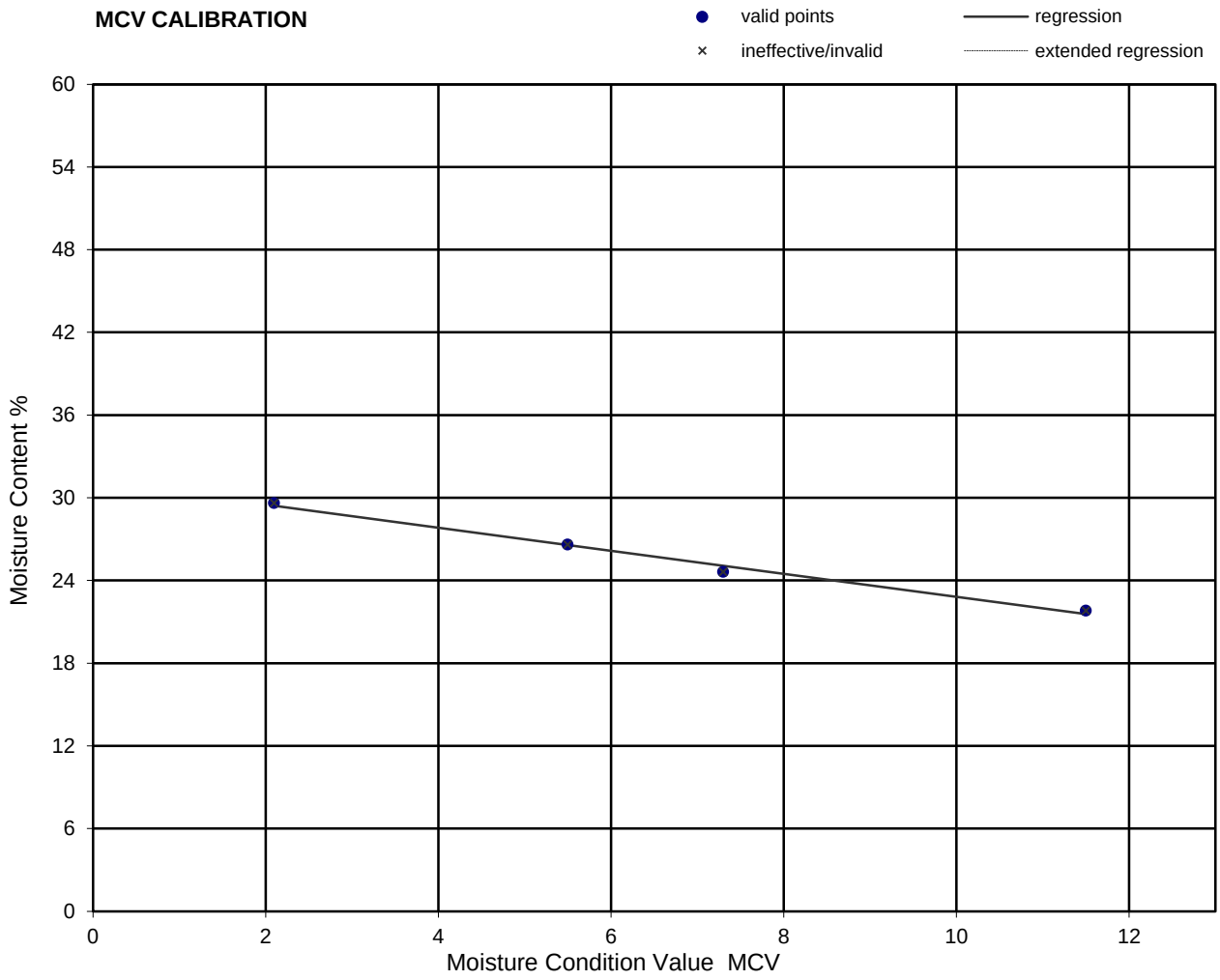
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191205104621

Hole No	ATK-CP-08
Sample Depth (m BGL)	8.20 - 8.65
Sample Type and No	B29
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	31.2
Slope	-0.84
Sensitivity (Change in MCV per 1% moisture content)	1.20
Correlation (proximity of test points to regression line)	-1.00
Method of interpretation of MCV	Steepest straight line

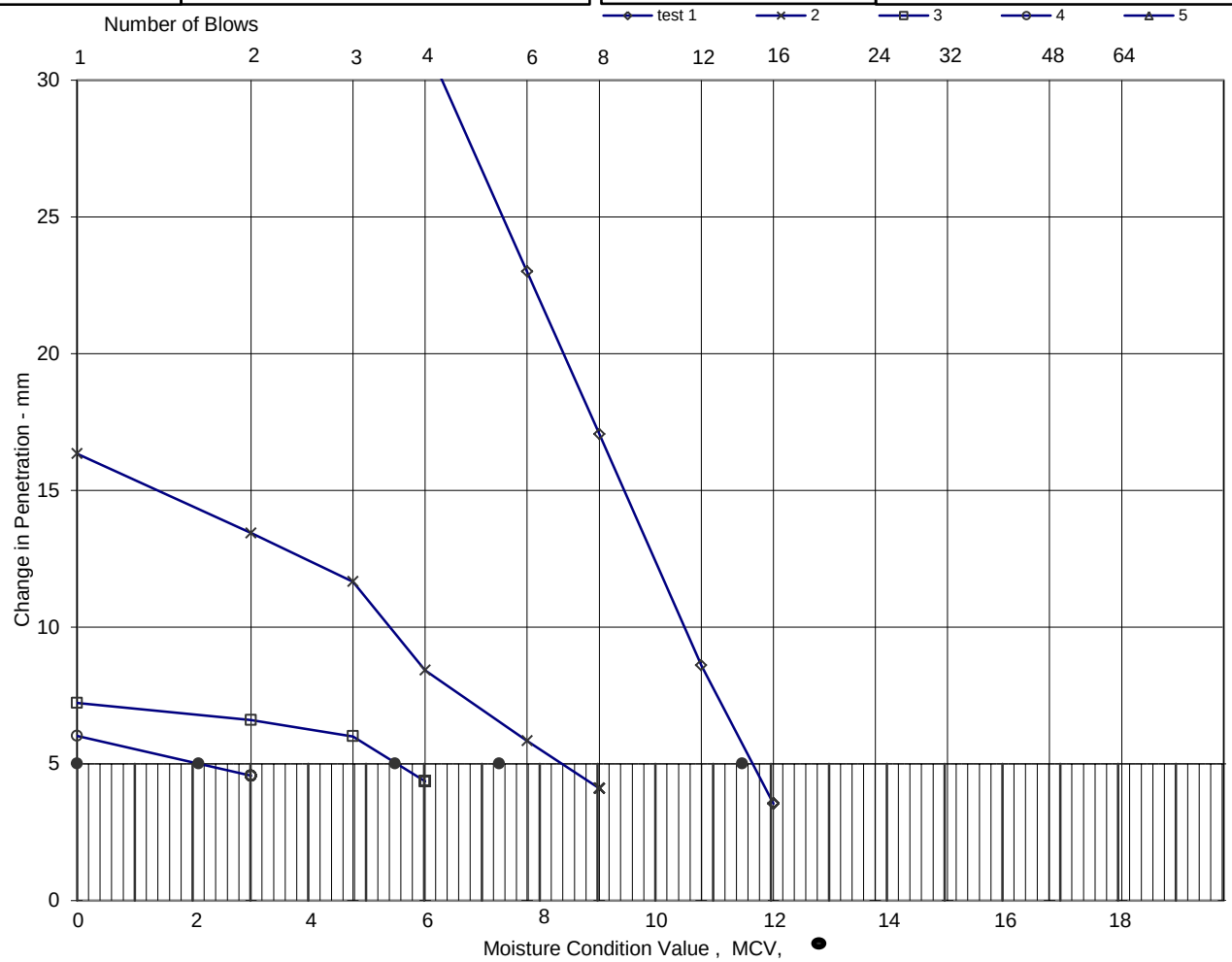
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191205104621

Hole No	ATK-CP-08
Sample Depth (m BGL)	8.20 - 8.65
Sample Type and No	B29
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.5	7.3	5.5	2.1	
Moisture Content	%	22.0	25.0	27.0	30.0	
Bulk density after test	Mg/m³	2.16	1.47	1.40	1.54	
Dry density after test	Mg/m³	1.77	1.18	1.11	1.19	
Vane shear strength	kPa	72	68	64	56	

Soil description	Brown mottled grey slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	21.8
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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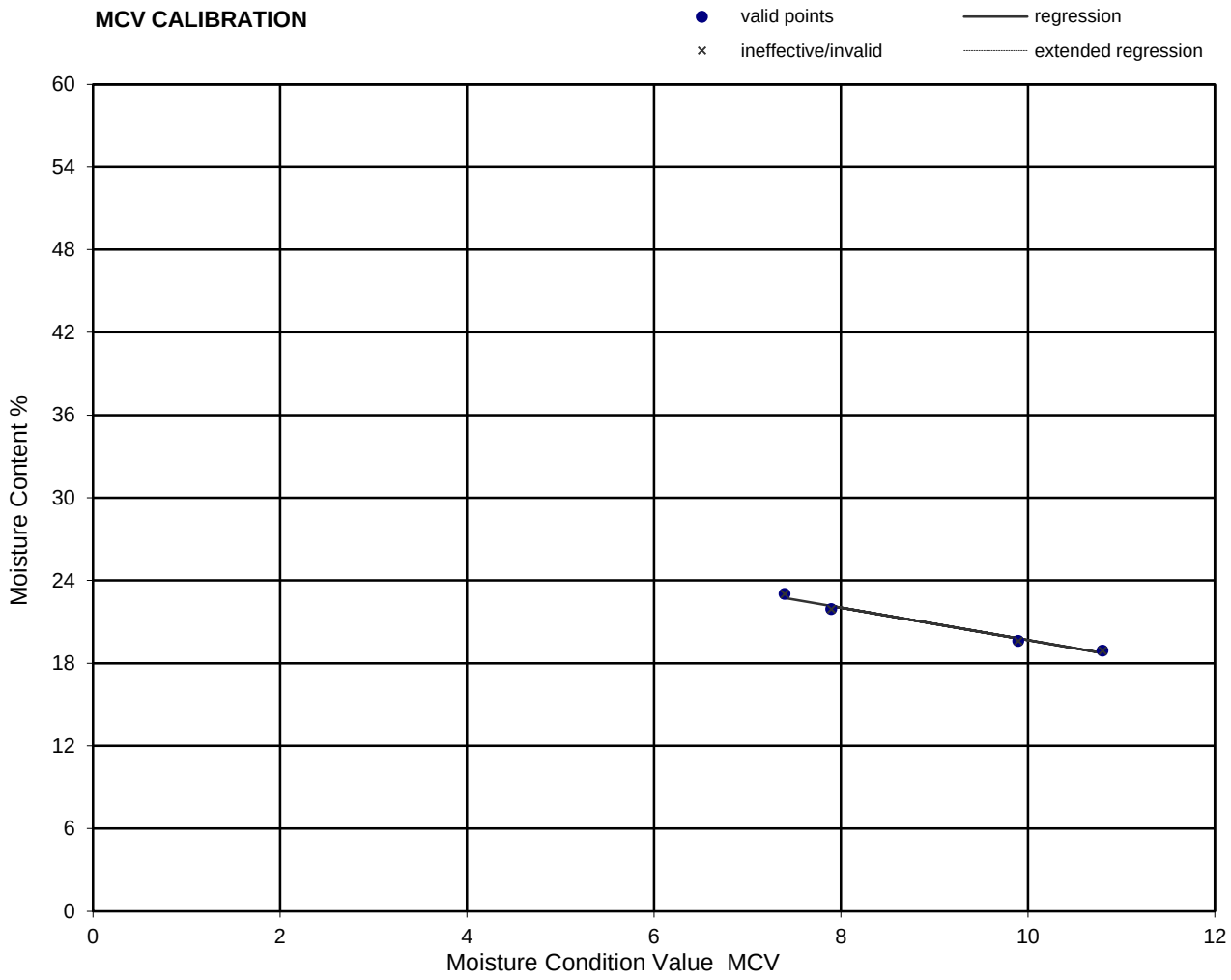
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191129110857

Hole No	ATK-CP-09
Sample Depth (m BGL)	6.50 - 6.95
Sample Type and No	B24
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	31.5
Slope	-1.18
Sensitivity (Change in MCV per 1% moisture content)	0.85
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

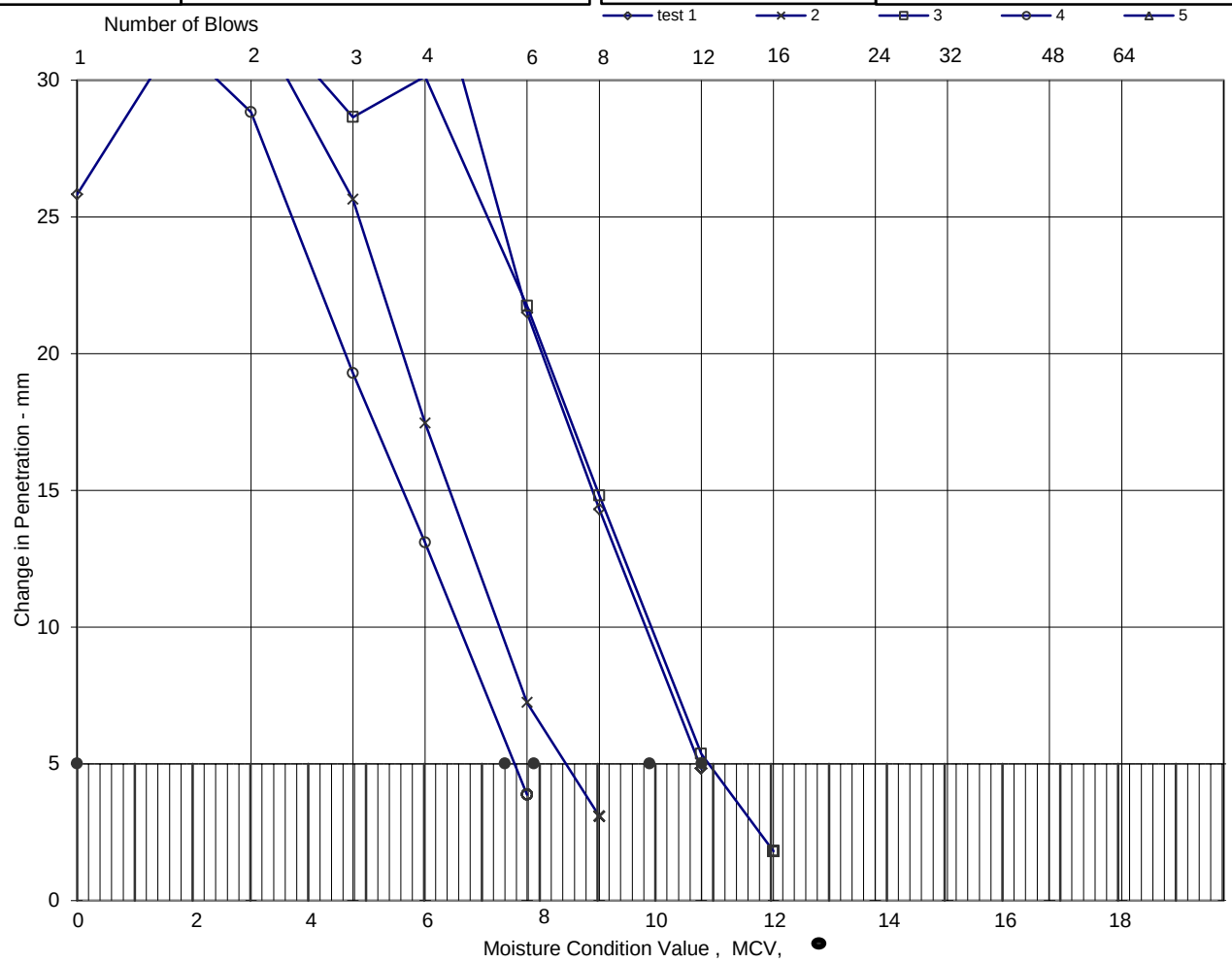
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191129110857

Hole No	ATK-CP-09
Sample Depth (m BGL)	6.50 - 6.95
Sample Type and No	B24
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		9.9	7.9	10.8	7.4	
Moisture Content	%	20.0	22.0	19.0	23.0	
Bulk density after test	Mg/m³	2.15	2.06	2.15	2.09	
Dry density after test	Mg/m³	1.80	1.69	1.81	1.70	
Vane shear strength	kPa	62	40	68	48	

Soil description	Reddish brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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MCVREL

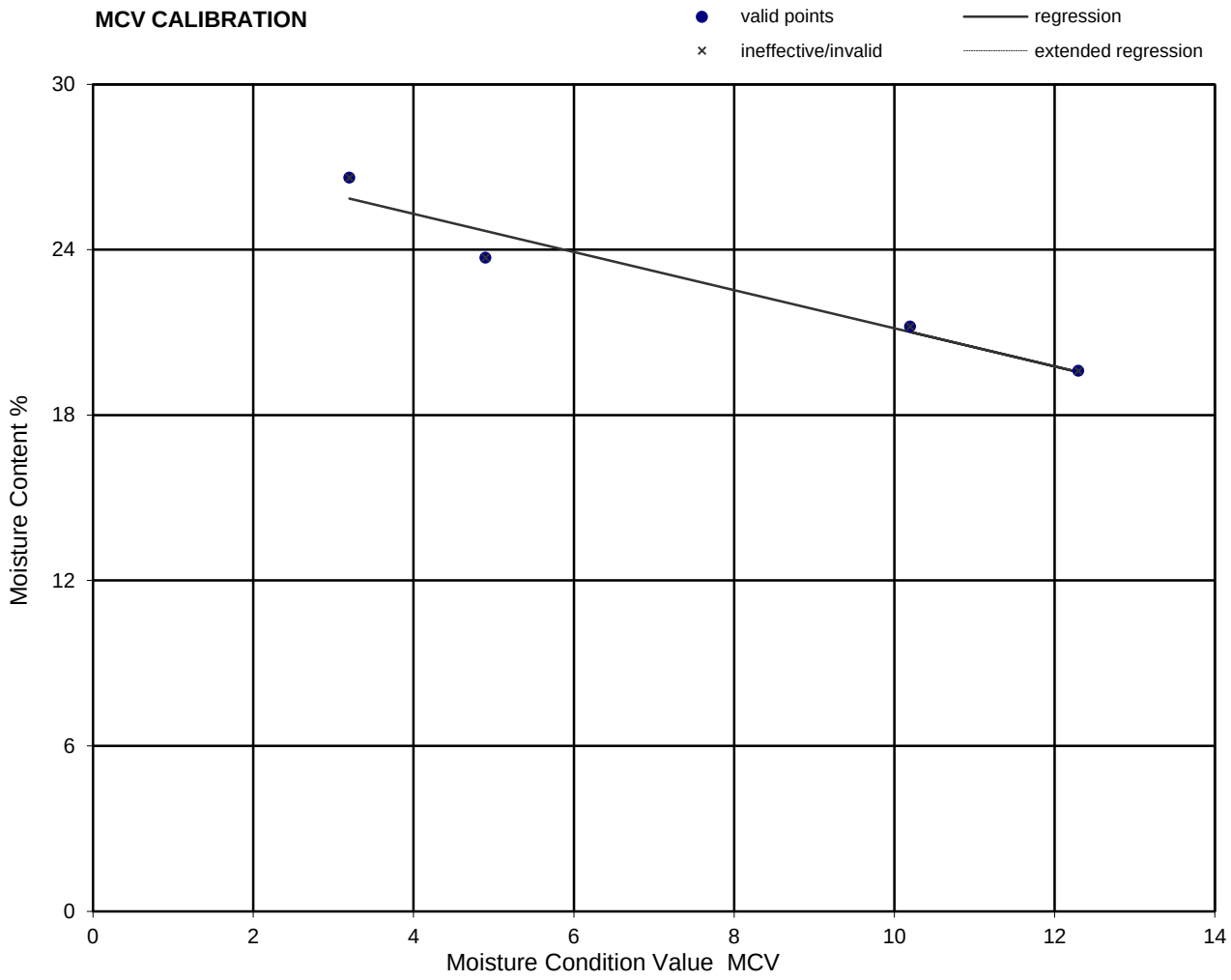
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191129111230

Hole No	ATK-CP-09
Sample Depth (m BGL)	8.65 - 9.20
Sample Type and No	B31
Specimen Ref	



Characteristics of calibration line (determined using linear regression)	
Intercept	28.1
Slope	-0.69
Sensitivity (Change in MCV per 1% moisture content)	1.45
Correlation (proximity of test points to regression line)	-0.97
Method of interpretation of MCV	Steepest straight line

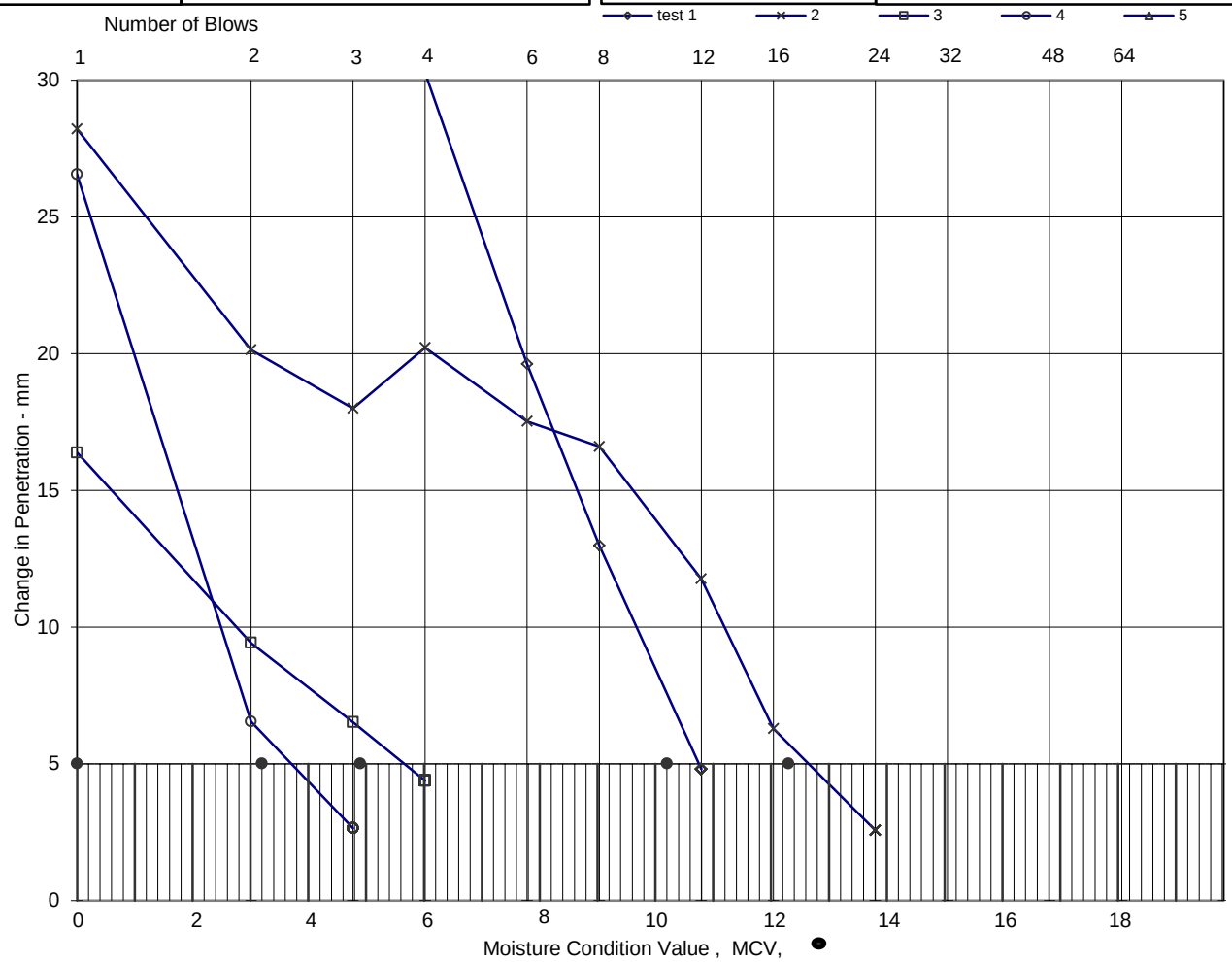
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191129111230

Hole No	ATK-CP-09
Sample Depth (m BGL)	8.65 - 9.20
Sample Type and No	B31
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		10.2	12.3	4.9	3.2	
Moisture Content	%	21.0	20.0	24.0	27.0	
Bulk density after test	Mg/m³	1.79	1.60	1.33	1.44	
Dry density after test	Mg/m³	1.48	1.34	1.08	1.14	
Vane shear strength	kPa	66	80	62	58	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	21.2
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

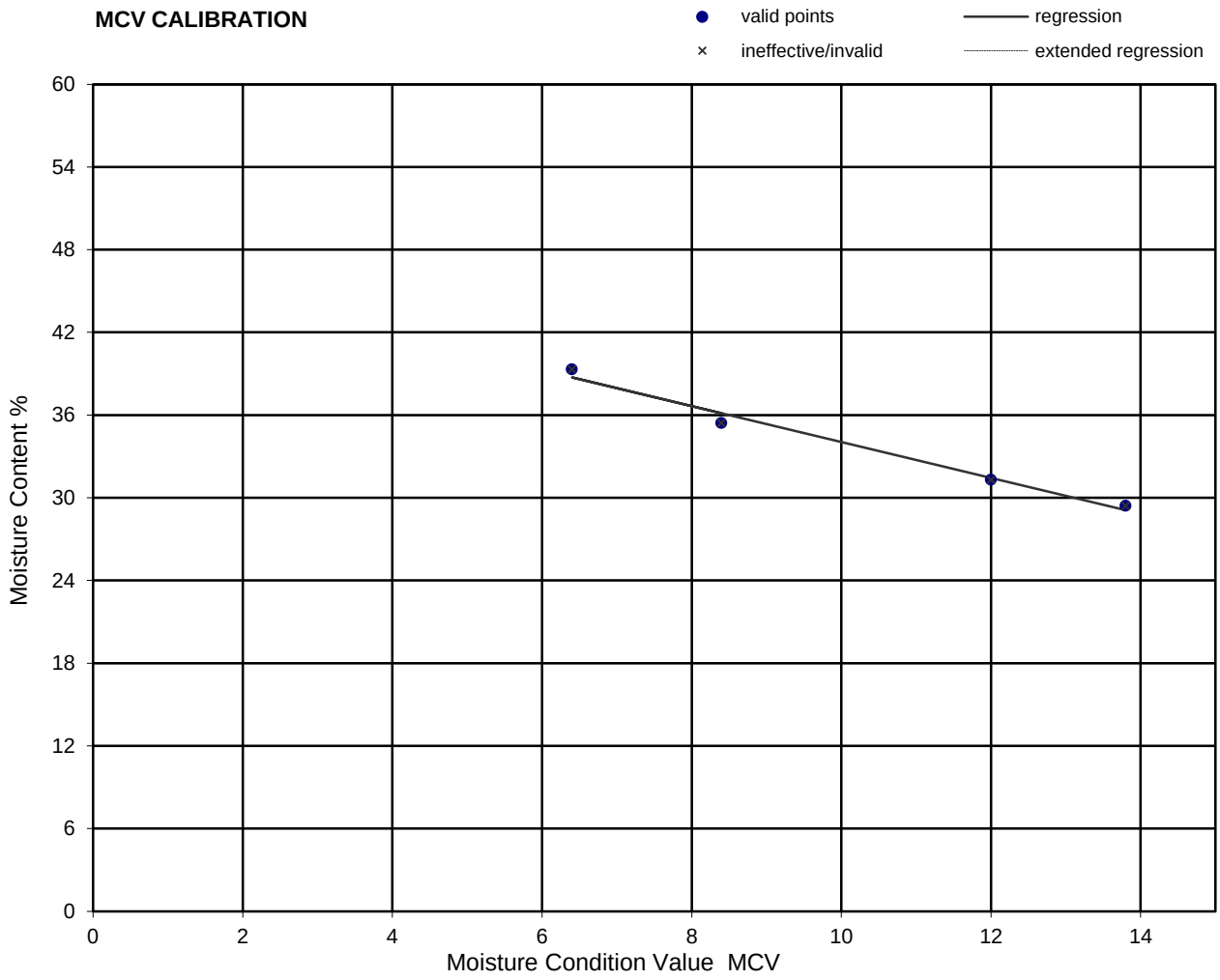
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127033323

Hole No	ATK-CP-13A
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	47.1
Slope	-1.30
Sensitivity (Change in MCV per 1% moisture content)	0.77
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

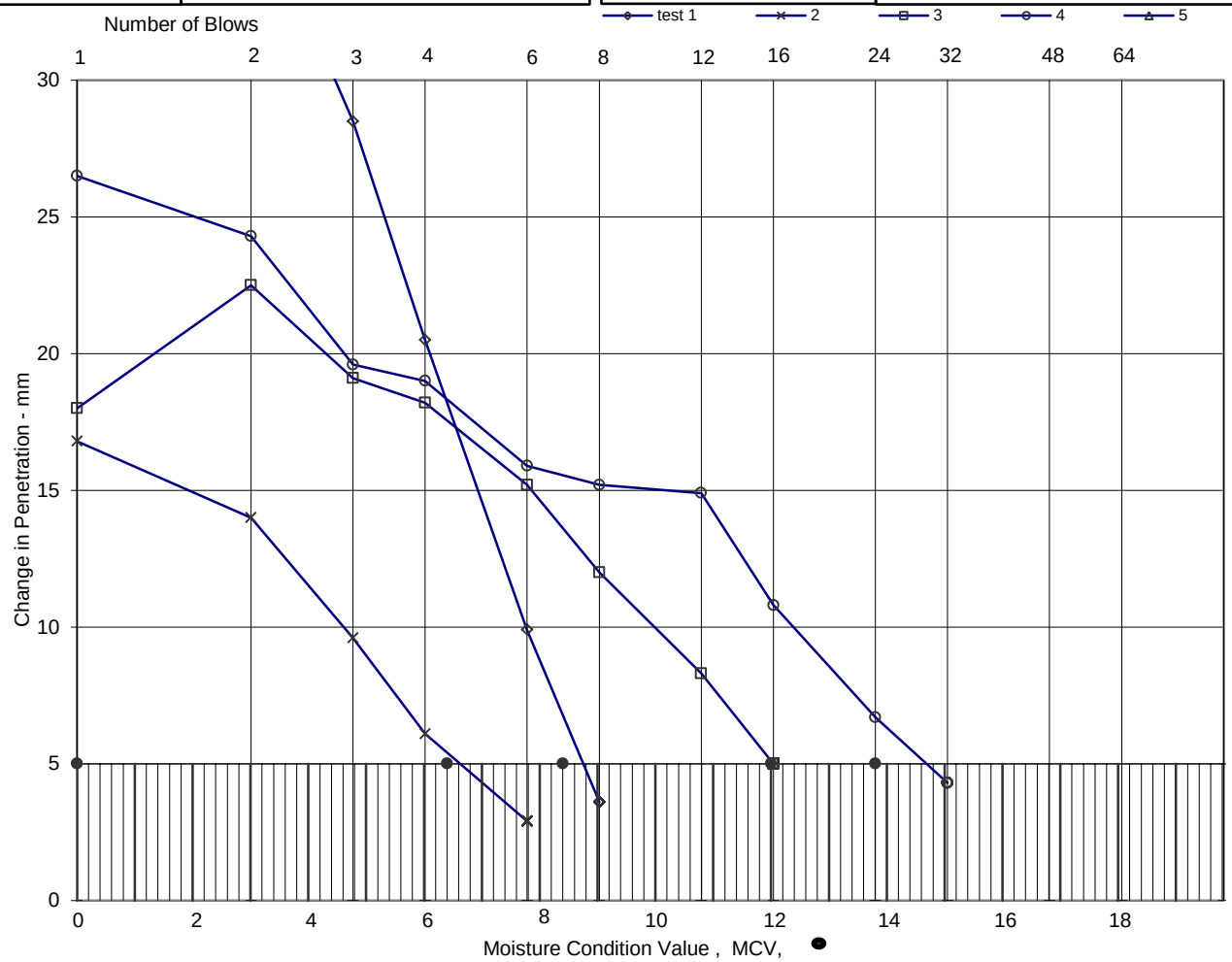
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127033323

Hole No	ATK-CP-13A
Sample Depth (m BGL)	0.50 - 0.80
Sample Type and No	B4
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		8.4	6.4	12.0	13.8	
Moisture Content	%	35.0	39.0	31.0	29.0	
Bulk density after test	Mg/m³	1.85	1.50	1.68	1.91	
Dry density after test	Mg/m³	1.37	1.08	1.28	1.48	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	0
Remarks	

Initial moisture content <20mm	%	35.4
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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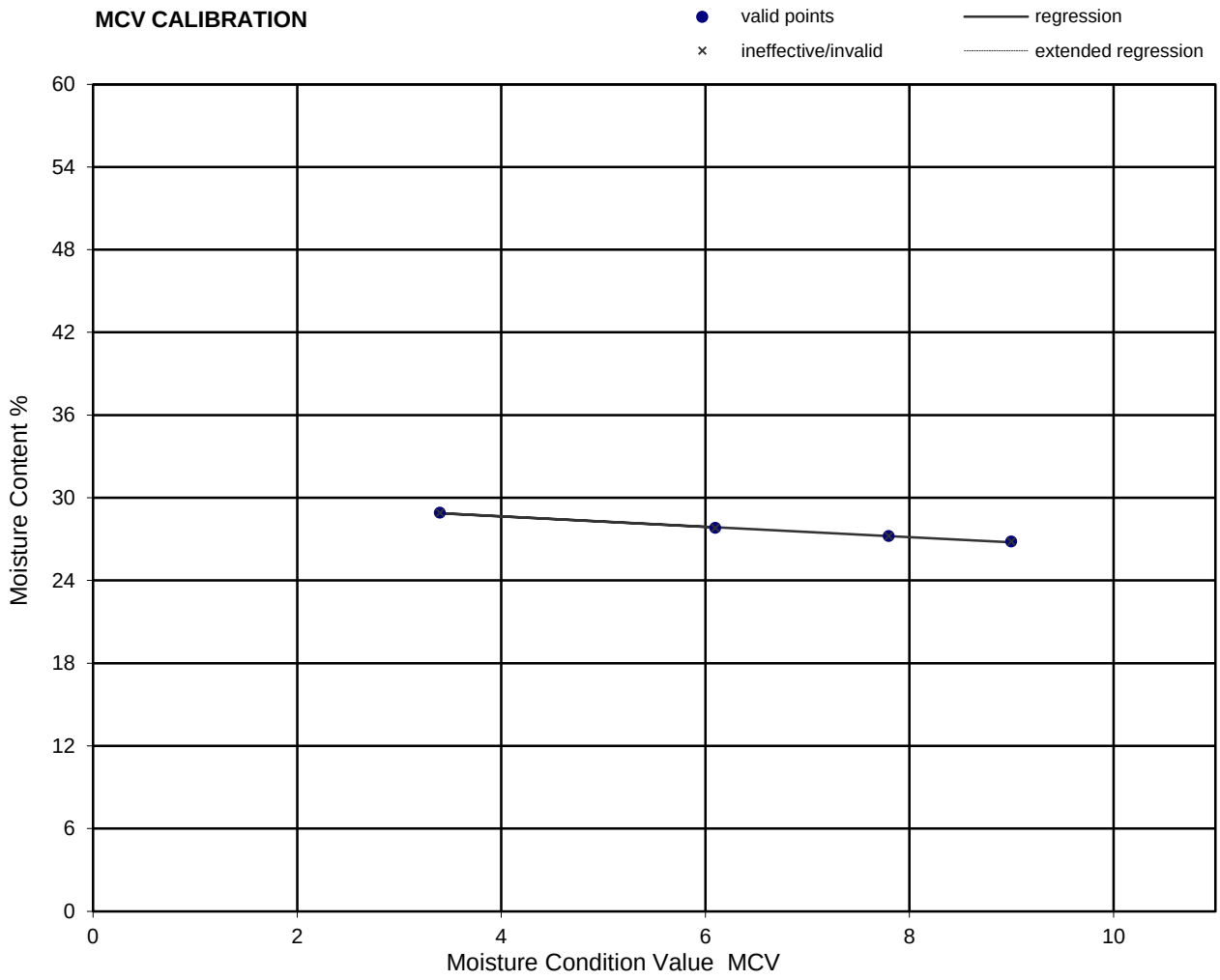
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127033838

Hole No	ATK-CP-13A
Sample Depth (m BGL)	5.00 - 5.50
Sample Type and No	B24
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	30.1
Slope	-0.38
Sensitivity (Change in MCV per 1% moisture content)	2.66
Correlation (proximity of test points to regression line)	-1.00
Method of interpretation of MCV	Steepest straight line

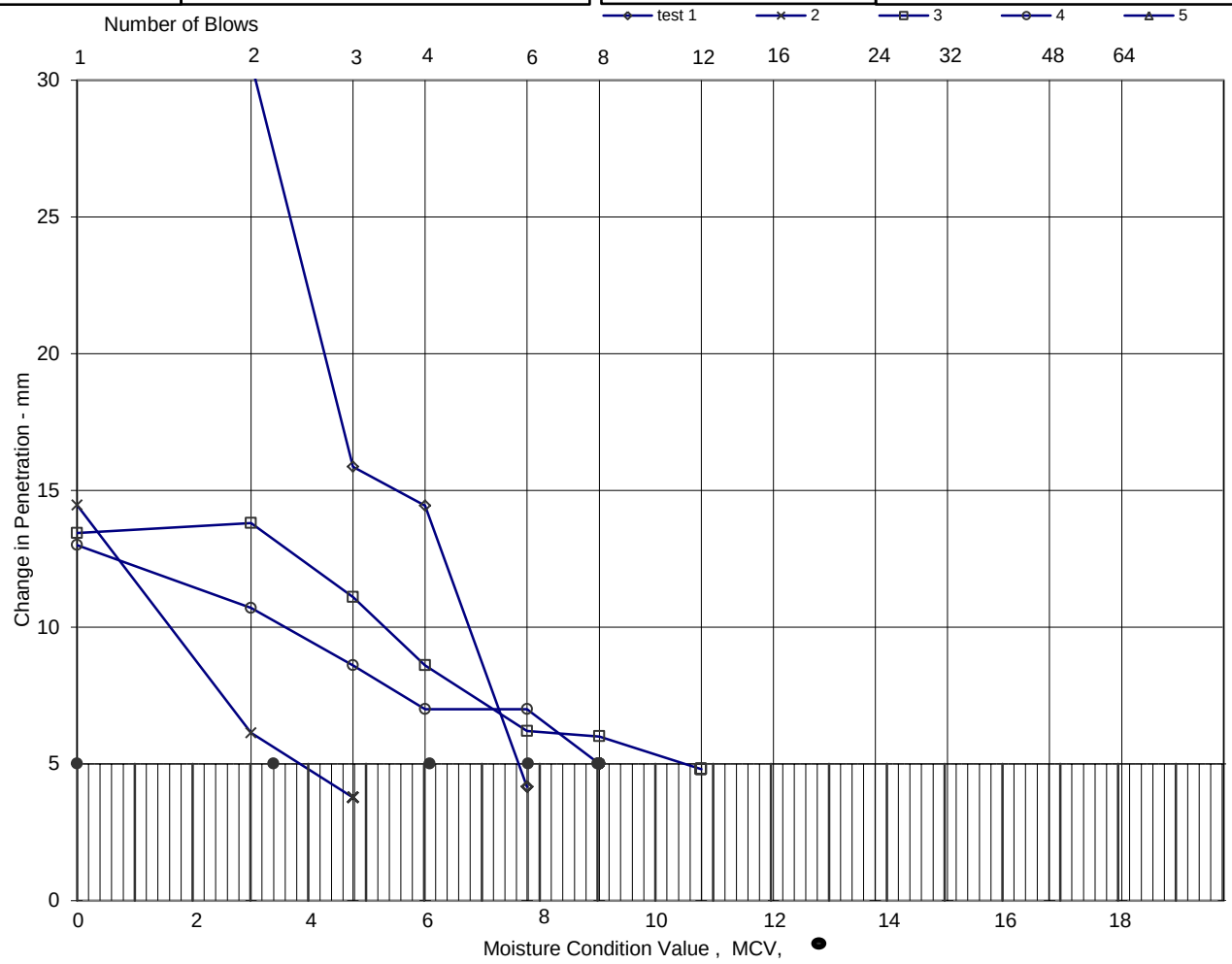
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127033838

Hole No	ATK-CP-13A
Sample Depth (m BGL)	5.00 - 5.50
Sample Type and No	B24
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		6.1	3.4	7.8	9.0	
Moisture Content	%	28.0	29.0	27.0	27.0	
Bulk density after test	Mg/m³	1.99	1.96	1.99	1.86	
Dry density after test	Mg/m³	1.56	1.52	1.56	1.47	
Vane shear strength	kPa	40	36	38	42	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	27.4
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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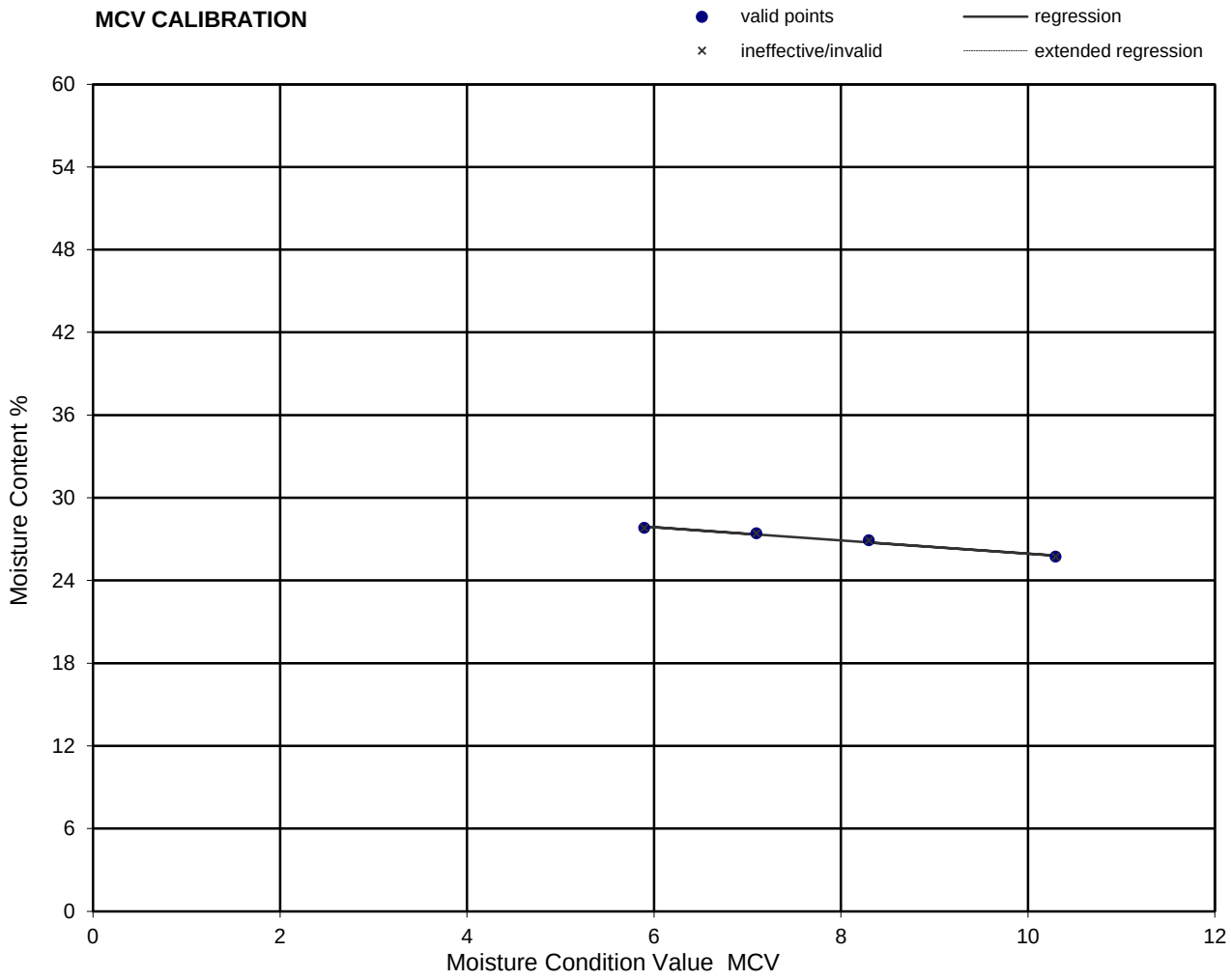
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191219120110

Hole No	ATK-CP-16
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B8
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	30.8
Slope	-0.48
Sensitivity (Change in MCV per 1% moisture content)	2.08
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

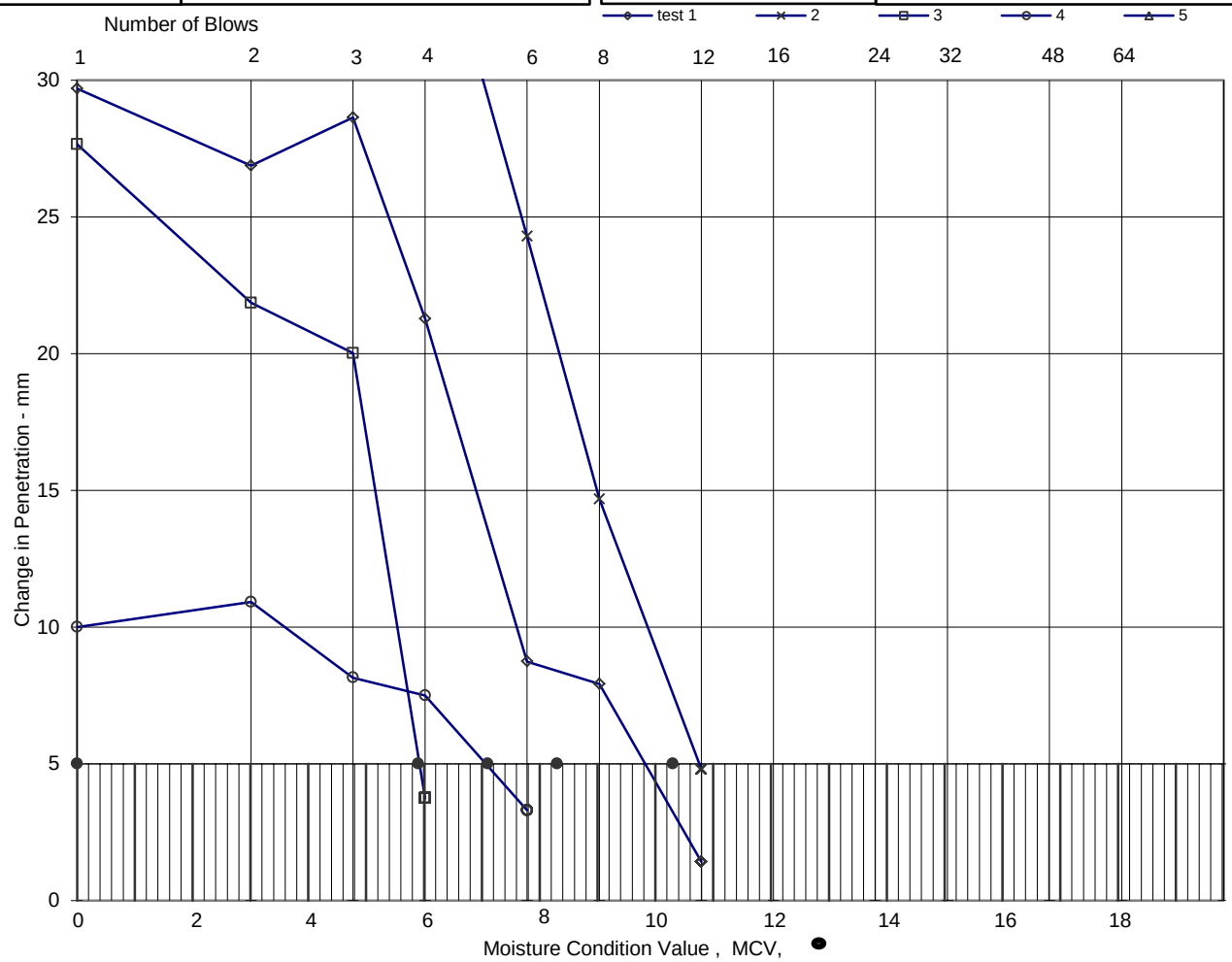
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191219120110

Hole No	ATK-CP-16
Sample Depth (m BGL)	3.50 - 4.00
Sample Type and No	B8
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		8.3	10.3	5.9	7.1	
Moisture Content	%	27.0	26.0	28.0	27.0	
Bulk density after test	Mg/m³	2.03	2.06	1.96	1.55	
Dry density after test	Mg/m³	1.60	1.64	1.53	1.22	
Vane shear strength	kPa	30	46	20	16	

Soil description	Brown CLAY
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	26.9
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

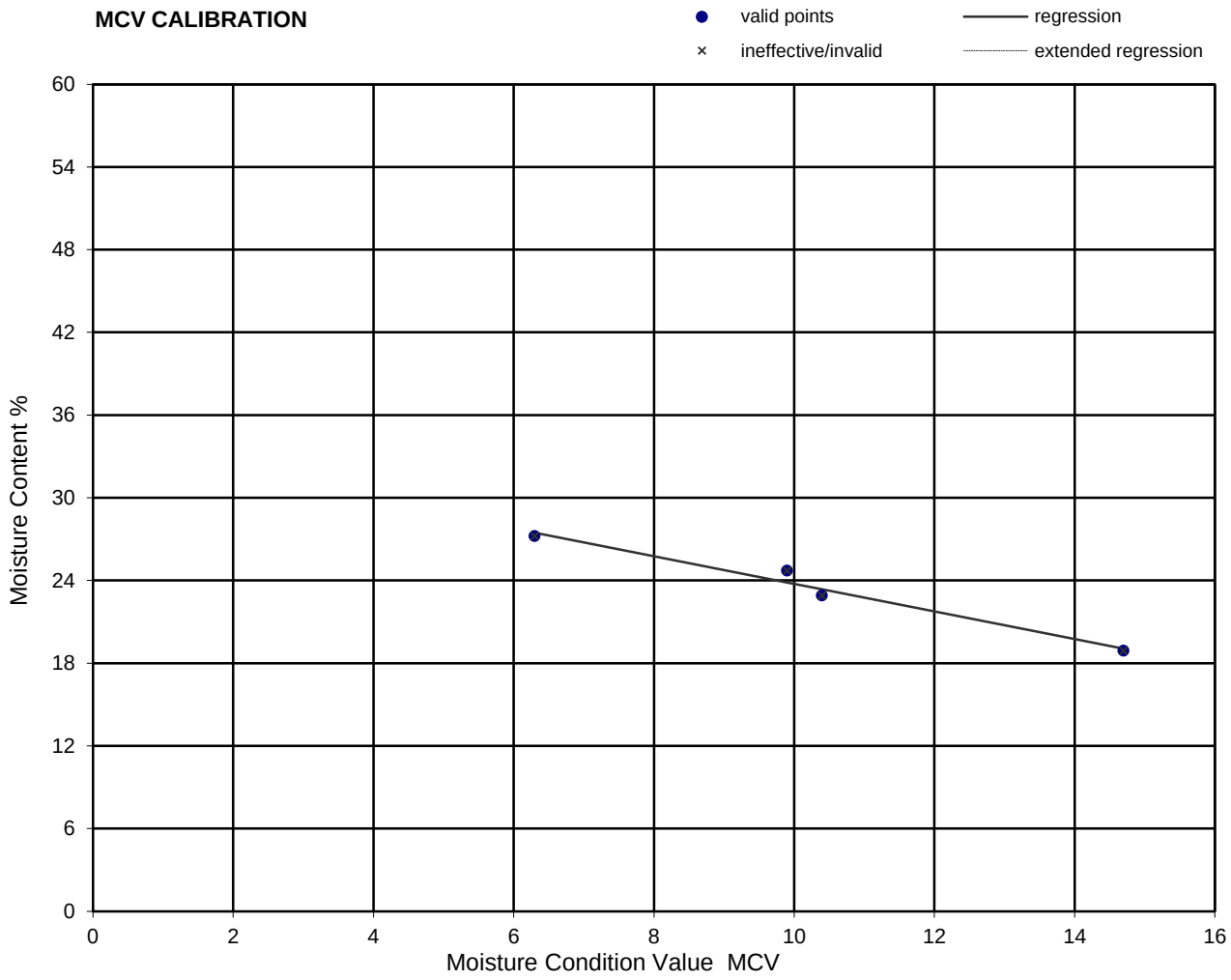
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191219022241

Hole No	ATK-CP-16
Sample Depth (m BGL)	5.50 - 6.00
Sample Type and No	B16
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	33.8
Slope	-1.00
Sensitivity (Change in MCV per 1% moisture content)	1.00
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

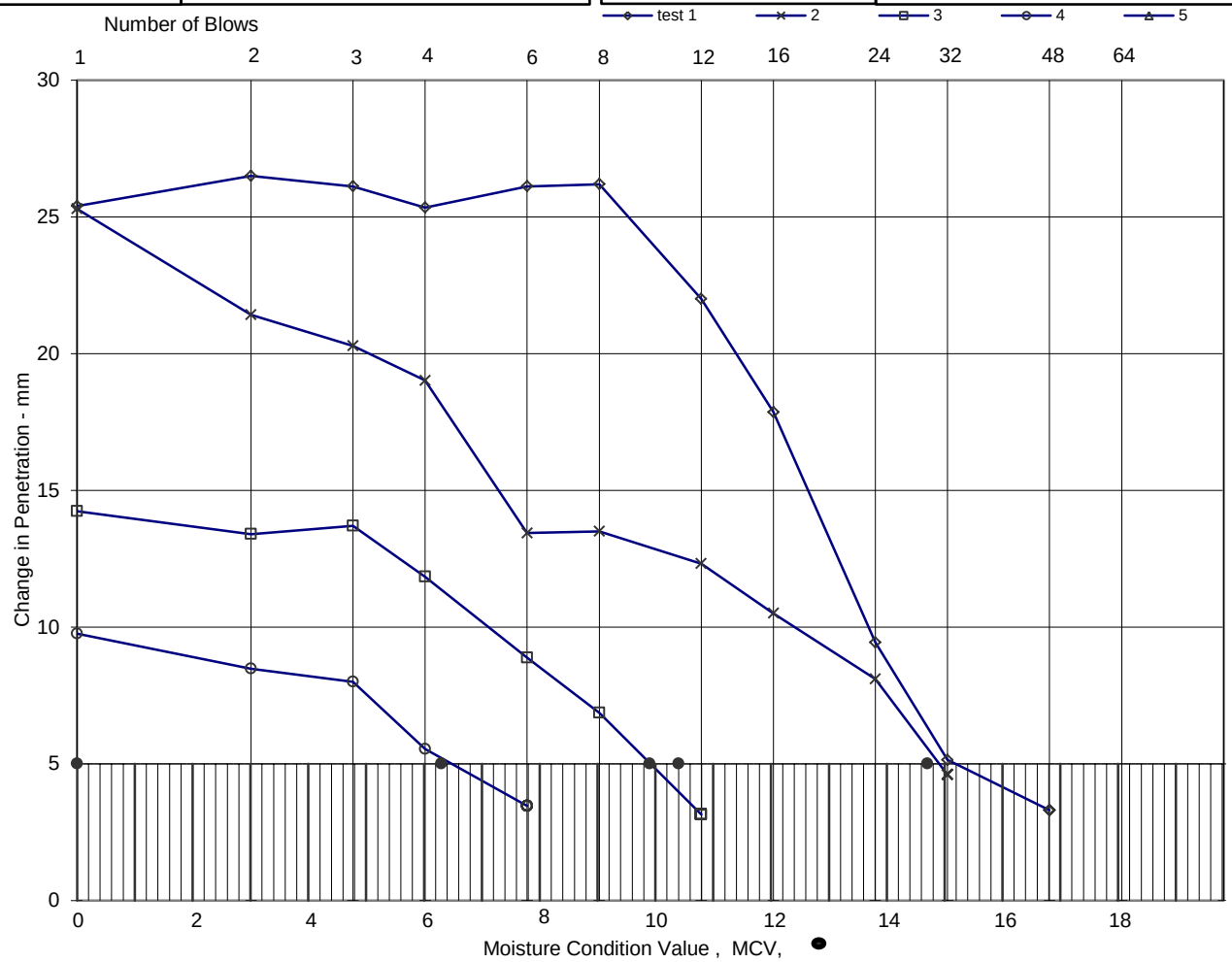
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191219022241

Hole No	ATK-CP-16
Sample Depth (m BGL)	5.50 - 6.00
Sample Type and No	B16
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		14.7	10.4	9.9	6.3	
Moisture Content	%	19.0	23.0	25.0	27.0	
Bulk density after test	Mg/m³	2.09	1.91	1.58	1.47	
Dry density after test	Mg/m³	1.76	1.55	1.27	1.16	
Vane shear strength	kPa	140	140	118	106	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	18.8
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

MCVREL

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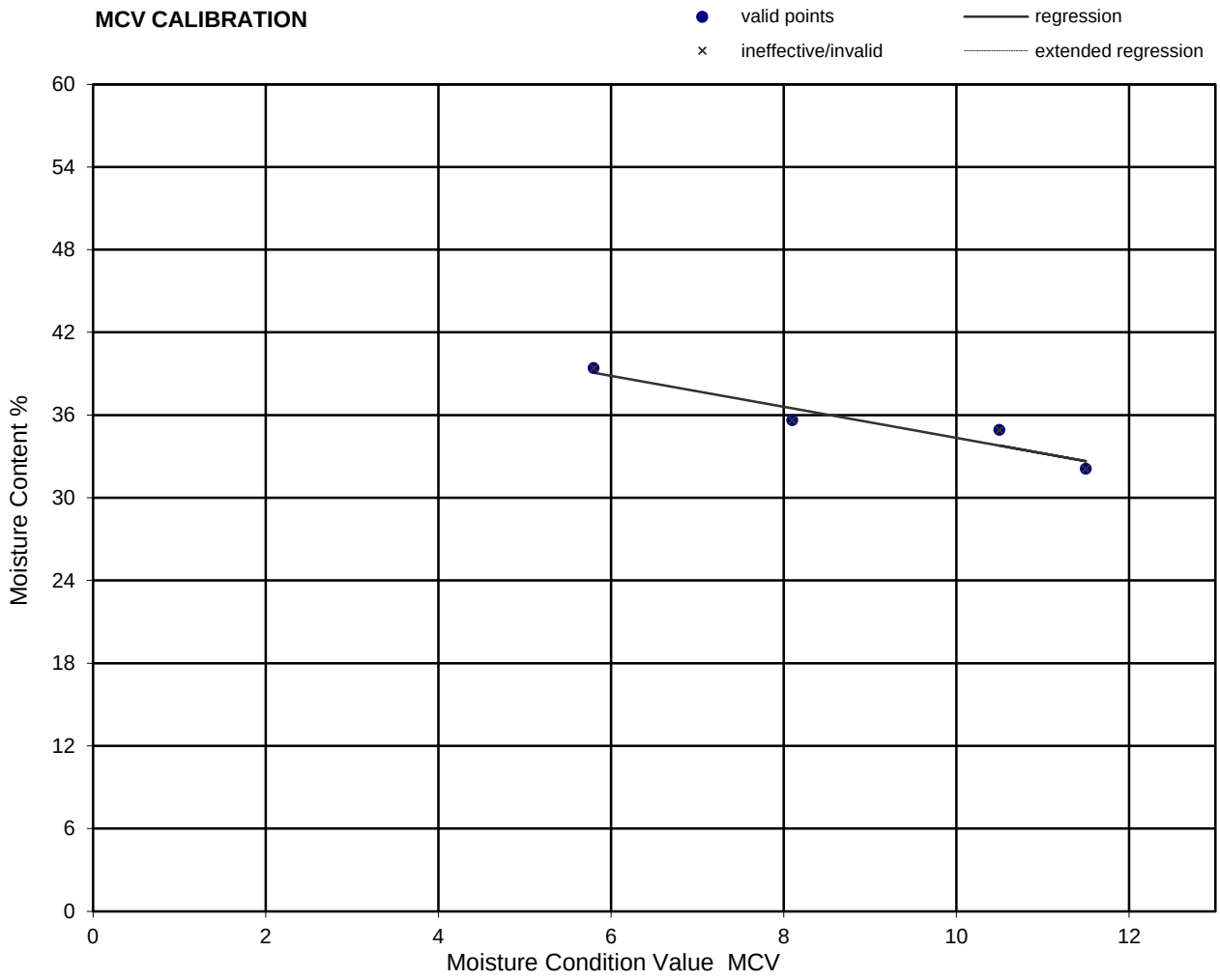
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114654

Hole No	ATK-TP-01
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B8
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	45.6
Slope	-1.12
Sensitivity (Change in MCV per 1% moisture content)	0.89
Correlation (proximity of test points to regression line)	-0.95
Method of interpretation of MCV	Steepest straight line

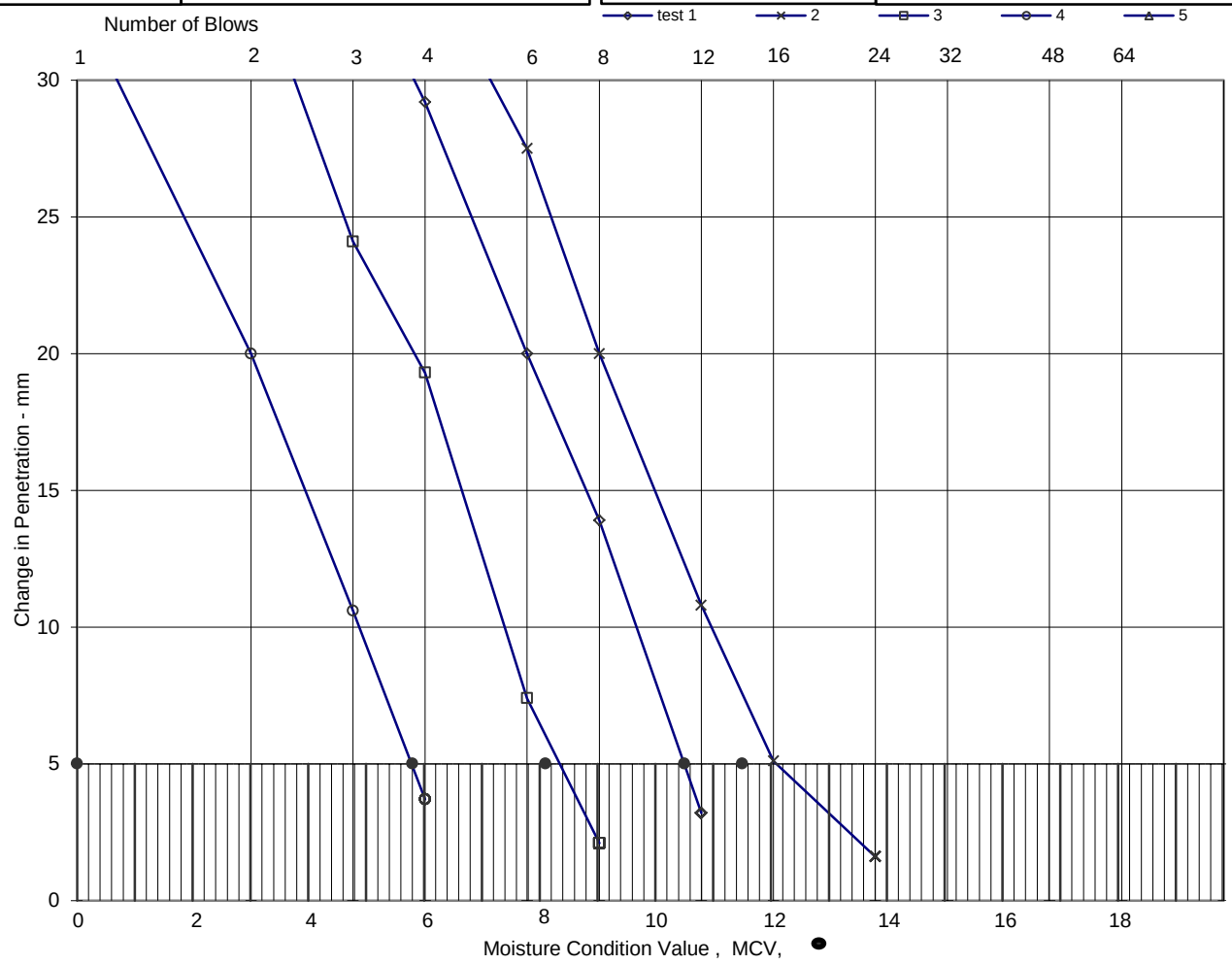
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114654

Hole No	ATK-TP-01
Sample Depth (m BGL)	1.00 - 1.20
Sample Type and No	B8
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		10.5	11.5	8.1	5.8	
Moisture Content	%	35.0	32.0	36.0	39.0	
Bulk density after test	Mg/m³	1.82	1.90	1.78	1.72	
Dry density after test	Mg/m³	1.35	1.44	1.31	1.23	

Soil description	Brown slightly sandy silty CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	34.9
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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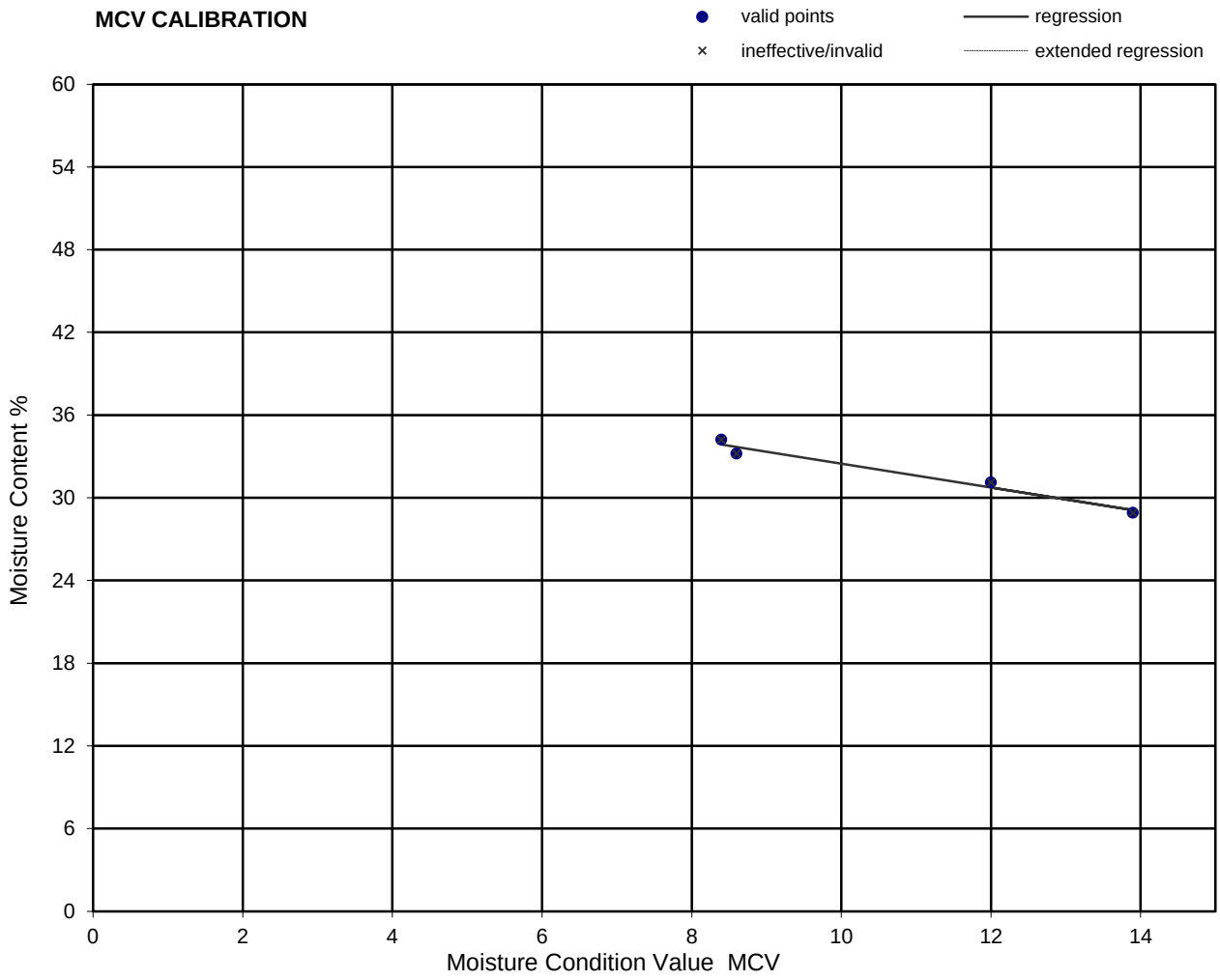
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114711

Hole No	ATK-TP-01
Sample Depth (m BGL)	2.80 - 2.90
Sample Type and No	B12
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	41.1
Slope	-0.86
Sensitivity (Change in MCV per 1% moisture content)	1.16
Correlation (proximity of test points to regression line)	-0.98
Method of interpretation of MCV	Steepest straight line

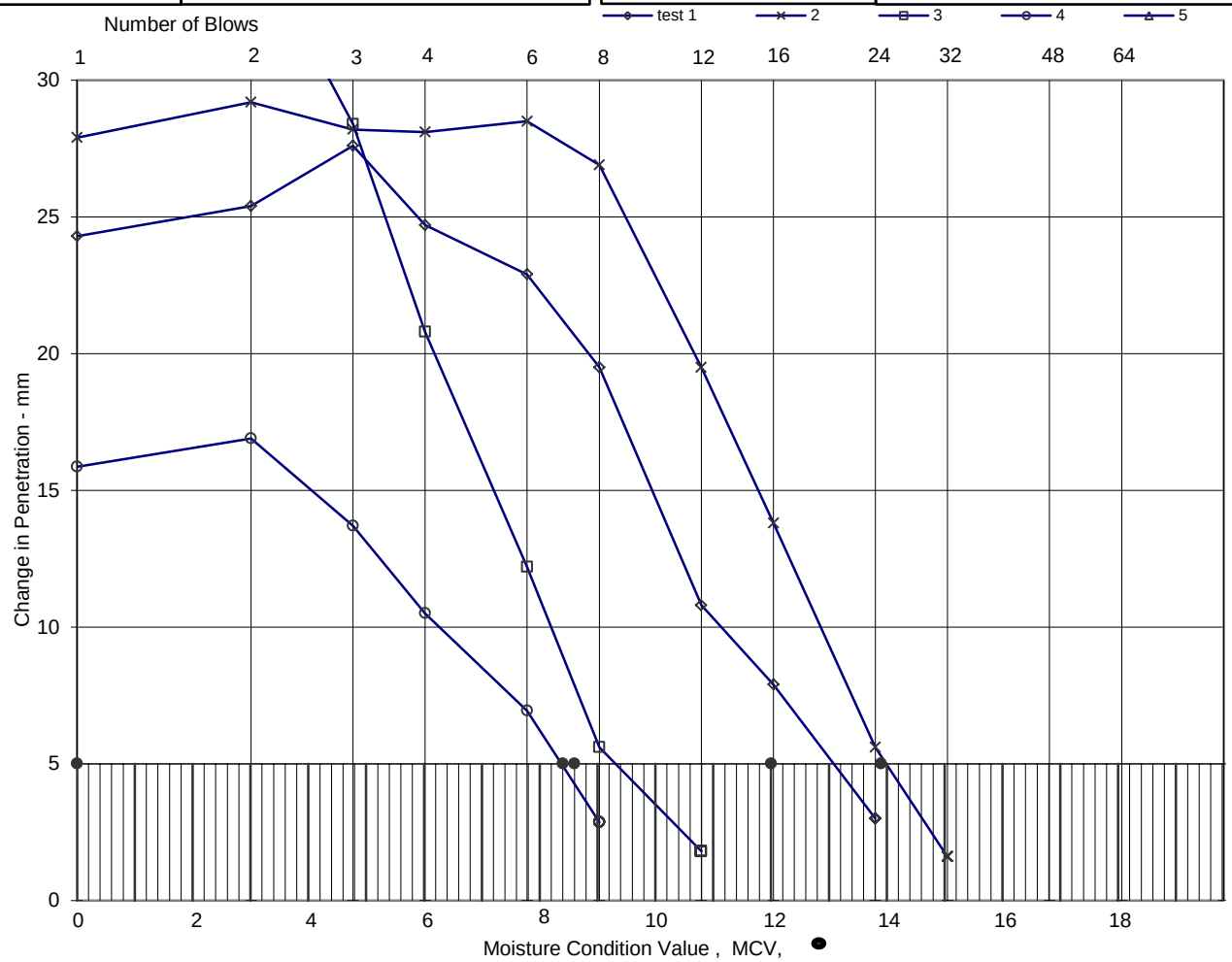
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114711

Hole No	ATK-TP-01
Sample Depth (m BGL)	2.80 - 2.90
Sample Type and No	B12
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		12.0	13.9	8.6	8.4	
Moisture Content	%	31.0	29.0	33.0	34.0	
Bulk density after test	Mg/m³	1.62	1.60	1.56	1.36	
Dry density after test	Mg/m³	1.24	1.24	1.17	1.01	
Vane shear strength	kPa	90	94	50	44	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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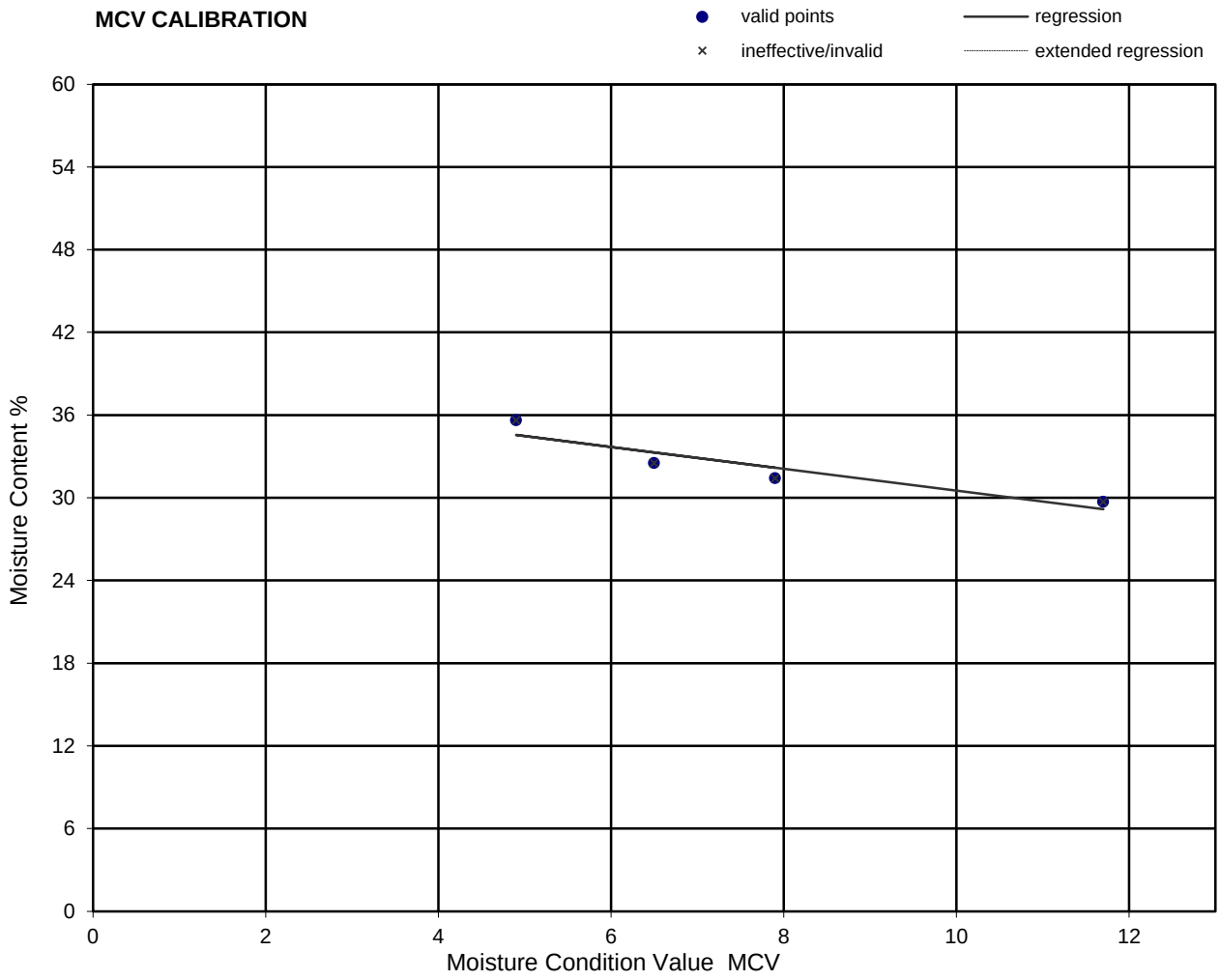
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114717

Hole No	ATK-TP-01
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B14
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	38.4
Slope	-0.79
Sensitivity (Change in MCV per 1% moisture content)	1.26
Correlation (proximity of test points to regression line)	-0.93
Method of interpretation of MCV	Steepest straight line

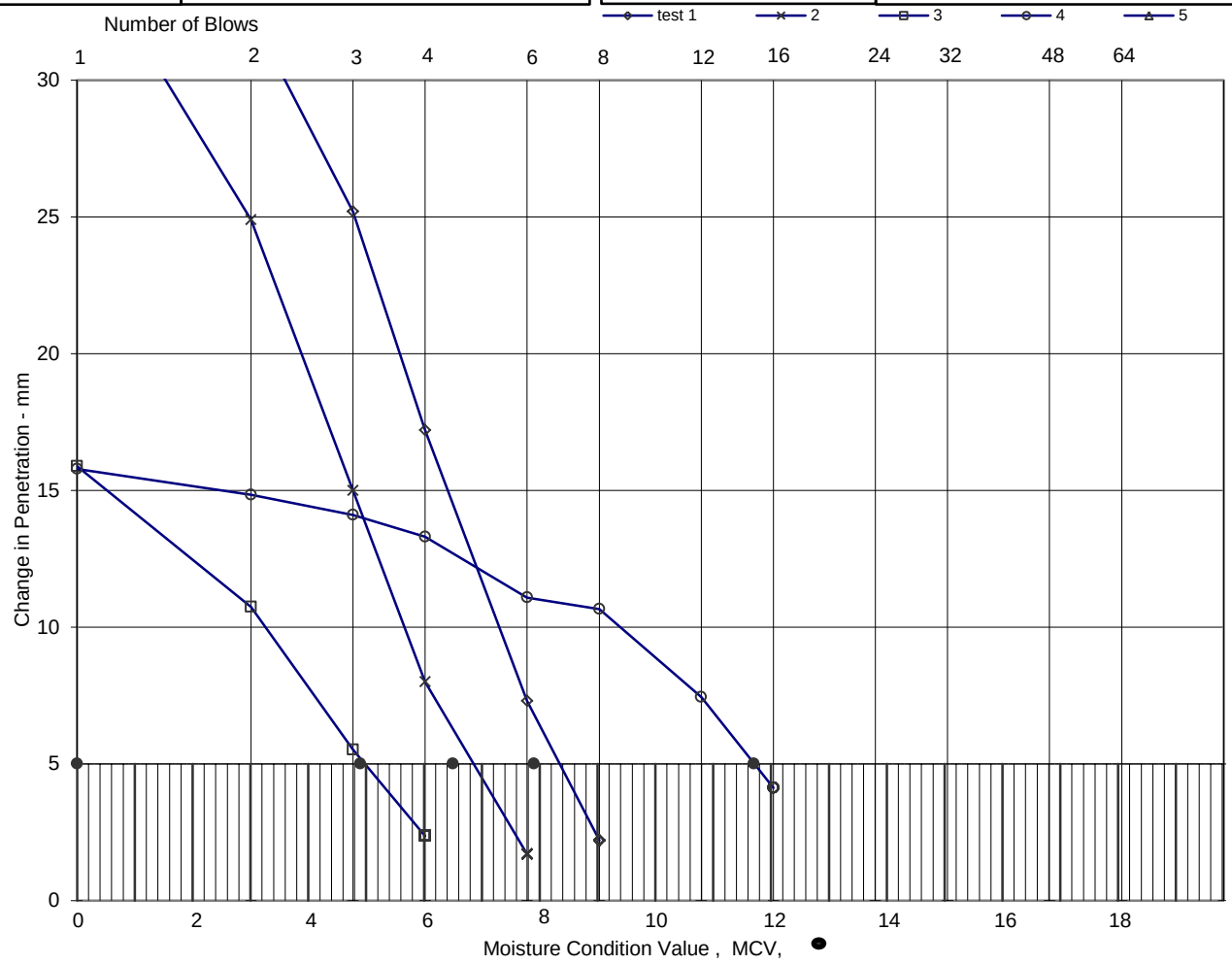
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191114114717

Hole No	ATK-TP-01
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B14
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		7.9	6.5	4.9	11.7	
Moisture Content	%	31.0	33.0	36.0	30.0	
Bulk density after test	Mg/m³	1.57	1.53	1.31	1.37	
Dry density after test	Mg/m³	1.19	1.15	0.97	1.06	
Vane shear strength	kPa	52	38	30	56	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	31.4
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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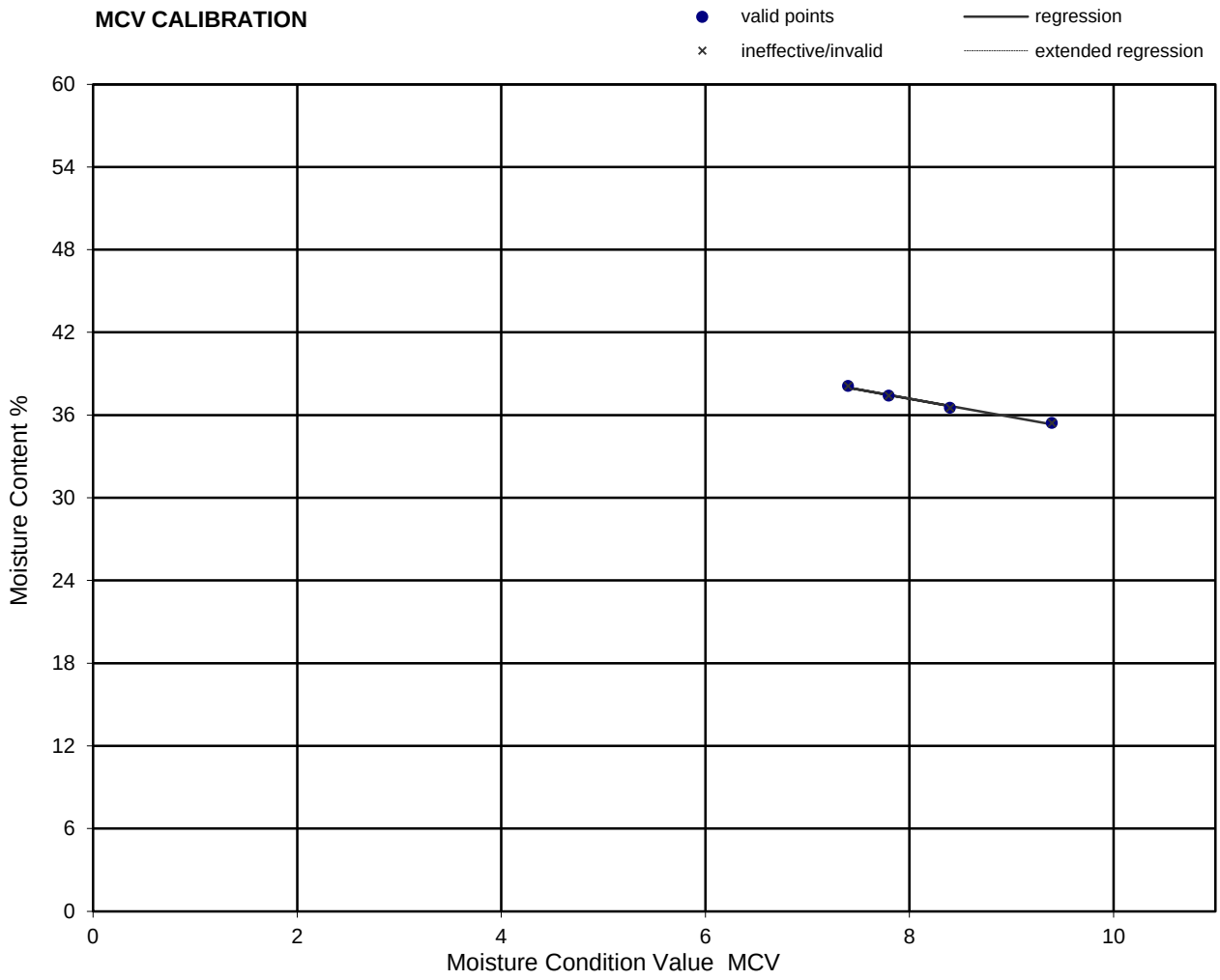
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191113101600

Hole No	ATK-TP-02
Sample Depth (m BGL)	0.50 - 0.70
Sample Type and No	B3
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	47.9
Slope	-1.33
Sensitivity (Change in MCV per 1% moisture content)	0.75
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

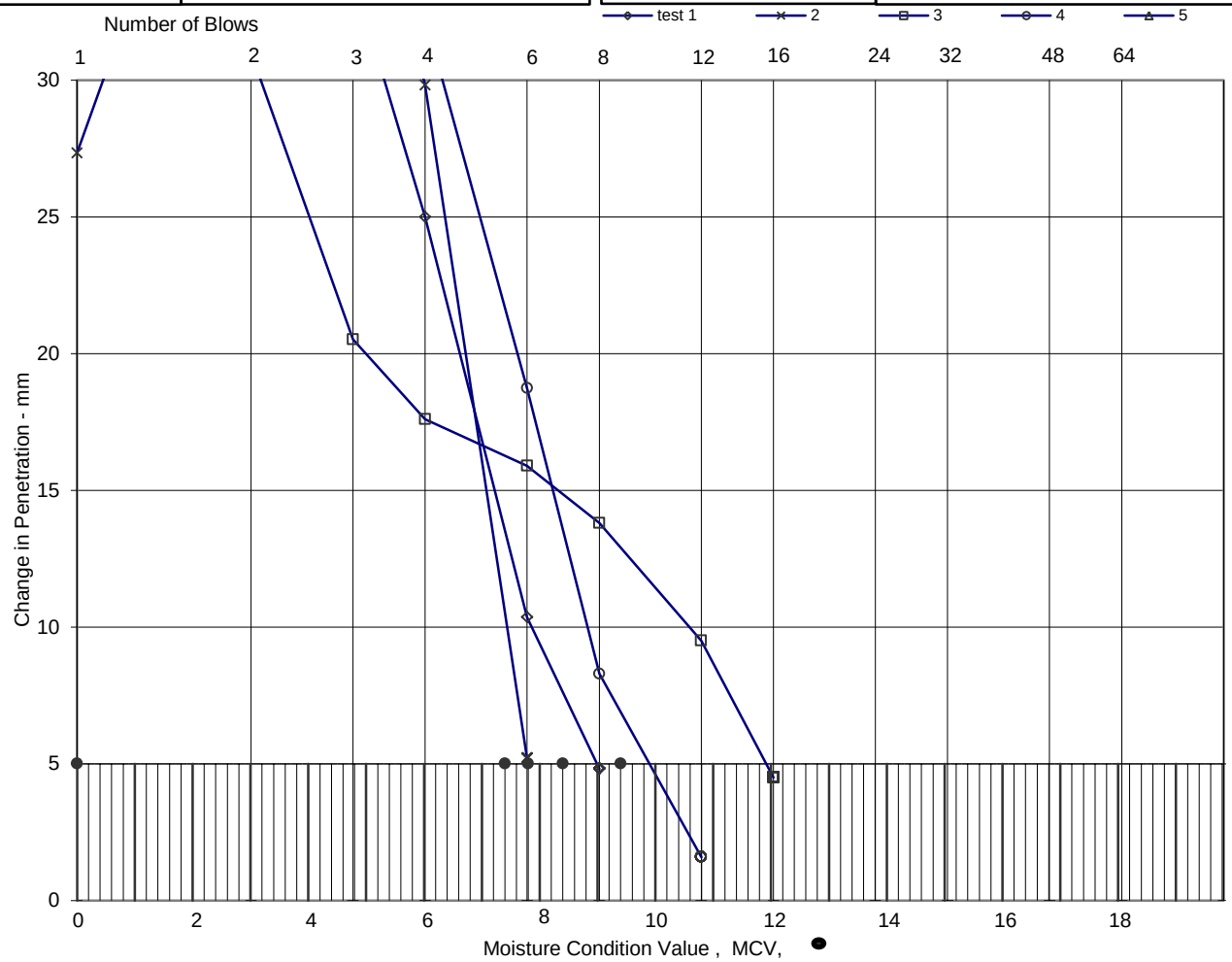
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191113101600

Hole No	ATK-TP-02
Sample Depth (m BGL)	0.50 - 0.70
Sample Type and No	B3
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		8.4	7.8	7.4	9.4	
Moisture Content	%	37.0	37.0	38.0	35.0	
Bulk density after test	Mg/m³	1.85	1.84	1.84	1.89	
Dry density after test	Mg/m³	1.36	1.34	1.33	1.40	
Vane shear strength	kPa	54	56	64	42	

Soil description	Brown slightly sandy CLAY
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	36.4
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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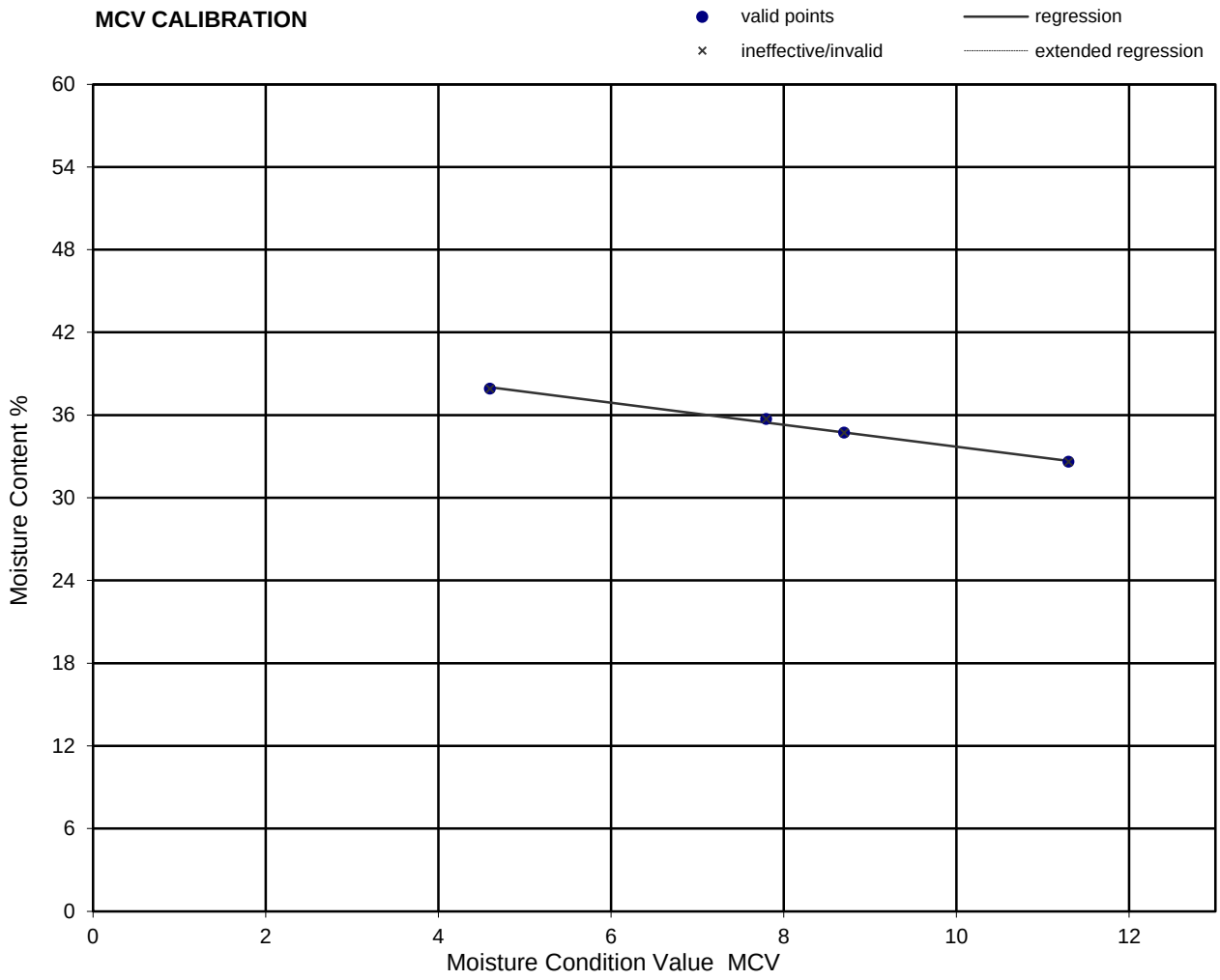
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191113101617

Hole No	ATK-TP-02
Sample Depth (m BGL)	1.30 - 1.40
Sample Type and No	B6
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	41.7
Slope	-0.79
Sensitivity (Change in MCV per 1% moisture content)	1.26
Correlation (proximity of test points to regression line)	-1.00
Method of interpretation of MCV	Steepest straight line

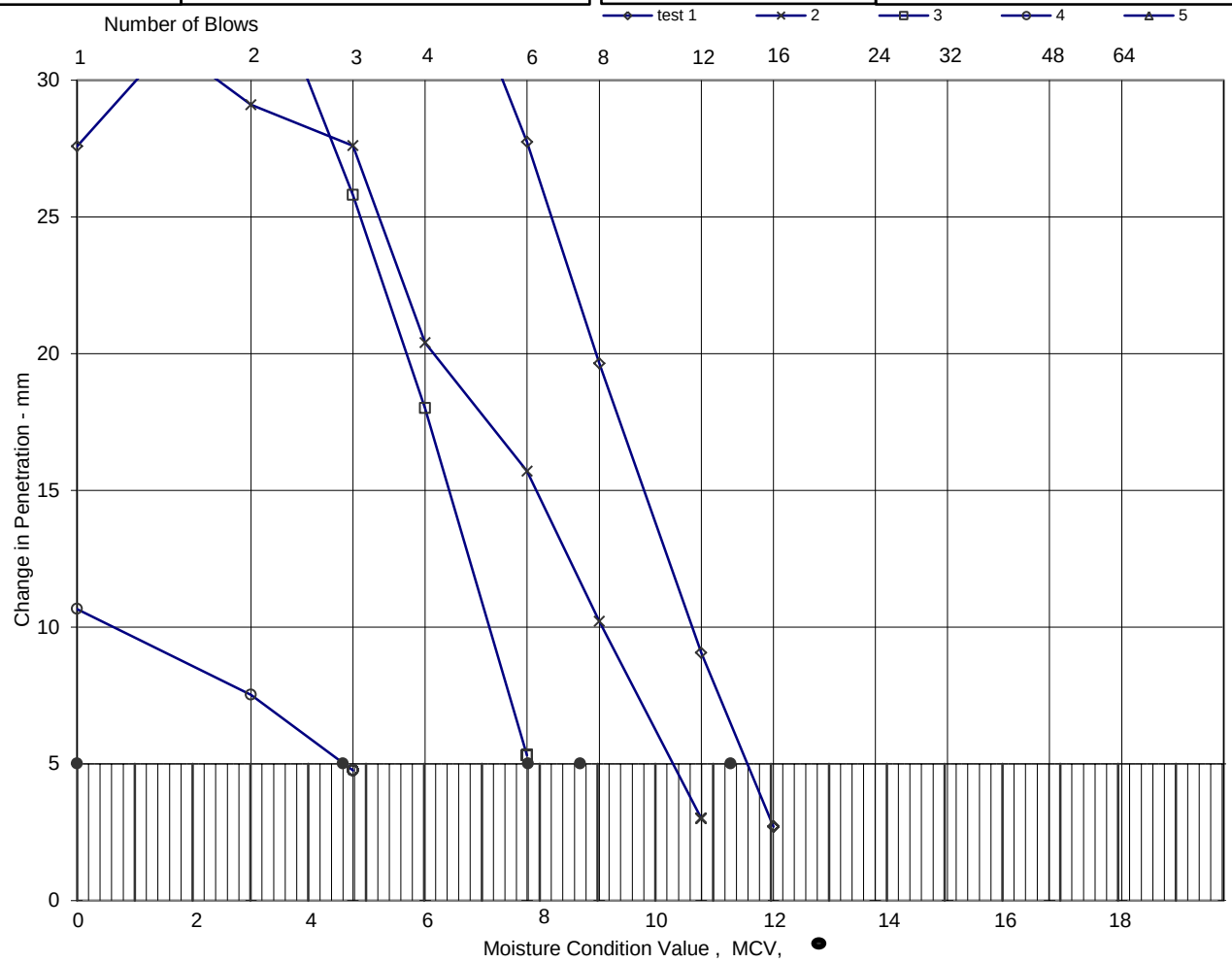
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191113101617

Hole No	ATK-TP-02
Sample Depth (m BGL)	1.30 - 1.40
Sample Type and No	B6
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.3	8.7	7.8	4.6	
Moisture Content	%	33.0	35.0	36.0	38.0	
Bulk density after test	Mg/m³	1.85	1.83	1.76	1.36	
Dry density after test	Mg/m³	1.40	1.36	1.30	0.99	

Soil description	Brown slightly sandy slightly gravelly CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	32.5
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

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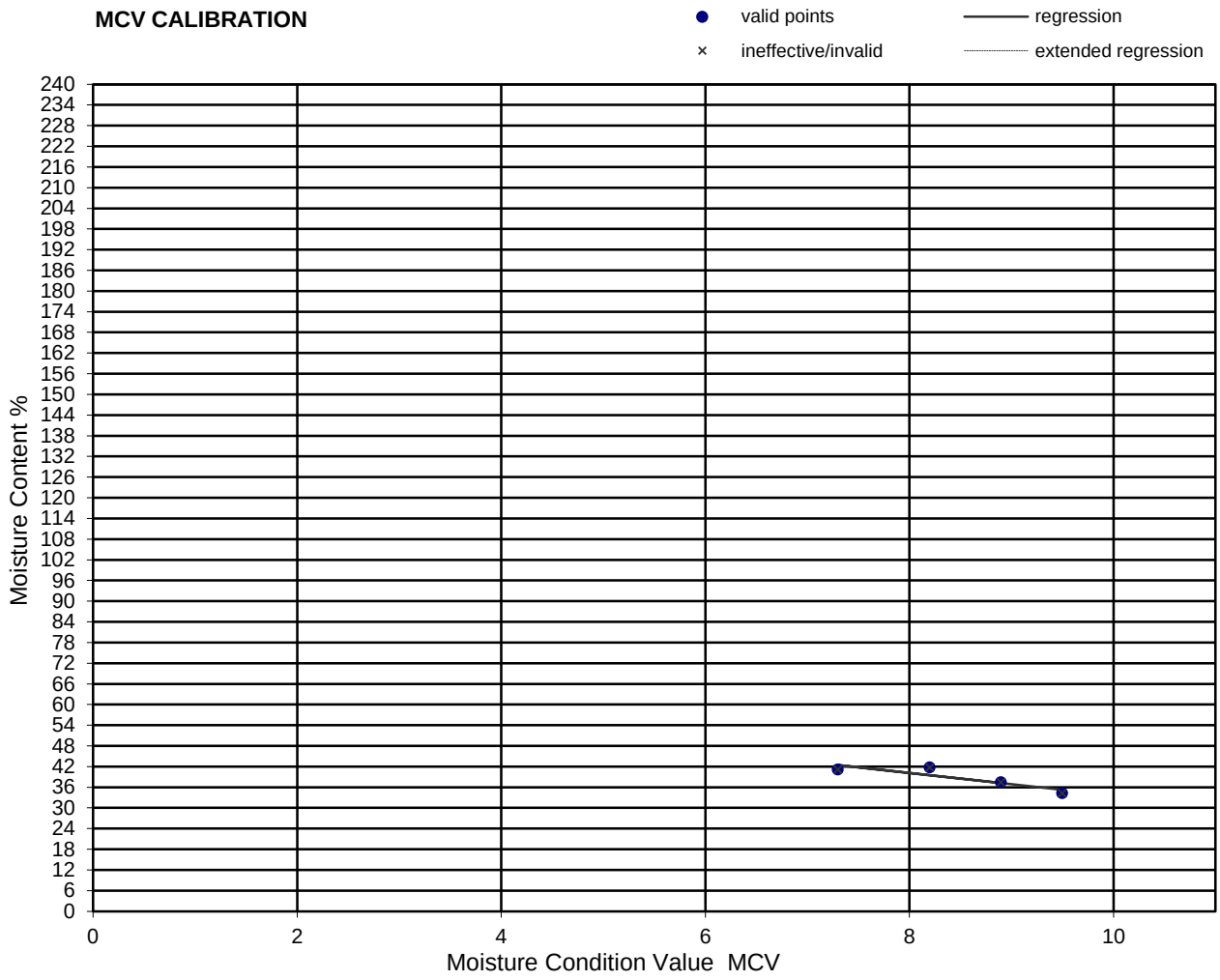
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080841

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	66.4
Slope	-3.28
Sensitivity (Change in MCV per 1% moisture content)	0.31
Correlation (proximity of test points to regression line)	-0.89
Method of interpretation of MCV	Steepest straight line

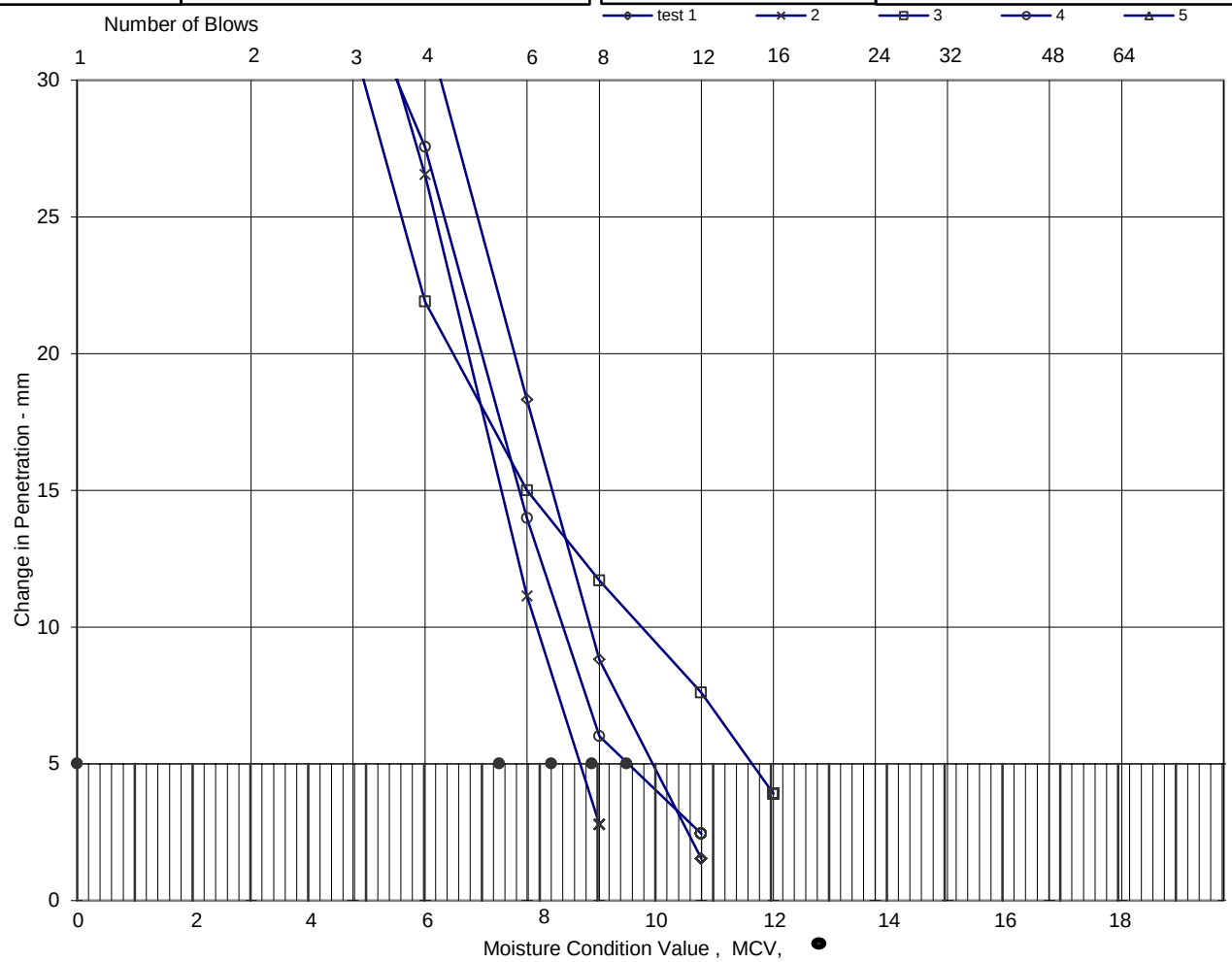
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080841

Hole No	ATK-TP-03
Sample Depth (m BGL)	0.90 - 1.00
Sample Type and No	B6
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		9.5	7.3	8.2	8.9	
Moisture Content	%	34.0	41.0	42.0	37.0	
Bulk density after test	Mg/m³	1.73	1.79	1.57	1.83	
Dry density after test	Mg/m³	1.29	1.27	1.11	1.33	
Vane shear strength	kPa	32	26	20	34	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	34.2
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

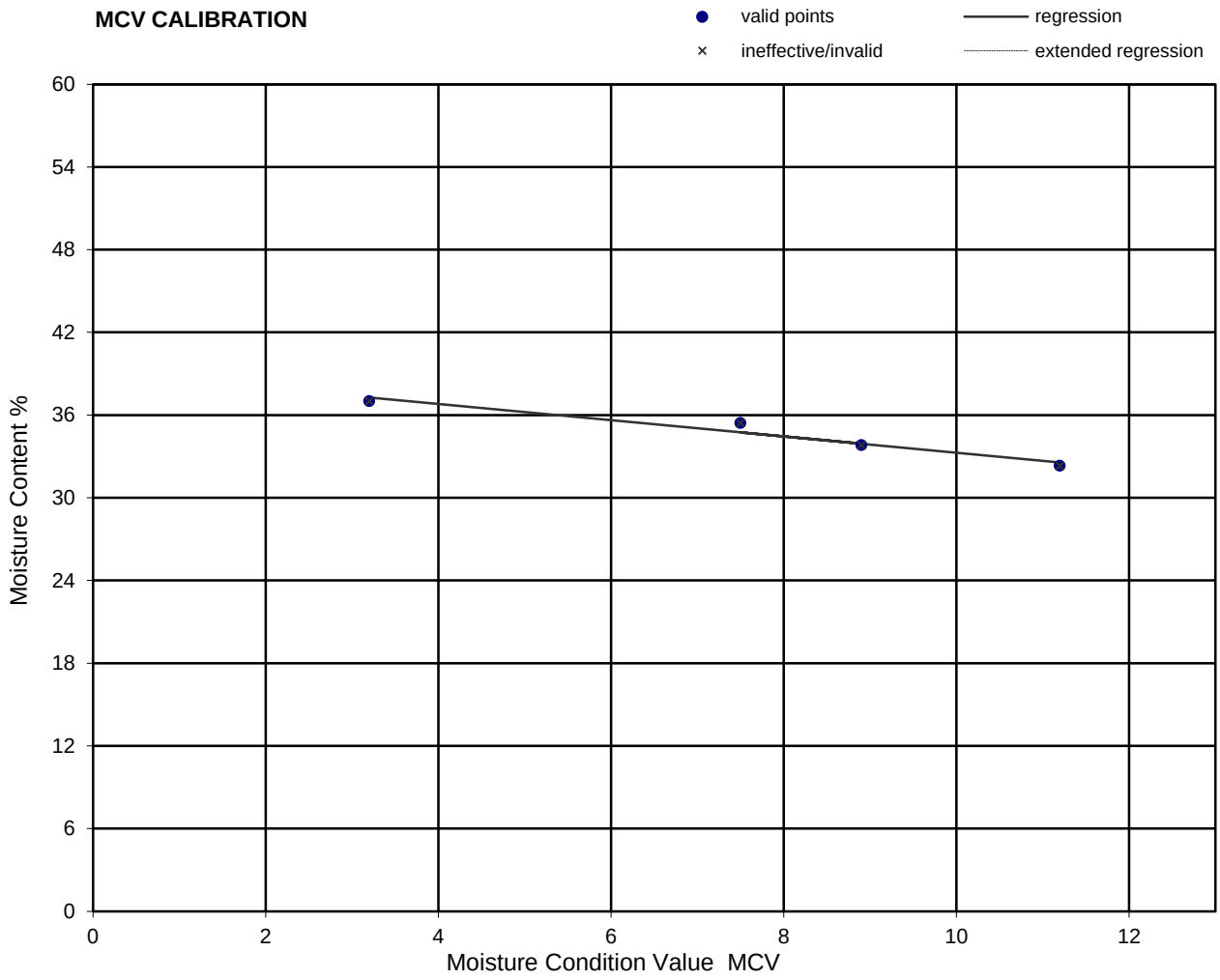
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080900

Hole No	ATK-TP-03
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B11
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	39.2
Slope	-0.59
Sensitivity (Change in MCV per 1% moisture content)	1.70
Correlation (proximity of test points to regression line)	-0.98
Method of interpretation of MCV	Steepest straight line

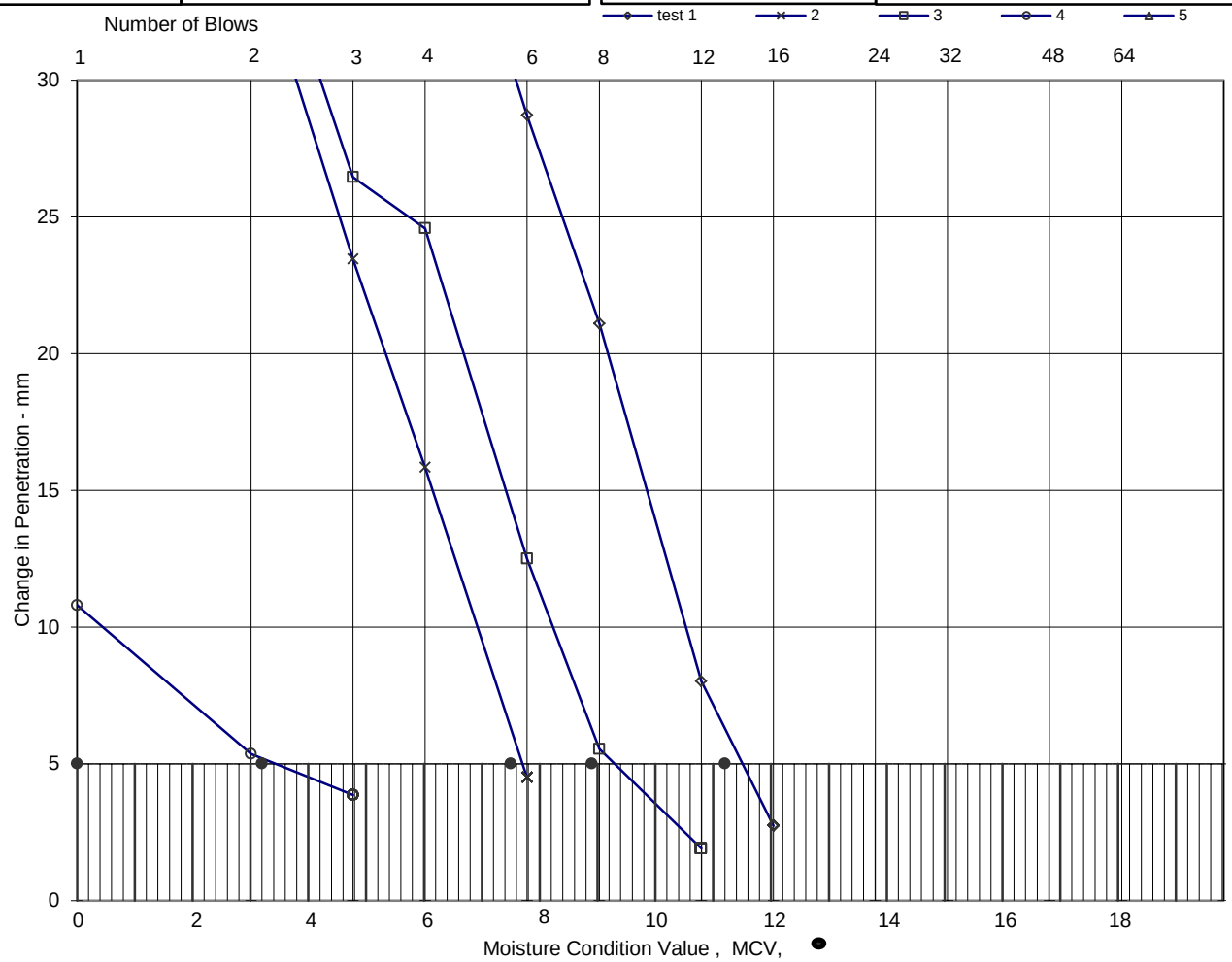
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080900

Hole No	ATK-TP-03
Sample Depth (m BGL)	2.20 - 2.40
Sample Type and No	B11
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.2	7.5	8.9	3.2	
Moisture Content	%	32.0	35.0	34.0	37.0	
Bulk density after test	Mg/m³	1.88	1.83	1.85	1.86	
Dry density after test	Mg/m³	1.42	1.35	1.38	1.36	
Vane shear strength	kPa	52	34	38	30	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	32.2
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

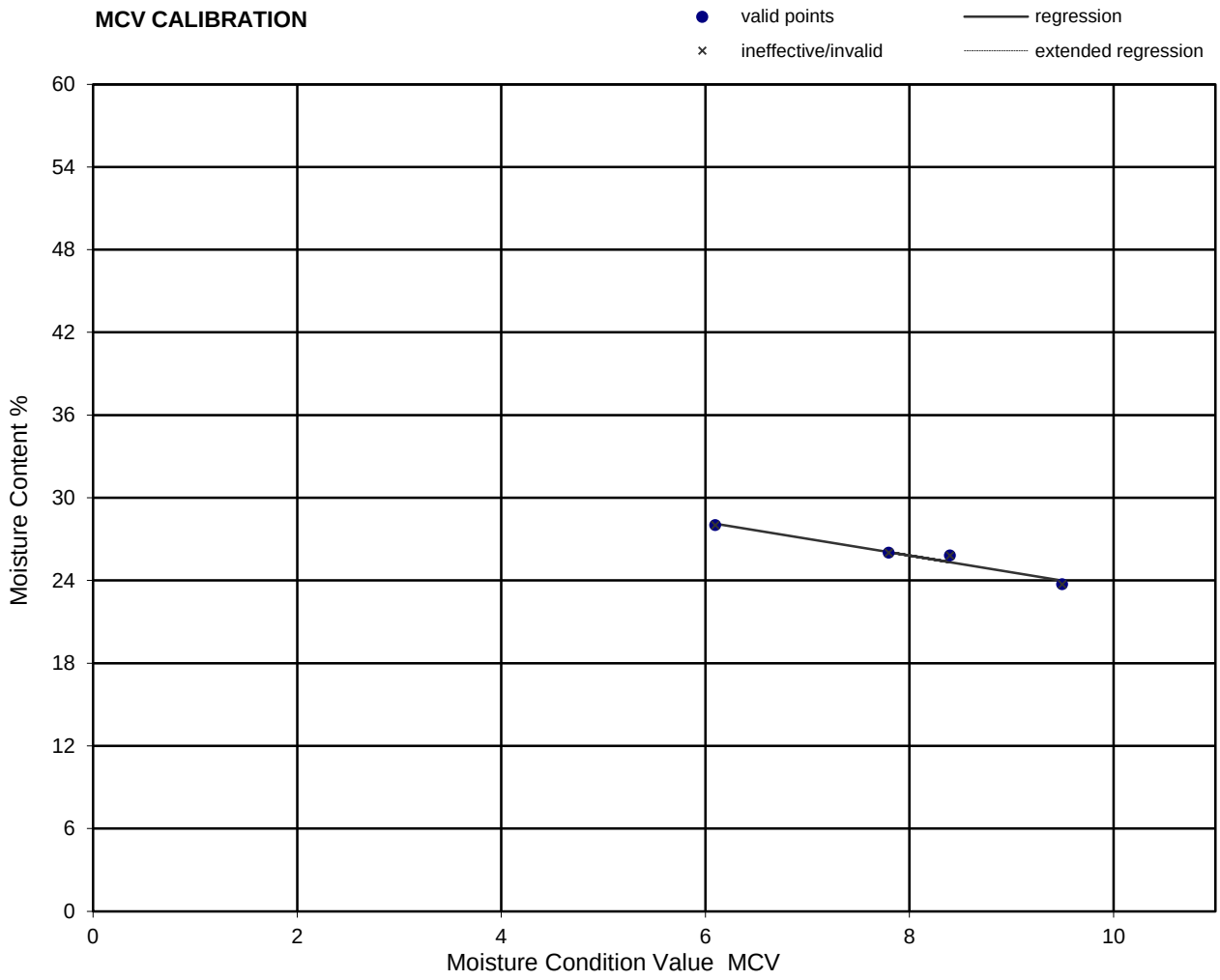
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080910

Hole No	ATK-TP-03
Sample Depth (m BGL)	3.10 - 3.20
Sample Type and No	B13
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	35.5
Slope	-1.22
Sensitivity (Change in MCV per 1% moisture content)	0.82
Correlation (proximity of test points to regression line)	-0.98
Method of interpretation of MCV	Steepest straight line

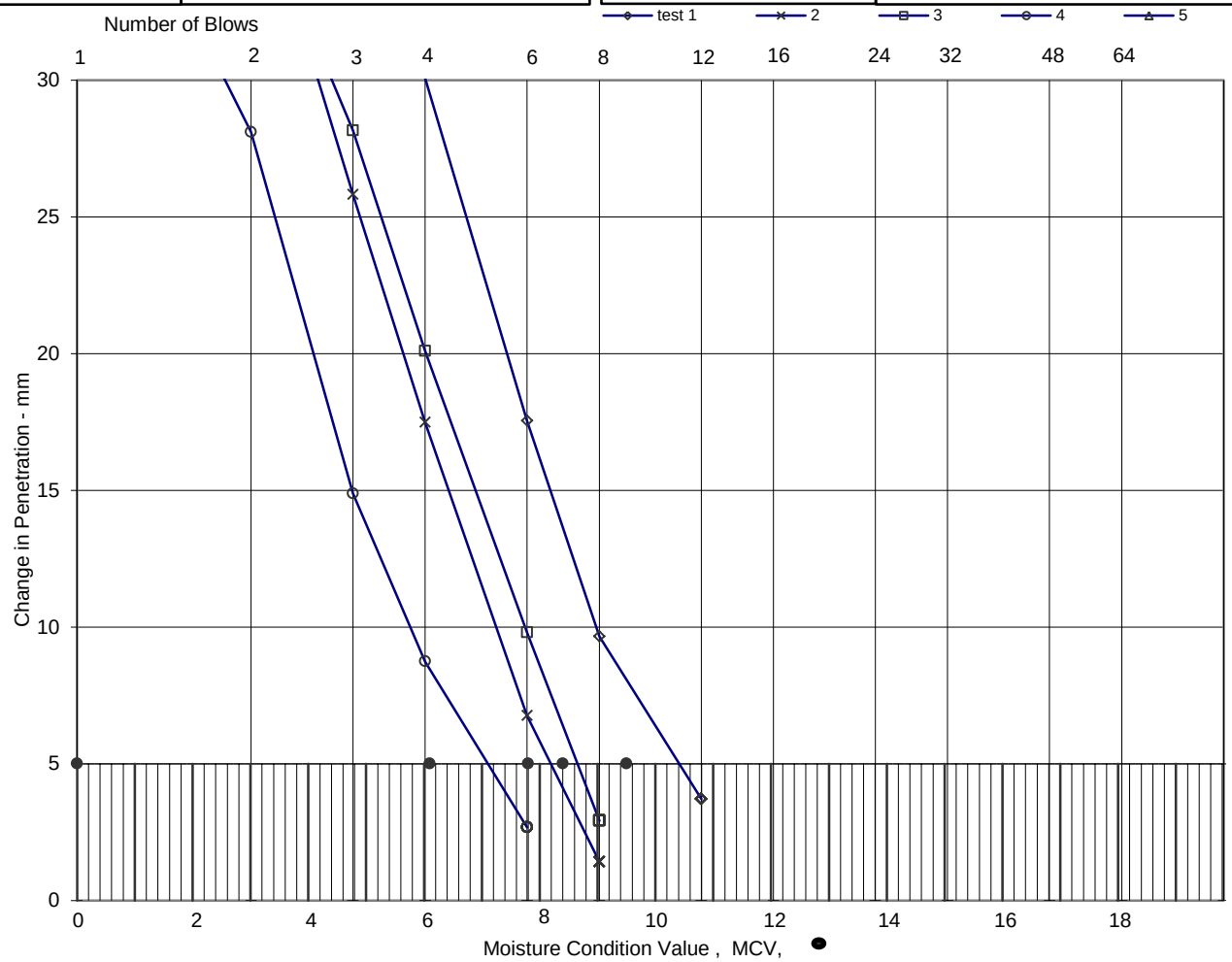
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191115080910

Hole No	ATK-TP-03
Sample Depth (m BGL)	3.10 - 3.20
Sample Type and No	B13
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		9.5	7.8	8.4	6.1	
Moisture Content	%	24.0	26.0	26.0	28.0	
Bulk density after test	Mg/m³	1.99	1.95	1.98	1.93	
Dry density after test	Mg/m³	1.61	1.55	1.57	1.51	
Vane shear strength	kPa	16	20	40	66	

Soil description	Dark grey slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	28.1
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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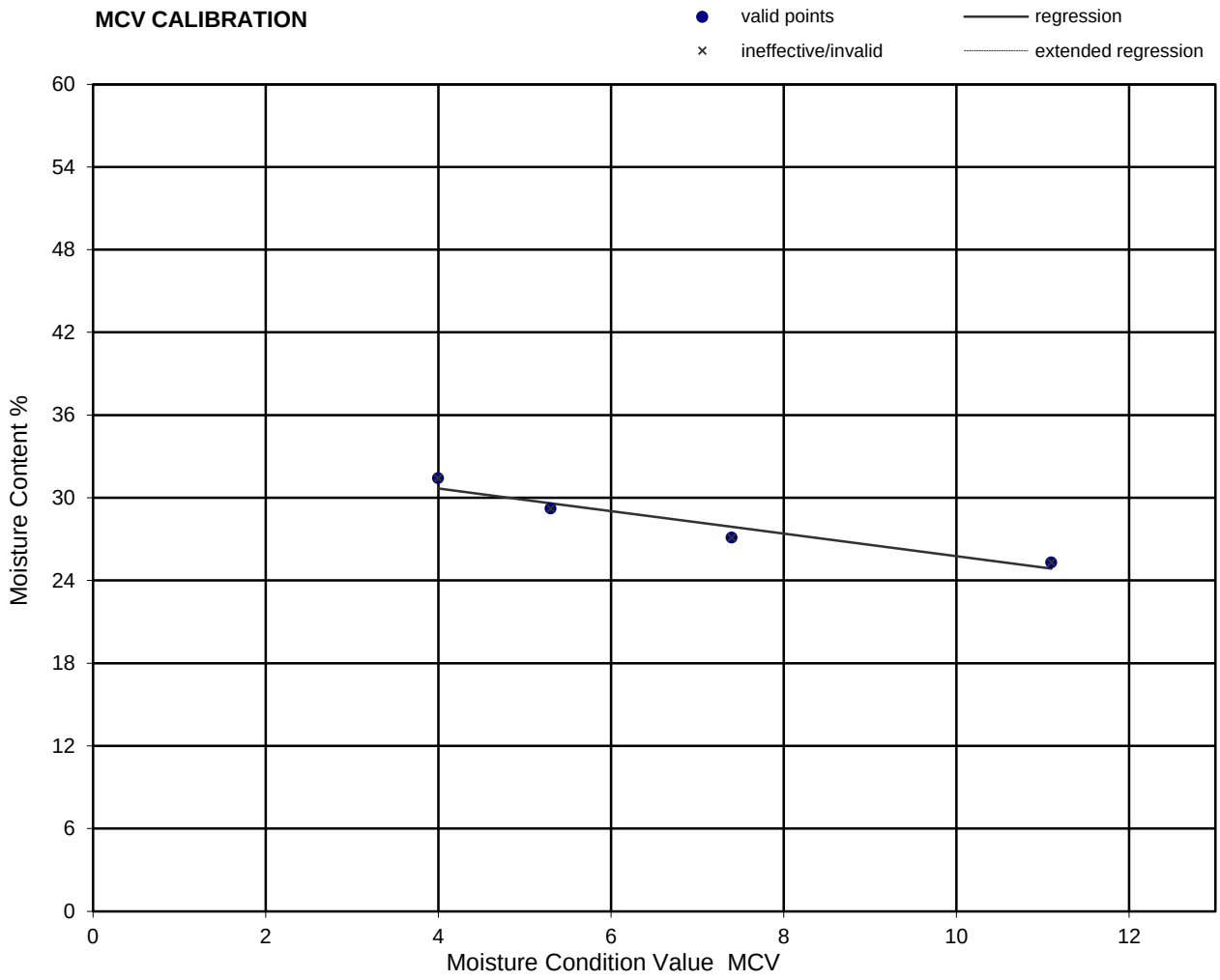
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127041518

Hole No	ATK-TP-04
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B12
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	33.9
Slope	-0.82
Sensitivity (Change in MCV per 1% moisture content)	1.22
Correlation (proximity of test points to regression line)	-0.96
Method of interpretation of MCV	Steepest straight line

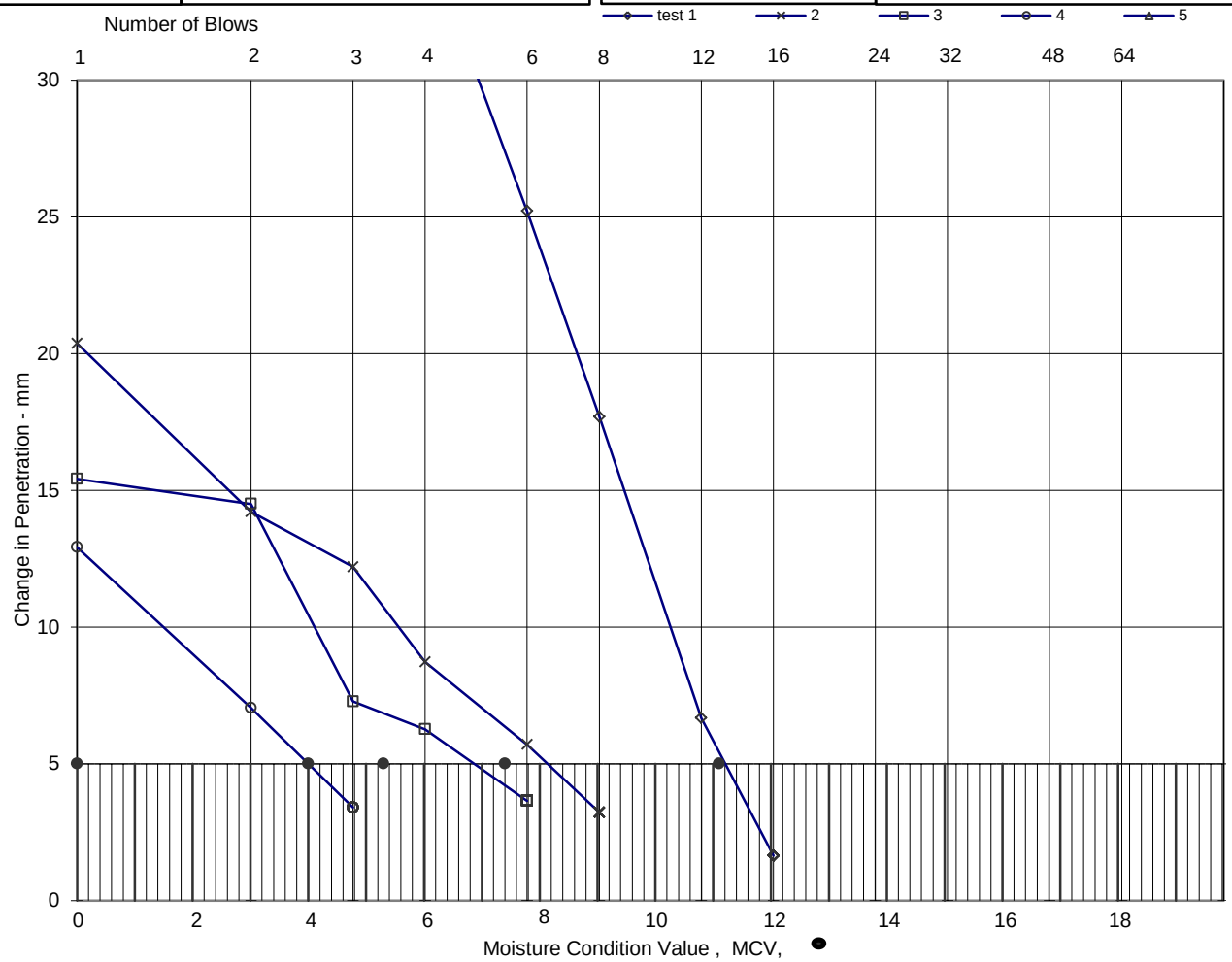
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191127041518

Hole No	ATK-TP-04
Sample Depth (m BGL)	3.00 - 3.10
Sample Type and No	B12
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.1	7.4	5.3	4.0	
Moisture Content	%	25.0	27.0	29.0	31.0	
Bulk density after test	Mg/m³	2.07	1.47	1.43	1.42	
Dry density after test	Mg/m³	1.65	1.16	1.11	1.08	
Vane shear strength	kPa	60	52	46	40	

Soil description	Reddish brown mottled grey slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	25.3
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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MCVREL

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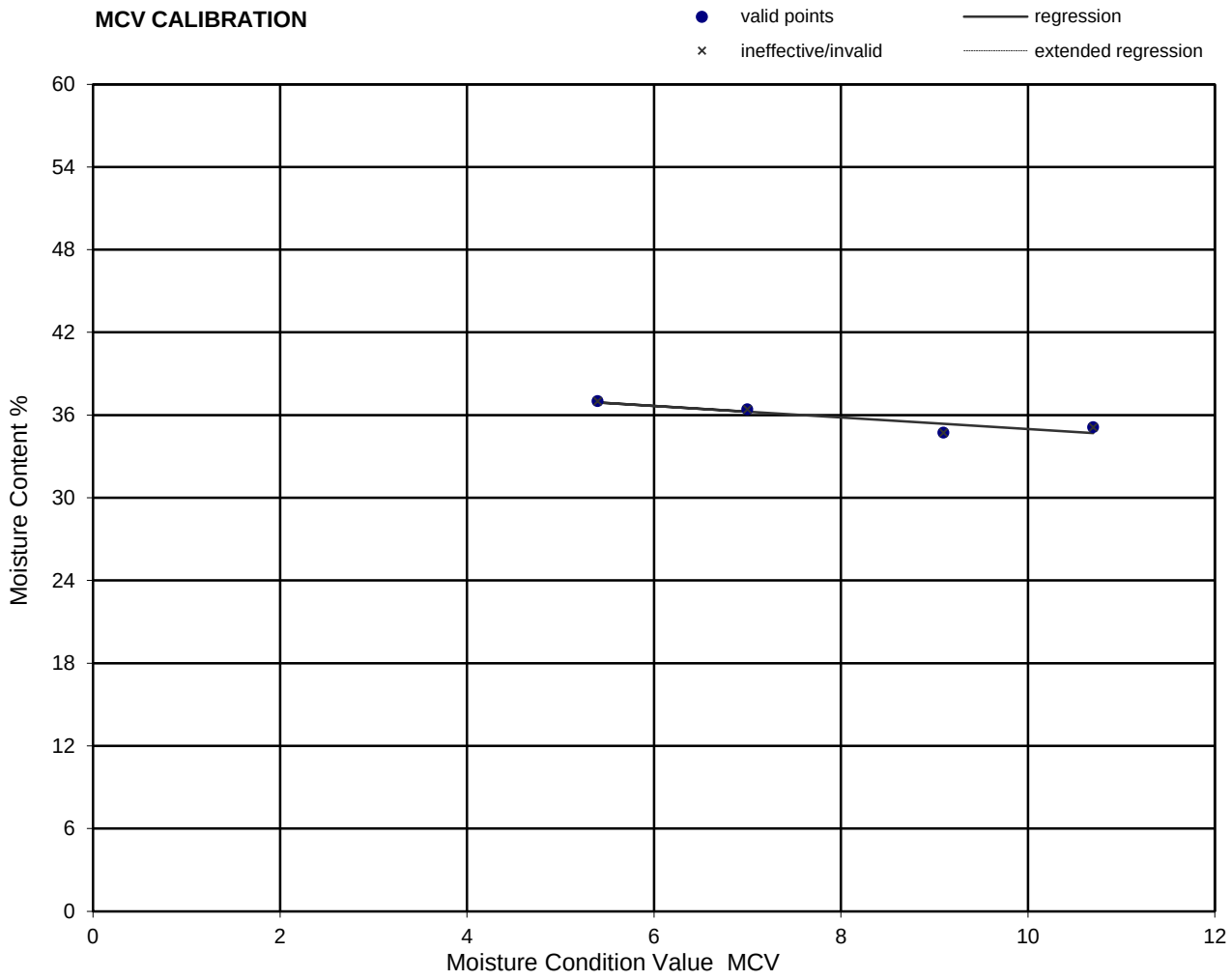
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040049

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.90 - 1.20
Sample Type and No	B8
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	39.2
Slope	-0.42
Sensitivity (Change in MCV per 1% moisture content)	2.38
Correlation (proximity of test points to regression line)	-0.90
Method of interpretation of MCV	Steepest straight line

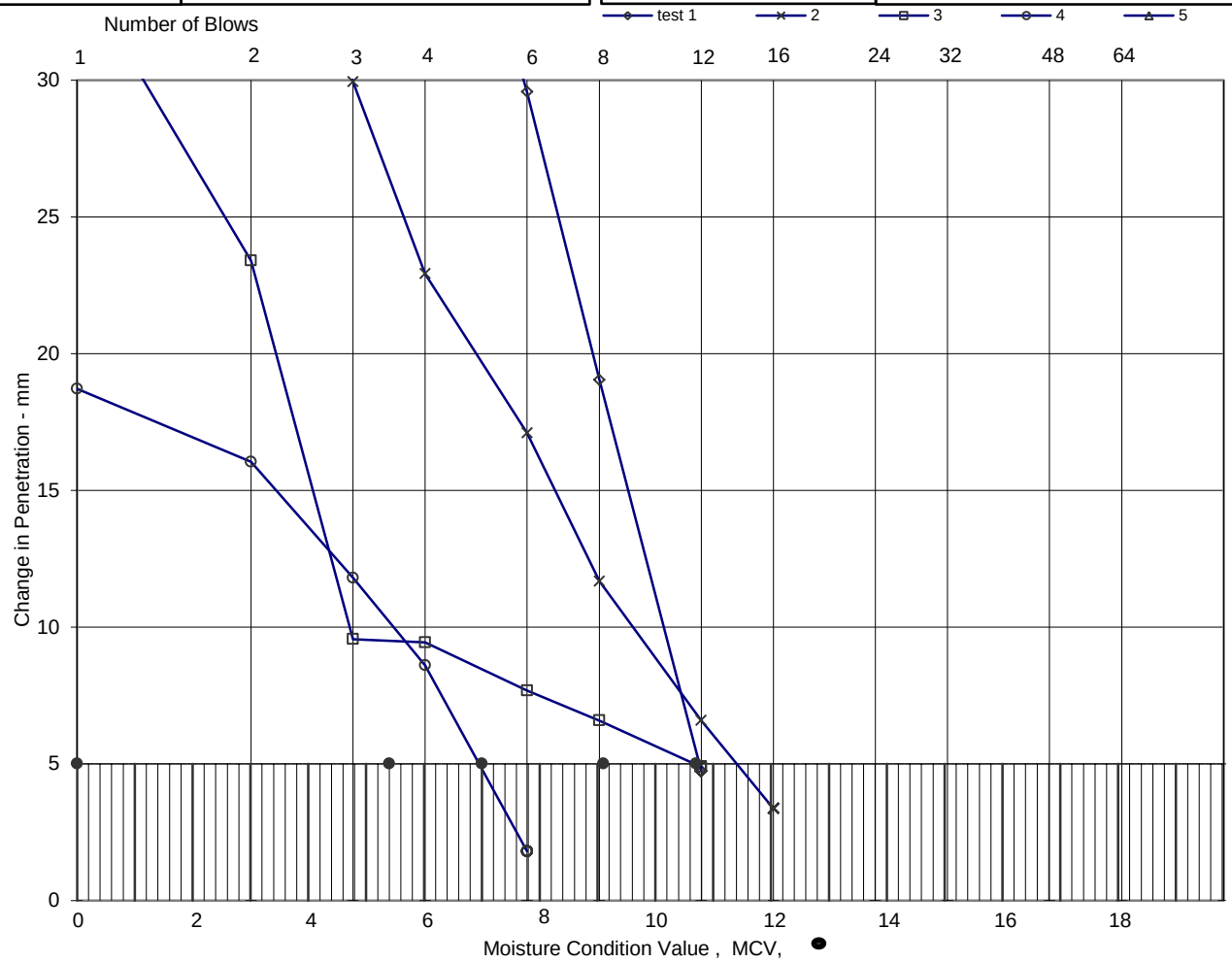
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040049

Hole No	ATK-TP-06
Sample Depth (m BGL)	0.90 - 1.20
Sample Type and No	B8
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		10.7	9.1	5.4	7.0	
Moisture Content	%	35.0	35.0	37.0	36.0	
Bulk density after test	Mg/m³	1.85	1.48	1.44	1.35	
Dry density after test	Mg/m³	1.37	1.10	1.05	0.99	
Vane shear strength	kPa	48	42	56	64	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	35.1
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

UKAS TESTING
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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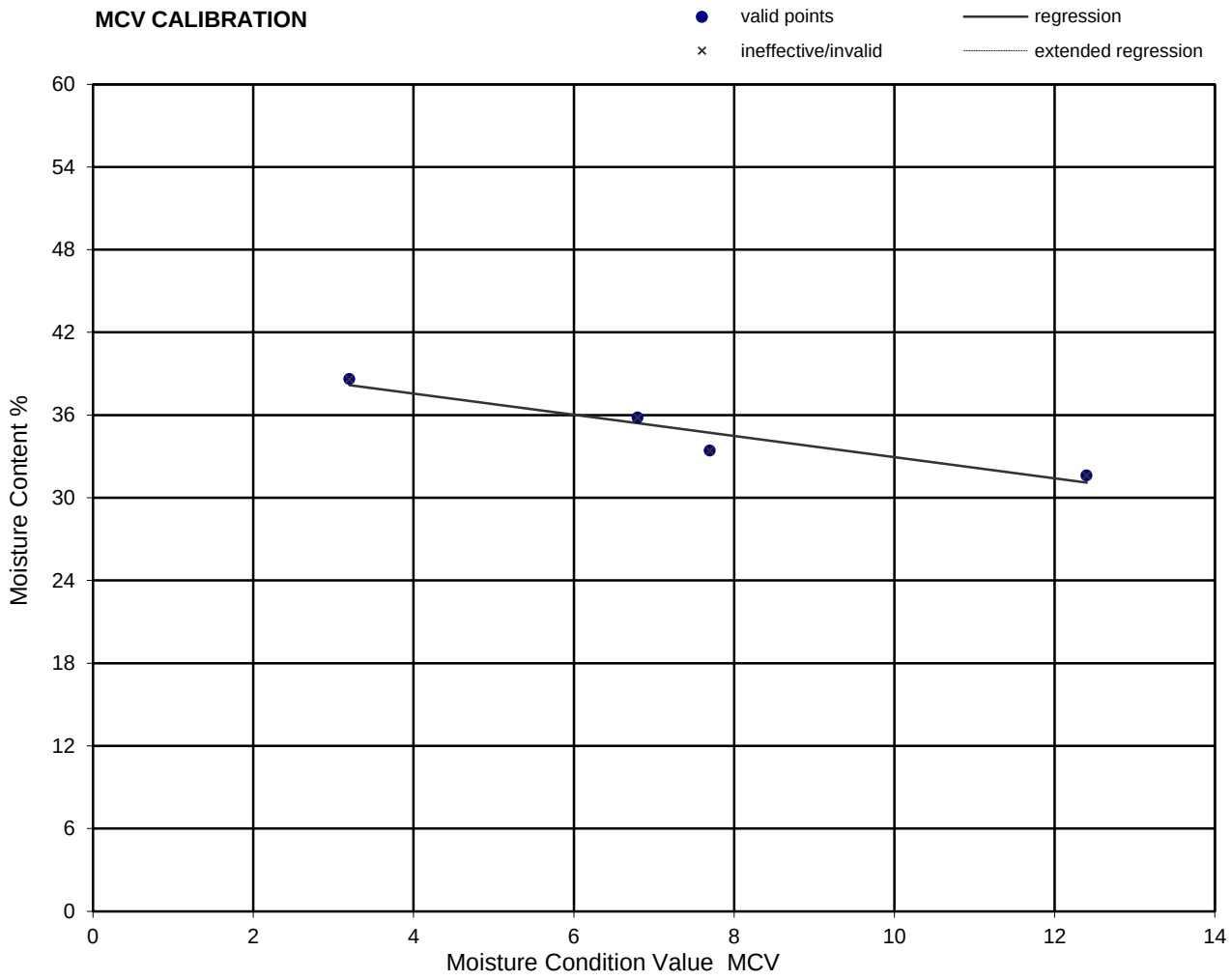
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040141

Hole No	ATK-TP-06
Sample Depth (m BGL)	2.00 - 2.40
Sample Type and No	B11
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	40.6
Slope	-0.77
Sensitivity (Change in MCV per 1% moisture content)	1.30
Correlation (proximity of test points to regression line)	-0.96
Method of interpretation of MCV	Steepest straight line

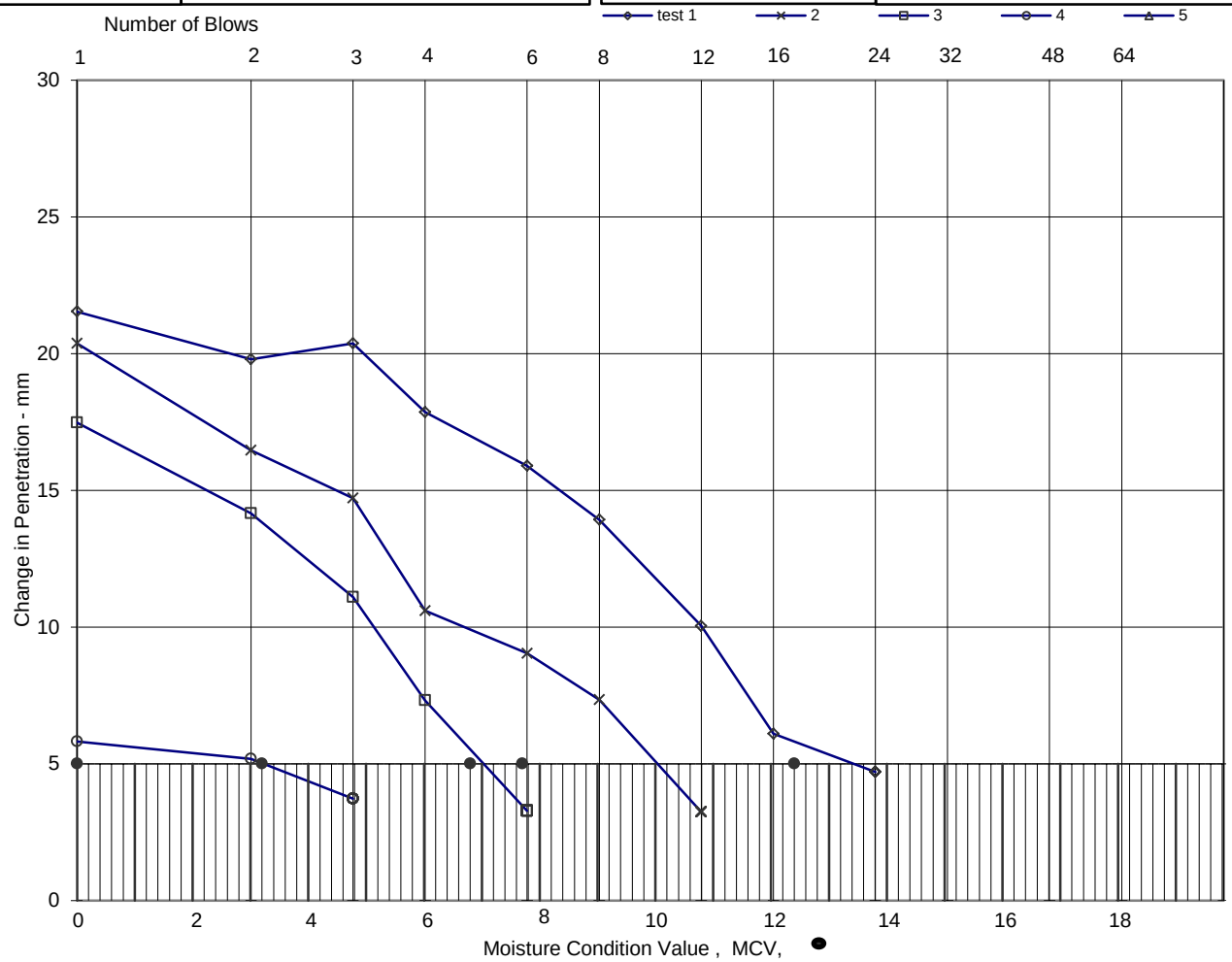
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040141

Hole No	ATK-TP-06
Sample Depth (m BGL)	2.00 - 2.40
Sample Type and No	B11
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		12.4	7.7	6.8	3.2	
Moisture Content	%	32.0	33.0	36.0	39.0	
Bulk density after test	Mg/m³	1.39	1.33	1.37	1.33	
Dry density after test	Mg/m³	1.06	1.00	1.01	0.96	
Vane shear strength	kPa	32	28	24	20	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	31.6
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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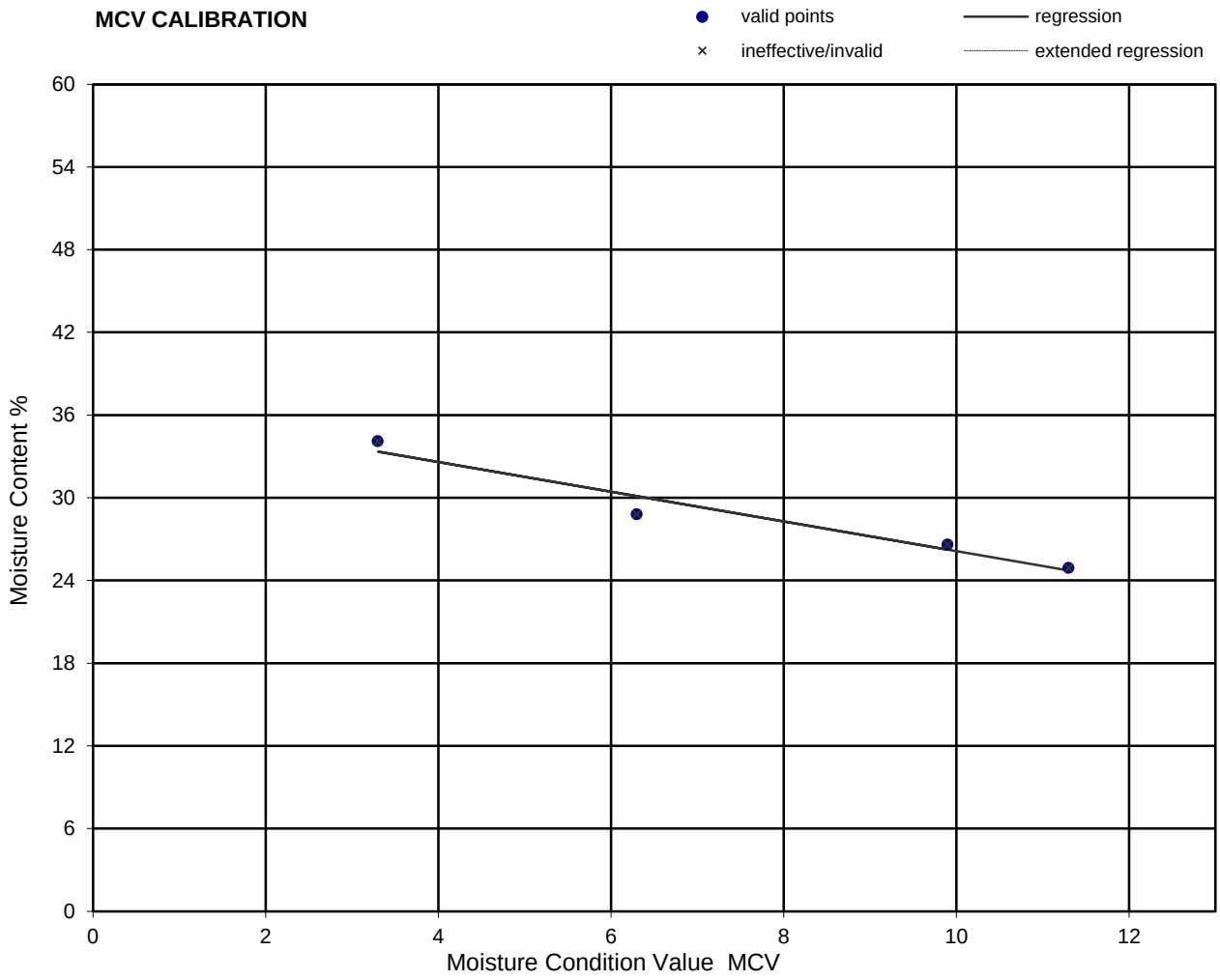
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040158

Hole No	ATK-TP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B13
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	36.9
Slope	-1.08
Sensitivity (Change in MCV per 1% moisture content)	0.93
Correlation (proximity of test points to regression line)	-0.97
Method of interpretation of MCV	Steepest straight line

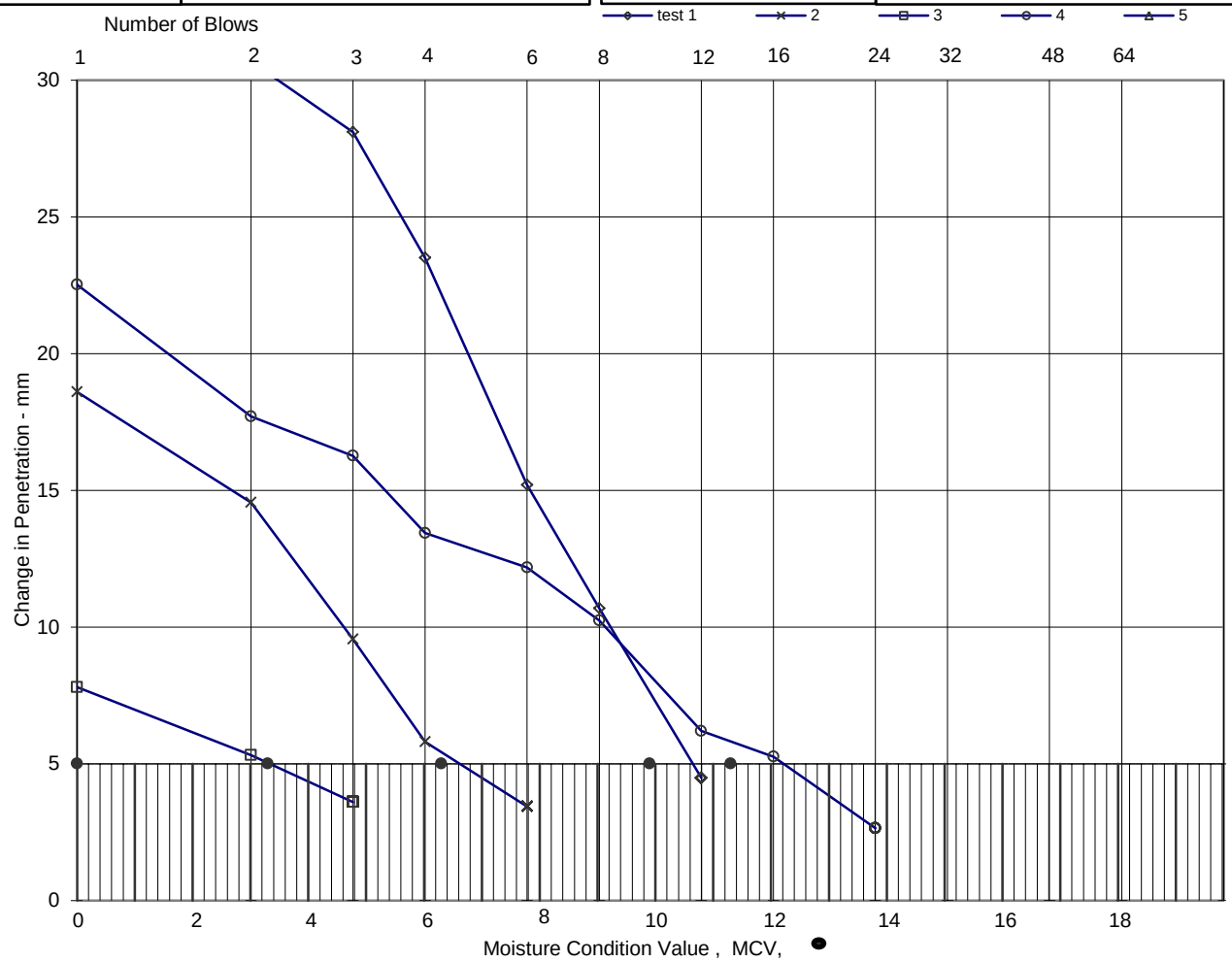
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191211040158

Hole No	ATK-TP-06
Sample Depth (m BGL)	3.00 - 3.50
Sample Type and No	B13
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		9.9	6.3	3.3	11.3	
Moisture Content	%	27.0	29.0	34.0	25.0	
Bulk density after test	Mg/m³	1.68	1.34	1.32	1.39	
Dry density after test	Mg/m³	1.33	1.04	0.98	1.11	
Vane shear strength	kPa	78	70	64	58	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	26.6
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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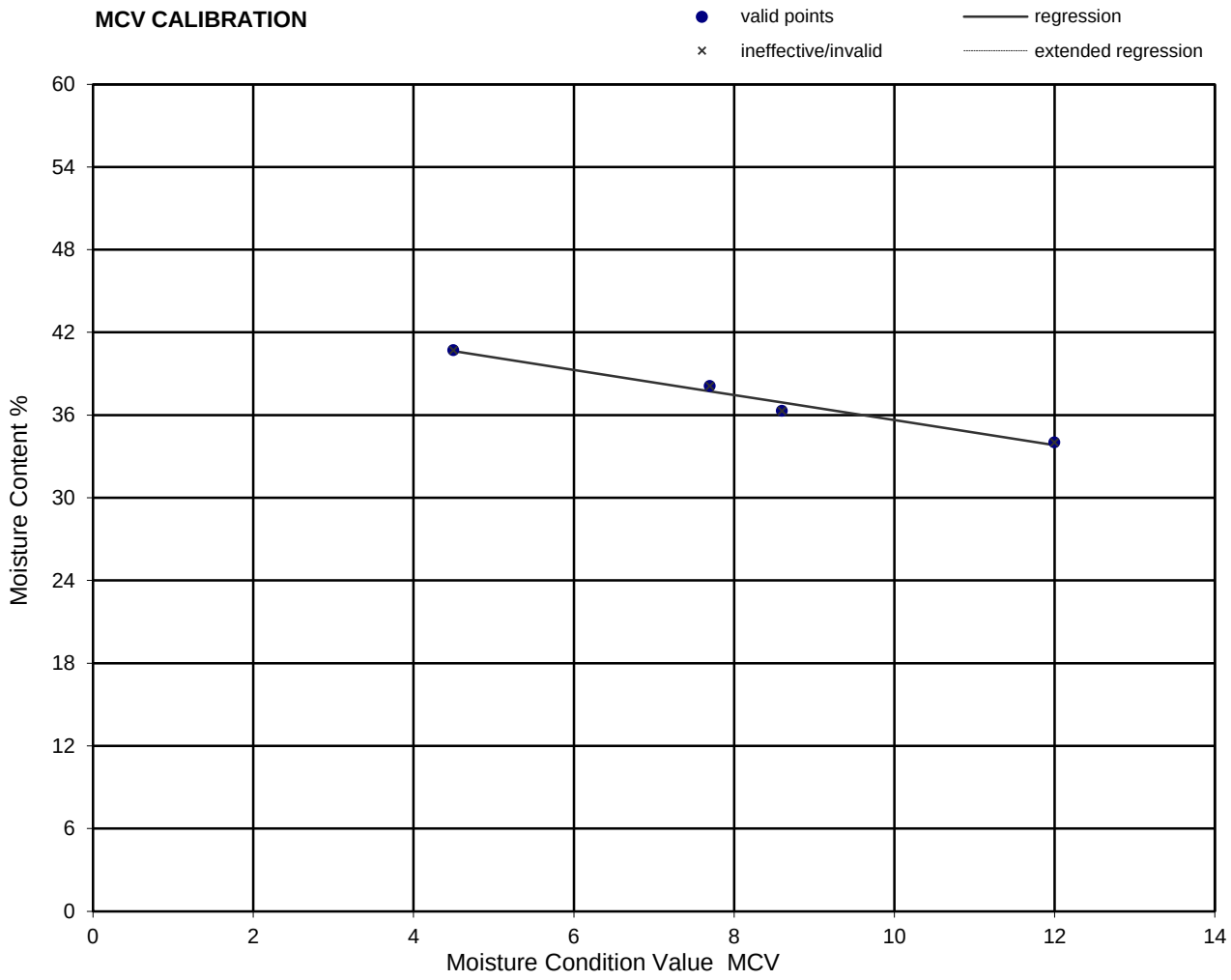
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191204111005

Hole No	ATK-TPM-03
Sample Depth (m BGL)	3.60 - 3.70
Sample Type and No	B12
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	44.7
Slope	-0.91
Sensitivity (Change in MCV per 1% moisture content)	1.10
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

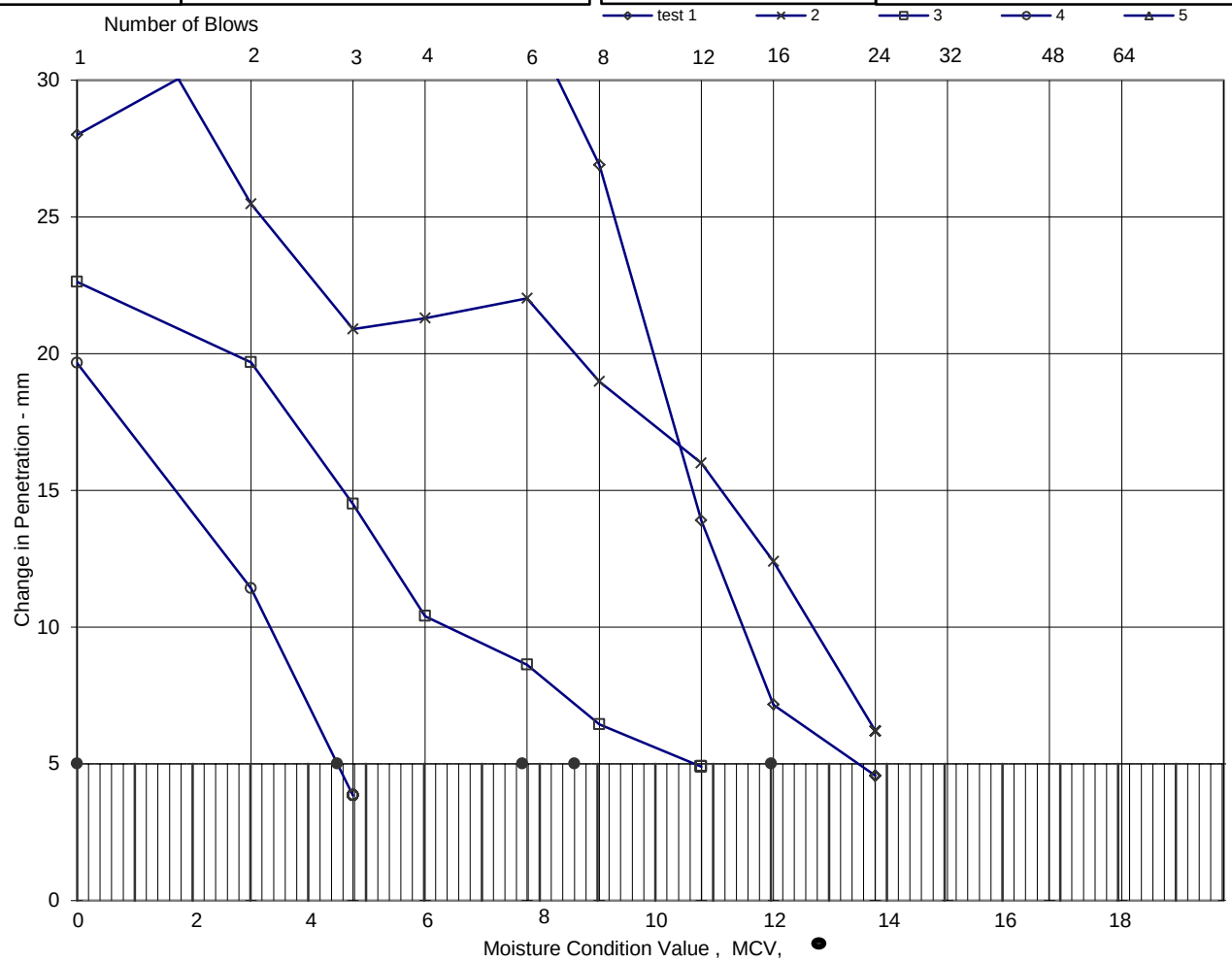
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191204111005

Hole No	ATK-TPM-03
Sample Depth (m BGL)	3.60 - 3.70
Sample Type and No	B12
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		12.0	8.6	7.7	4.5	
Moisture Content	%	34.0	36.0	38.0	41.0	
Bulk density after test	Mg/m³	1.65	1.60	1.32	1.33	
Dry density after test	Mg/m³	1.23	1.17	0.96	0.95	
Vane shear strength	kPa	100	88	76	62	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	34
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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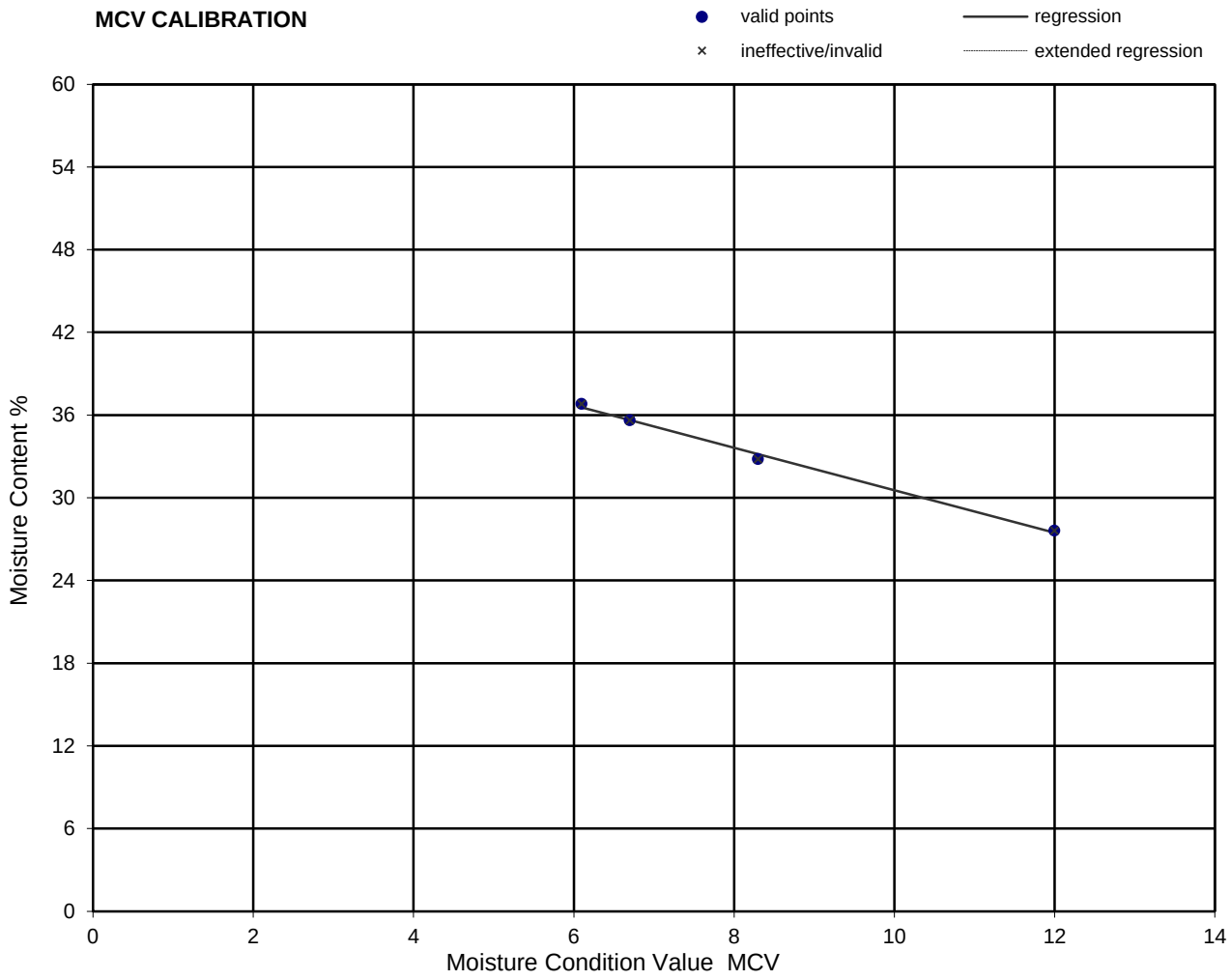
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191204125101

Hole No	ATK-TPM-04
Sample Depth (m BGL)	1.50 - 1.60
Sample Type and No	B7
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	45.9
Slope	-1.54
Sensitivity (Change in MCV per 1% moisture content)	0.65
Correlation (proximity of test points to regression line)	-1.00
Method of interpretation of MCV	Steepest straight line

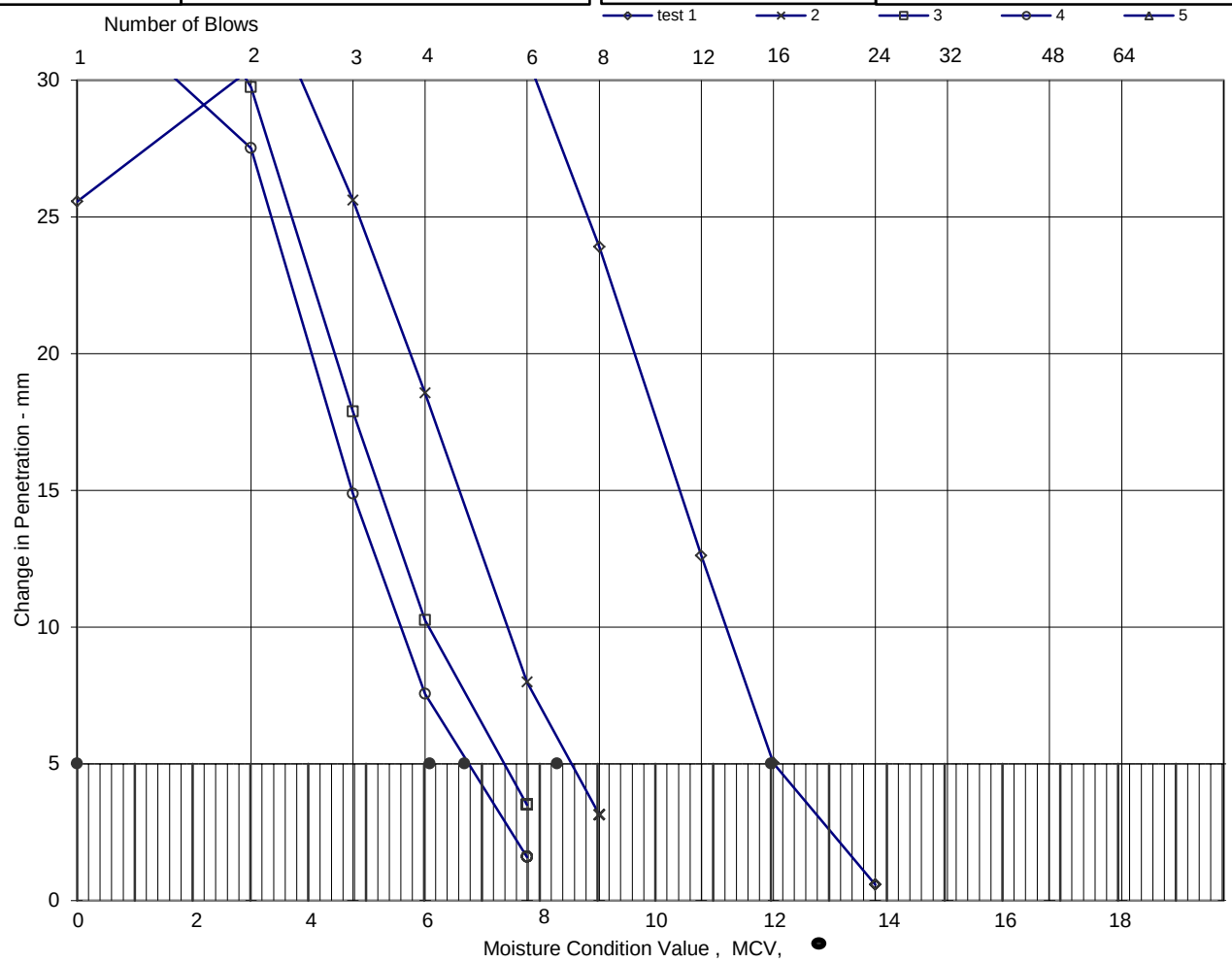
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-1920191204125101

Hole No	ATK-TPM-04
Sample Depth (m BGL)	1.50 - 1.60
Sample Type and No	B7
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		12.0	8.3	6.7	6.1	
Moisture Content	%	28.0	33.0	36.0	37.0	
Bulk density after test	Mg/m³	1.97	1.94	1.90	1.86	
Dry density after test	Mg/m³	1.54	1.46	1.40	1.36	
Vane shear strength	kPa	69	46	26	20	

Soil description	Brown slightly sandy slightly gravelly CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	27.6
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

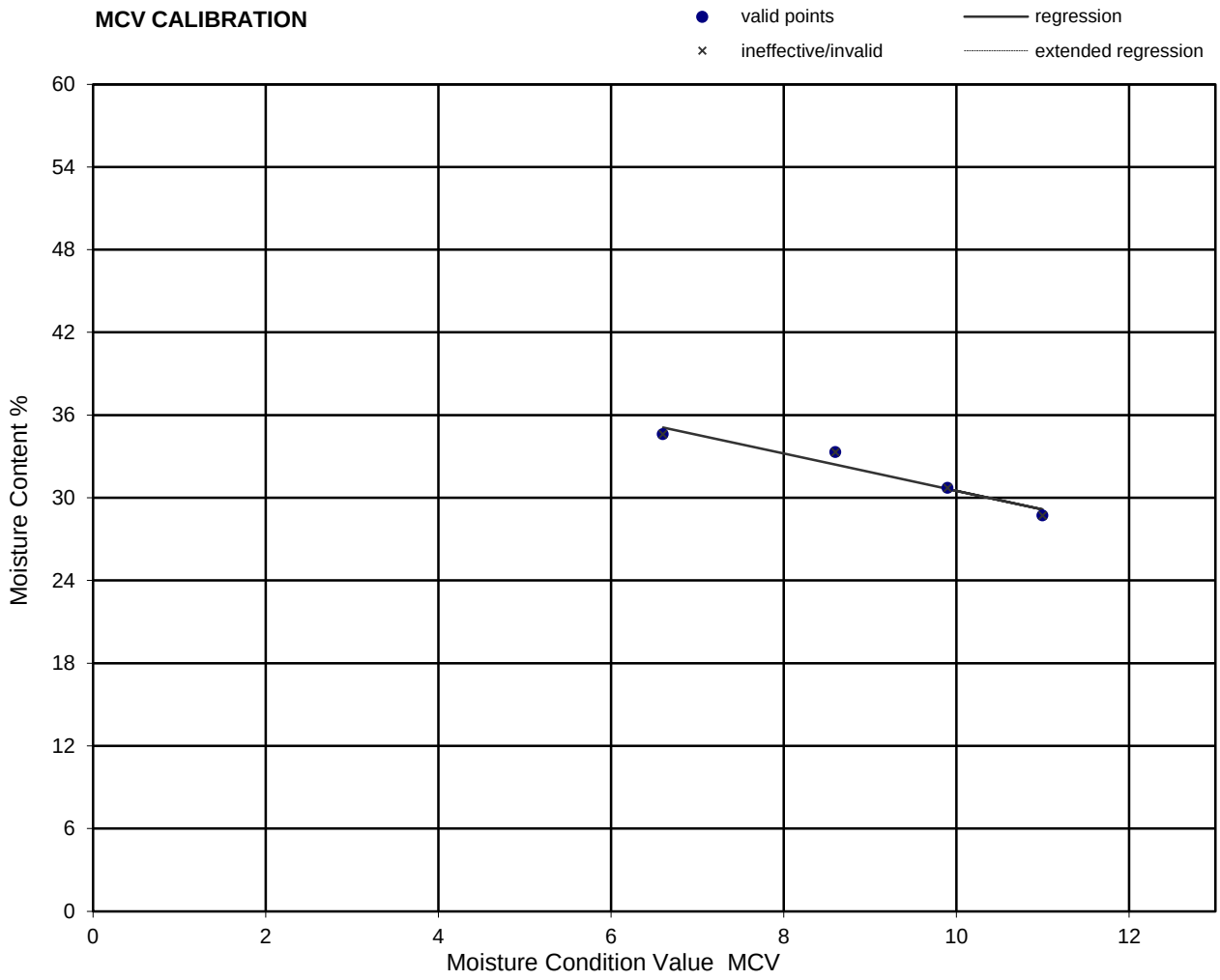
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032002

Hole No	ATK-TPM-05
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B8
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	44.0
Slope	-1.35
Sensitivity (Change in MCV per 1% moisture content)	0.74
Correlation (proximity of test points to regression line)	-0.97
Method of interpretation of MCV	Steepest straight line

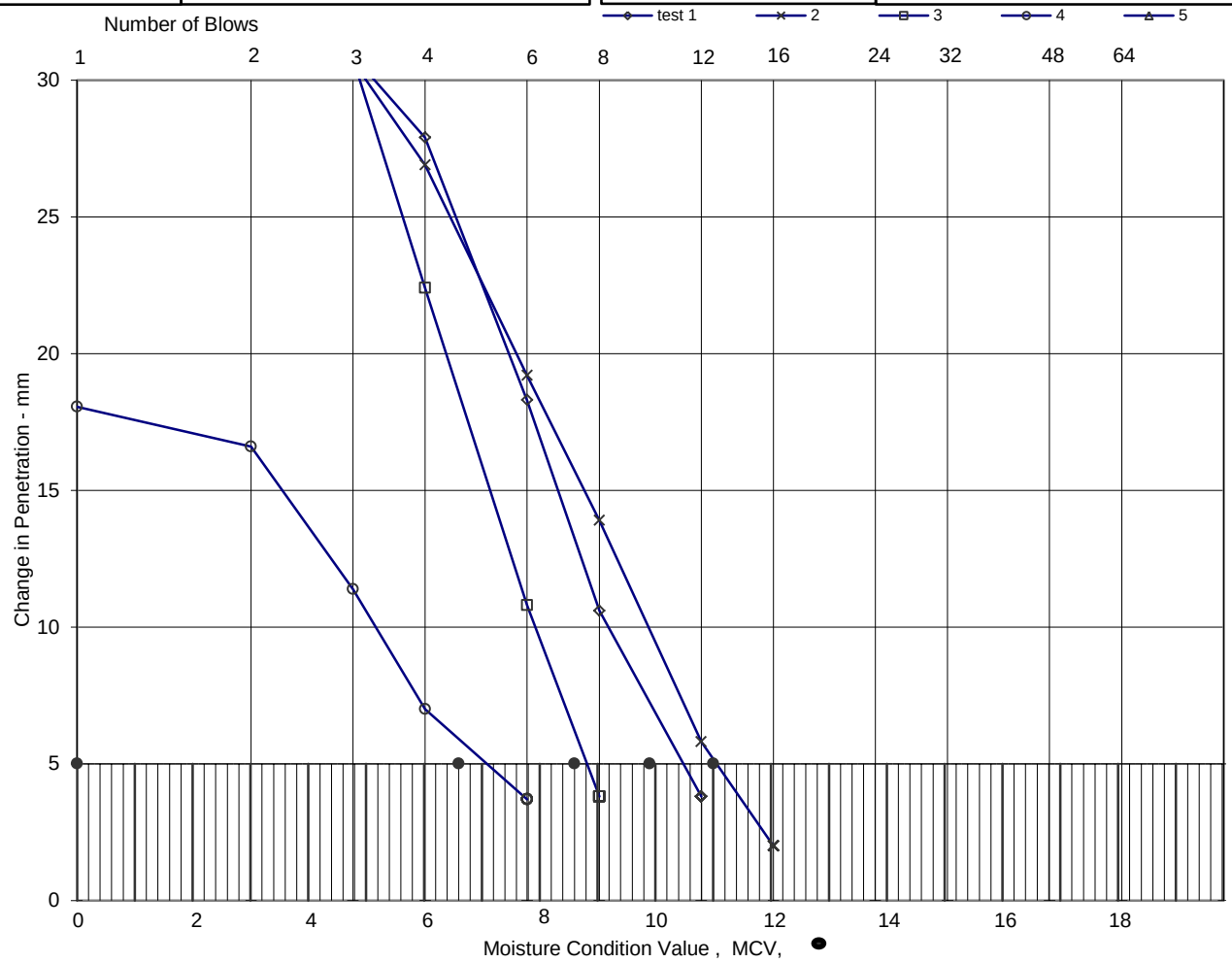
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032002

Hole No	ATK-TPM-05
Sample Depth (m BGL)	1.60 - 1.70
Sample Type and No	B8
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		9.9	11.0	8.6	6.6	
Moisture Content	%	31.0	29.0	33.0	35.0	
Bulk density after test	Mg/m³	1.57	1.58	1.54	1.30	
Dry density after test	Mg/m³	1.20	1.23	1.16	0.97	
Vane shear strength	kPa	58	60	40	30	

Soil description	Brown slightly sandy slightly gravelly CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	30.7
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5.5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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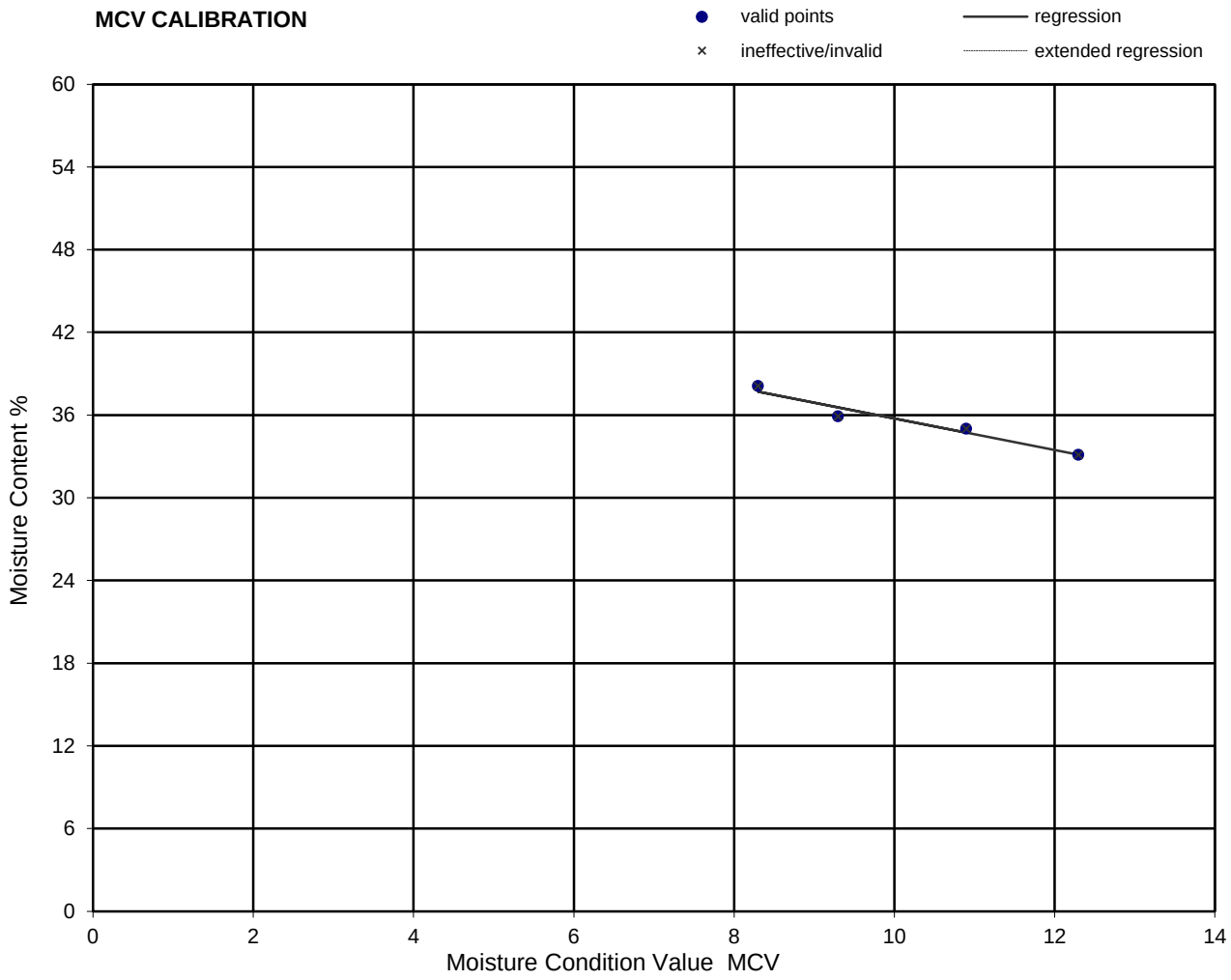
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032311

Hole No	ATK-TPM-05
Sample Depth (m BGL)	2.90 - 3.00
Sample Type and No	B12
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	47.2
Slope	-1.15
Sensitivity (Change in MCV per 1% moisture content)	0.87
Correlation (proximity of test points to regression line)	-0.97
Method of interpretation of MCV	Steepest straight line

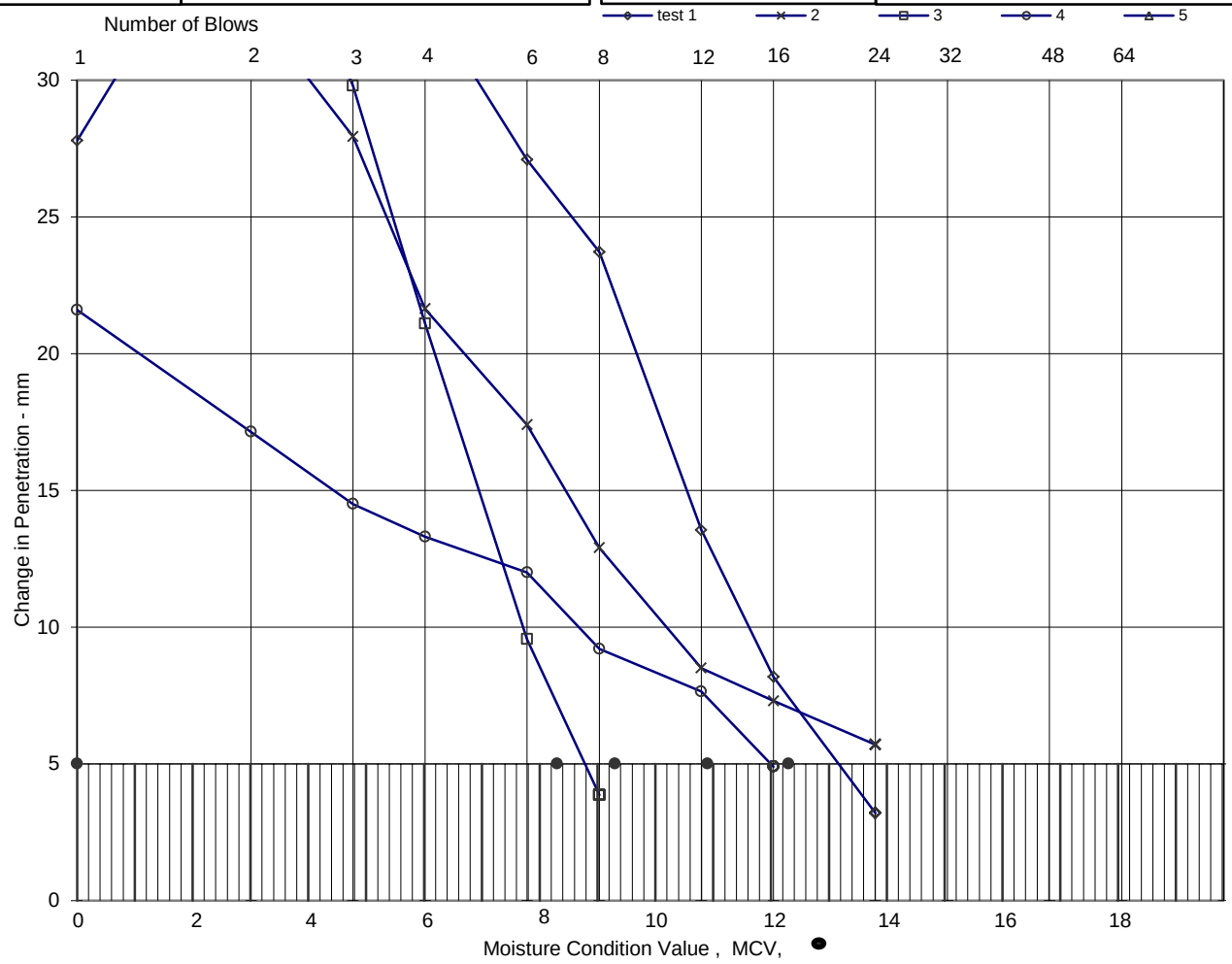
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032311

Hole No	ATK-TPM-05
Sample Depth (m BGL)	2.90 - 3.00
Sample Type and No	B12
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		12.3	9.3	8.3	10.9	
Moisture Content	%	33.0	36.0	38.0	35.0	
Bulk density after test	Mg/m³	1.92	1.89	1.83	1.81	
Dry density after test	Mg/m³	1.44	1.39	1.33	1.34	
Vane shear strength	kPa	56	40	24	20	

Soil description	Brown slightly sandy slightly gravelly CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	33.1
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

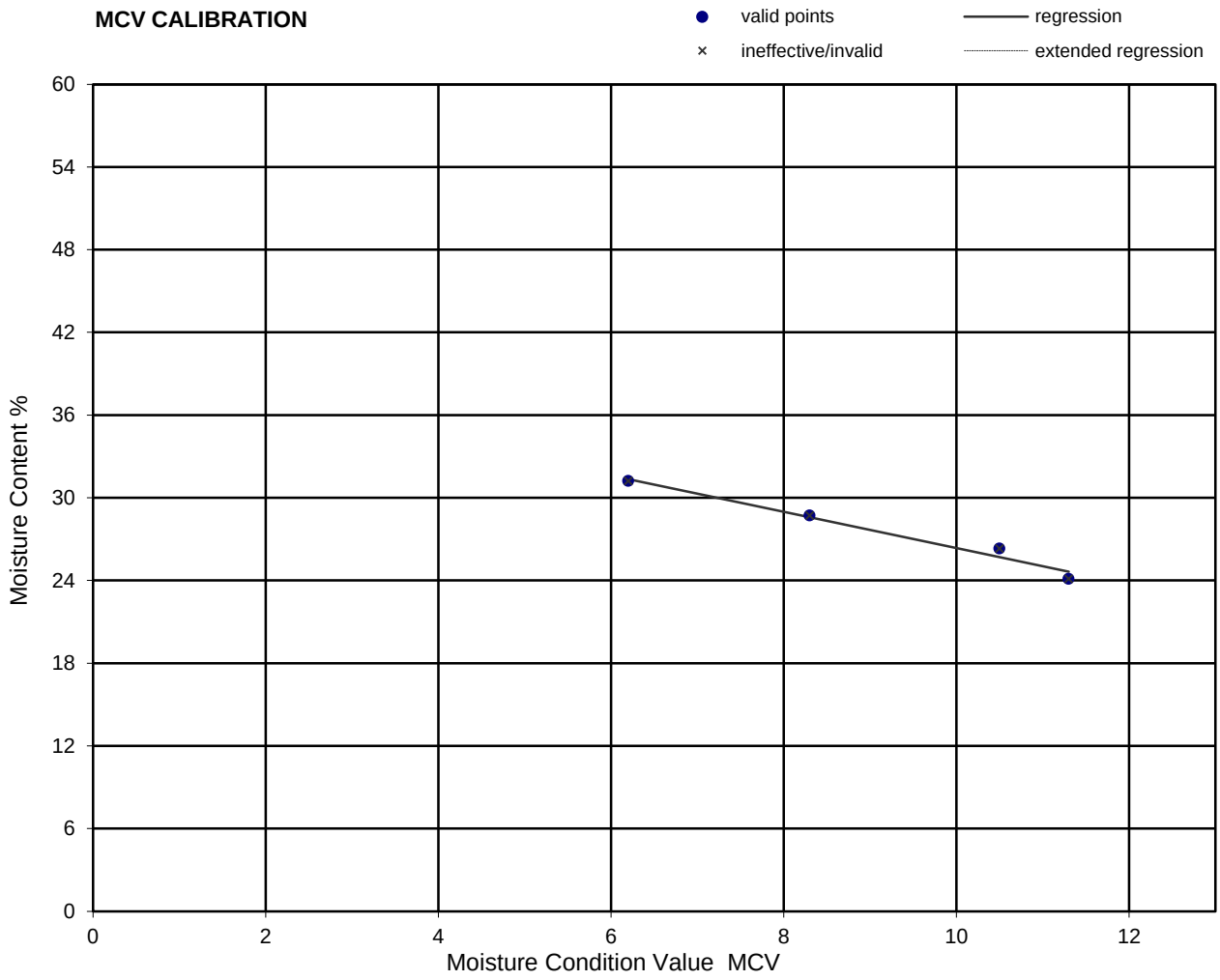
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032444

Hole No	ATK-TPM-05
Sample Depth (m BGL)	4.40 - 4.50
Sample Type and No	B17
Specimen Ref	

MCV CALIBRATION



Characteristics of calibration line (determined using linear regression)	
Intercept	39.5
Slope	-1.32
Sensitivity (Change in MCV per 1% moisture content)	0.76
Correlation (proximity of test points to regression line)	-0.99
Method of interpretation of MCV	Steepest straight line

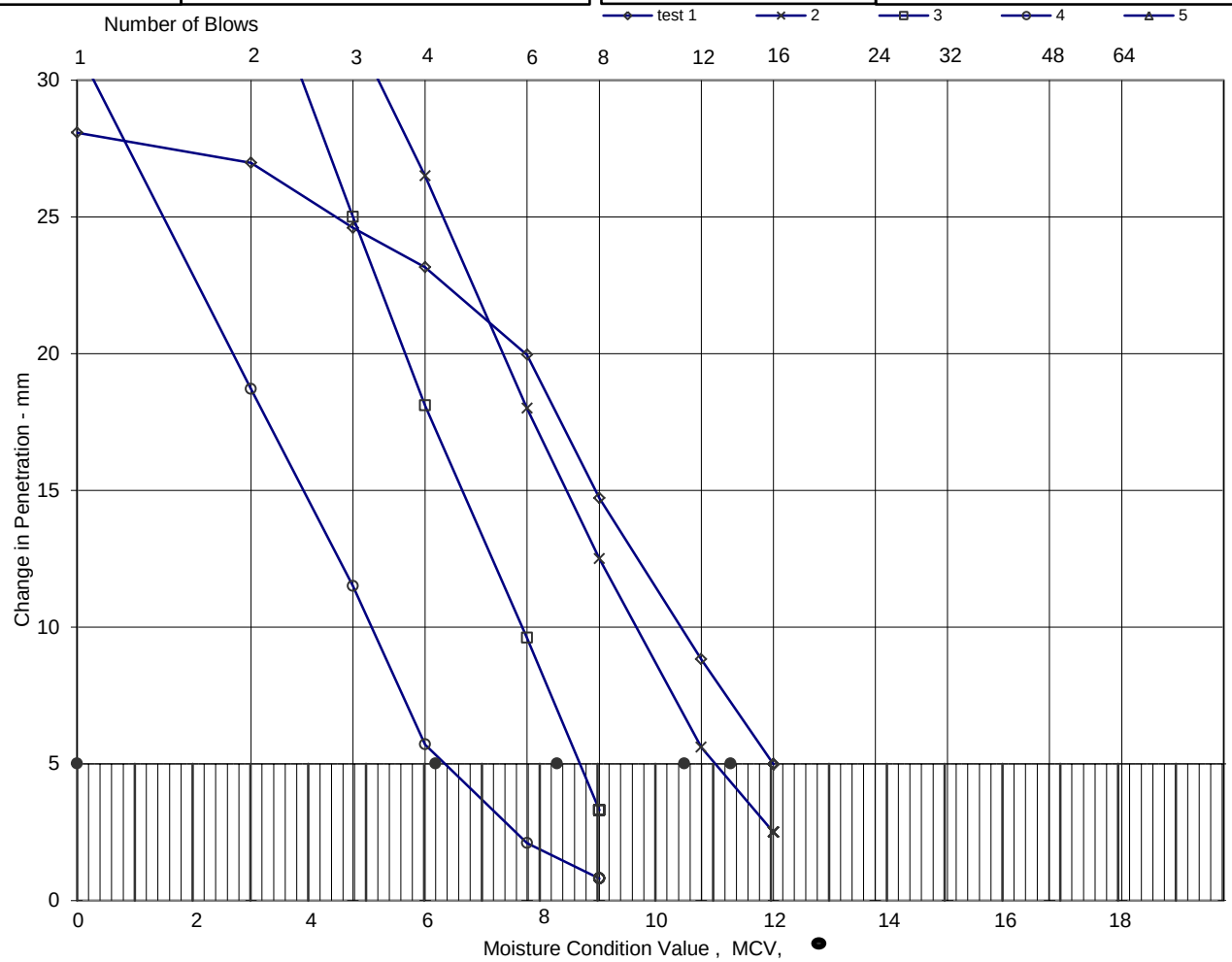
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MOISTURE CONDITION VALUE (MCV) / MOISTURE CONTENT

Sample Details:	SAMPLE ID:
	A9031-19-20191120032444

Hole No	ATK-TPM-05
Sample Depth (m BGL)	4.40 - 4.50
Sample Type and No	B17
Specimen Ref	



Test No * ineffective / invalid point		1	2	3	4	*
Moisture Condition Value		11.3	10.5	8.3	6.2	
Moisture Content	%	24.0	26.0	29.0	31.0	
Bulk density after test	Mg/m³	2.06	1.97	1.92	1.87	
Dry density after test	Mg/m³	1.66	1.56	1.49	1.43	
Vane shear strength	kPa	85	70	44	24	

Soil description	Brown slightly sandy CLAY.
Procedure / Preparation	using single sample
Remarks	

Initial moisture content <20mm	%	24.1
Material retained on 20mm sieve	%	0

Method of determining MCV
Steepest straight line

QA Ref
SLR 4,5,5
Rev 2.8
Jun 19

UKAS TESTING
0001

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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m3	Density dry Mg/m3	*w* %	Test type	Dia. mm	ó3 kPa	At failure / end of stage: Axial strain %	ó1 - ó3 kPa	*cu* kPa	MODE	Membrane Thickness mm	Remarks
ATK-CP-01	11	2.00		UT	Firm yellowish brown slightly sandy silty CLAY.	1.95	1.51	30	UU	103.3	50	19.8	134	67	C	0.2	
ATK-CP-01	19	4.00		UT	Stiff greyish brown slightly sandy silty CLAY.	2.04	1.65	24	UU	103.9	90	9	196	98	B	0.2	
ATK-CP-01	53	13.00		UT	Stiff thinly laminated greyish brown slightly sandy CLAY.	2	1.6	25	UU	103.5	250	8.6	282	141	C	0.2	
ATK-CP-01	65	16.00		UT	Very stiff thinly laminated greyish brown slightly sandy CLAY.	2.02	1.6	26	UU	103	300	3.5	200	100	B	0.2	
ATK-CP-02	29	9.00	9.45	UT	Stiff greyish brown slightly sandy silty CLAY.	2.06	1.67	24	UU	103.7	200	18.9	351	175	B	0.3	
ATK-CP-02	57	17.50	17.95	UT	Firm to stiff brownish grey slightly sandy CLAY.	2.01	1.58	27	UU	103.6	350	7.9	209	104	B	0.3	
ATK-CP-03	7	1.20		UT	Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is mainly mudstone.	2.02	1.57	29	UU	103.1	50	6.4	116	58	B	0.3	
ATK-CP-03	15	3.00	3.45	UT	Very stiff brown slightly sandy CLAY.	1.95	1.47	33	UU	102.6	70	5.5	131	65	B	0.3	
ATK-CP-04	26	6.00		UT	Firm to stiff greyish brown slightly sandy silty CLAY.	2.04	1.63	25	UU	103	130	11.9	167	84	C	0.2	
ATK-CP-05	45	11.50		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.27	1.98	14	UU	103.4	220	10	298	149	C	0.2	
ATK-CP-05	65	17.50		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.22	1.93	15	UU	103.2	350	9.6	770	385	B	0.2	
ATK-CP-06	41	10.00	10.45	UT	Firm to stiff reddish brown mottled grey slightly sandy CLAY.	2.16	1.81	19	UU	102.8	110	19.6	163	82	C	0.3	
ATK-CP-06	51	13.00	13.40	UT	Stiff reddish brown mottled grey slightly sandy CLAY.	2.19	1.89	16	UU	103.2	150	4.9	429	215	B	0.3	
ATK-CP-07A	13	4.00	4.45	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.15	1.8	19	UU	103	90	4.5	305	153	B	0.2	
ATK-CP-07A	21	6.00	6.40	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.26	2.03	12	UU	104.1	130	8.9	835	417	B	0.2	
ATK-CP-07A	28	8.00	8.35	UT	Very stiff grey mottled reddish brown slightly sandy CLAY.	2.18	1.85	18	UU	103.3	170	2.2	252	126	B	0.2	
ATK-CP-07A	35	10.00	10.35	UT	Very stiff reddish brown mottled grey and brown slightly sandy CLAY.	2.22	1.92	16	UU	103.9	210	7.7	936	468	B	0.2	
ATK-CP-08	9	2.20	2.65	UT	Firm brown slightly sandy silty CLAY.	2	1.59	26	UU	103.5	50	14.4	91	46	C	0.2	
ATK-CP-08	15	4.20	4.65	UT	Very stiff reddish brown slightly sandy CLAY.	2.12	1.76	20	UU	102.9	100	13.4	144	72	B	0.2	
ATK-CP-09	16	4.20	4.65	UT	Stiff reddish brown mottled grey slightly sandy CLAY.	2.14	1.78	20	UU	103.5	100	18.4	171	85	B	0.2	
ATK-CP-10	12	3.00	3.45	UT	Stiff brown slightly sandy CLAY.	1.92	1.46	31	UU	103.7	70	4.5	186	93	B	0.2	
ATK-CP-10	26	7.00	7.45	UT	Very stiff thinly laminated dark brown slightly sandy CLAY.	2.04	1.65	23	UU	103	140	8.6	269	135	B	0.3	

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 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. Tested from base depth and in a vertical orientation unless stated otherwise.

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
suffix R - remoulded or recompacted	*cu*	undrained shear strength		C	compound

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SLR 2
Rev 2.8
Apr 19

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

UUSUM

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

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m3	Density dry Mg/m3	*w* %	Test type	Dia. mm	ó3 kPa	At failure / end of stage: Axial strain %	ó1 - ó3 kPa	*cu* kPa	MODE	Membrane Thickness mm	Remarks
ATK-CP-11	11	2.00		UT	Stiff light brown mottled grey slightly sandy CLAY.	1.93	1.48	30	UU	103.2	50	4.5	127	63	B	0.3	
ATK-CP-11	43	10.00		UT	Very stiff thinly laminated greyish brown slightly sandy CLAY.	2.04	1.65	23	UU	104.3	200	7.9	413	207	B	0.3	
ATK-CP-13A	19	4.00		UT	Firm multicoloured slightly sandy slightly gravelly CLAY. Gravel is mainly mudstone.	2.14	1.78	20	UU	103.1	80	19.8	167	83	C	0.2	
ATK-CP-13A	27	6.00		UT	Soft reddish brown mottled grey slightly sandy CLAY becoming stiff towards base.	2.2	1.86	18	UU	103.3	130	19.8	180	90	C	0.3	
ATK-CP-13A	35	8.00		UT	Stiff reddish brown mottled grey slightly sandy CLAY.	2.22	1.9	17	UU	103.6	160	10.4	309	154	B	0.3	
ATK-CP-13A	43	10.00		UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.22	1.88	18	UU	103.2	200	5.2	258	129	B	0.3	
ATK-CP-14	14	4.00	4.45	UT	Stiff greyish brown slightly sandy silty CLAY.	2.06	1.69	22	UU	104	90	18.8	209	104	B	0.3	
ATK-CP-15	7	1.20		UT	Firm brown slightly sandy slightly gravelly CLAY.	1.96	1.5	31	UU	102.7	30	18.3	52	26	C	0.3	
ATK-CP-15	37	9.00		UT	Grey slightly silty CLAY	2	1.58	27	UU	103.5	180	1.5	119	60	B	0.3	
ATK-CP-15	48	12.00		UT	Very stiff thinly laminated dark brown slightly sandy CLAY.	2.03	1.61	26	UU	102.9	240	4.5	395	198	B	0.3	
ATK-CP-15	59	15.00		UT	Stiff thinly laminated dark brown slightly sandy slightly gravelly CLAY.	2.06	1.65	25	UU	103.3	300	14.9	162	81	B	0.3	
ATK-CP-15	80	21.00		UT	Very stiff reddish brown slightly sandy CLAY.	2.35	2.13	10	UU	102.6	420	5.7	2,050	1,025	B	0.3	
ATK-CP-16	6	3.00		UT	Firm to stiff reddish brown mottled grey slightly sandy CLAY.	2.09	1.69	24	UU	103.4	60	19.9	116	58	C	0.3	
ATK-CP-16	21	7.00	7.45	UT	Very stiff reddish brown mottled grey slightly sandy CLAY.	2.17	1.83	18	UU	103.8	140	4	240	120	B	0.3	
ATK-CP-16	28	9.00	9.45	UT	Very stiff brown mottled grey slightly sandy CLAY.	2.16	1.83	18	UU	103.8	180	4.5	251	126	B	0.3	
ATK-RC-02	27	6.00		UT	Firm greyish brown slightly sandy silty CLAY.	2.04	1.64	24	UU	103.5	130	19.3	159	80	P	0.3	

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 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. Tested from base depth and in a vertical orientation unless stated otherwise.

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
suffix R - remoulded or recompacted	*cu*	undrained shear strength		C	compound

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Project Name HAVANT THICKET WATER STORAGE

Figure

UUSUM

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-BH-02	3	0.50	0.80	B		Brown slightly sandy CLAY.	60		tested at 14.7% mc
ATK-BH-02	3	0.50	0.80	B		Brown slightly sandy CLAY.	58		tested at 20% mc
ATK-BH-02	3	0.50	0.80	B		Brown slightly sandy CLAY.	50		tested at 16.4% mc
ATK-BH-02	3	0.50	0.80	B		Brown slightly sandy CLAY.	46		tested at 18.4% mc
ATK-BH-02	3	0.50	0.80	B		Brown slightly sandy CLAY.	30		tested at 22.4% mc
ATK-CP-01	4	0.50	0.80	B		Brown slightly sandy CLAY.	16		tested at 26.8% mc
ATK-CP-01	4	0.50	0.80	B		Brown slightly sandy CLAY.	28		tested at 23.1% mc
ATK-CP-01	4	0.50	0.80	B		Brown slightly sandy CLAY.	46		tested at 19.8% mc
ATK-CP-01	4	0.50	0.80	B		Brown slightly sandy CLAY.	54		tested at 16.6% mc
ATK-CP-01	4	0.50	0.80	B		Brown slightly sandy CLAY.	80		tested at 13.5% mc
ATK-CP-01	17	3.50	4.00	B		Brown slightly sandy CLAY.	76		Tested at 16.2% mc
ATK-CP-01	17	3.50	4.00	B		Brown slightly sandy CLAY.	72		Tested at 21.15% mc
ATK-CP-01	17	3.50	4.00	B		Brown slightly sandy CLAY.	68		Tested at 23.1% mc
ATK-CP-01	17	3.50	4.00	B		Brown slightly sandy CLAY.	64		Tested at 19.2% mc
ATK-CP-01	17	3.50	4.00	B		Brown slightly sandy CLAY.	46		Tested at 25.1% mc
ATK-CP-02	5	1.20	1.70	B		Brown slightly sandy CLAY.	30		tested at 22.8% mc
ATK-CP-02	5	1.20	1.70	B		Brown slightly sandy CLAY.	42		tested at 21% mc
ATK-CP-02	5	1.20	1.70	B		Brown slightly sandy CLAY.	52		tested at 17.3 mc
ATK-CP-02	5	1.20	1.70	B		Brown slightly sandy CLAY.	60		tested at 15.3% mc
ATK-CP-02	5	1.20	1.70	B		Brown slightly sandy CLAY.	76		tested at 12.15 mc
ATK-CP-03	12	2.00	2.50	B		Brown slightly sandy CLAY.	80		Tested at 14.6% mc
ATK-CP-03	12	2.00	2.50	B		Brown slightly sandy CLAY.	70		Tested at 17% mc
ATK-CP-03	12	2.00	2.50	B		Brown slightly sandy CLAY.	66		Tested at 19.6%mc
ATK-CP-03	12	2.00	2.50	B		Brown slightly sandy CLAY.	60		Tested at 22.6% mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-03	12	2.00	2.50	B		Brown slightly sandy CLAY.	50		Tested at 24.8
ATK-CP-04	6	0.80	1.20	B		Brown slightly sandy CLAY.	66		Tested at 14.8% mc
ATK-CP-04	6	0.80	1.20	B		Brown slightly sandy CLAY.	60		Tested at 16.9% mc
ATK-CP-04	6	0.80	1.20	B		Brown slightly sandy CLAY.	52		Tested at 18.5% mc
ATK-CP-04	6	0.80	1.20	B		Brown slightly sandy CLAY.	46		Tested at 20.3% mc
ATK-CP-04	6	0.80	1.20	B		Brown slightly sandy CLAY.	30		Tested at 22% mc
ATK-CP-04	13	2.50	3.00	B	1	Brown slightly sandy CLAY.	60		
ATK-CP-06	7	1.00		B	1	Light brown slightly sandy slightly gravelly CLAY.	70.7		
ATK-CP-06	16	3.00	3.50	B		Dark brown slightly sandy CLAY.	64		Tested at 15.5% mc
ATK-CP-06	16	3.00	3.50	B		Dark brown slightly sandy CLAY.	60		Tested at 19.2% mc
ATK-CP-06	16	3.00	3.50	B		Dark brown slightly sandy CLAY.	54		Tested at 20.5% mc
ATK-CP-06	16	3.00	3.50	B		Dark brown slightly sandy CLAY.	50		Tested at 13.2% mc
ATK-CP-06	16	3.00	3.50	B		Dark brown slightly sandy CLAY.	44		Tested at 10.8% mc
ATK-CP-07	7	2.00	2.45	UT	1	Brown slightly sandy CLAY.	13		
ATK-CP-07A	11	3.50	4.00	B	1	Brown slightly sandy CLAY.	24.7		
ATK-CP-07A	32	9.00	9.50	B		Brown slightly sandy CLAY.	80		Tested at 17.9% mc
ATK-CP-07A	32	9.00	9.50	B		Brown slightly sandy CLAY.	66		Tested at 19.3% mc
ATK-CP-07A	32	9.00	9.50	B		Brown slightly sandy CLAY.	94		Tested at 15.8 % mc
ATK-CP-07A	32	9.00	9.50	B		Brown slightly sandy CLAY.	60		Tested at 21.8% mc
ATK-CP-07A	32	9.00	9.50	B		Brown slightly sandy CLAY.	54		Tested at 23.5% mc
ATK-CP-07A	33	9.50	10.00	B	1	Brown slightly sandy CLAY.	78.7		
ATK-CP-08	11	2.65	3.20	B		Brown slightly sandy slightly gravelly CLAY.	30		Tested at 25% mc
ATK-CP-08	11	2.65	3.20	B		Brown slightly sandy slightly gravelly CLAY.	46		Tested at 23.1% mc
ATK-CP-08	11	2.65	3.20	B		Brown slightly sandy slightly gravelly CLAY.	54		Tested at 18.5% mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-08	11	2.65	3.20	B		Brown slightly sandy slightly gravelly CLAY.	62		Tested at 16.7% mc
ATK-CP-08	11	2.65	3.20	B		Brown slightly sandy slightly gravelly CLAY.	78		Tested at 13.5% mc
ATK-CP-08	13	3.20	3.65	B	1	Brown slightly sandy CLAY.	76.7		
ATK-CP-08	17	4.65	5.20	B	1	Grey and reddish brown slightly sandy CLAY.	27.3		
ATK-CP-08	27	7.65	8.20	B		Brown slightly sandy CLAY.	30		Tested at 22% mc
ATK-CP-08	27	7.65	8.20	B		Brown slightly sandy CLAY.	48		Tested at 19.6% mc
ATK-CP-08	27	7.65	8.20	B		Brown slightly sandy CLAY.	58		Tested at 16.3% mc
ATK-CP-08	27	7.65	8.20	B		Brown slightly sandy CLAY.	62		Tested at 14.8% mc
ATK-CP-08	27	7.65	8.20	B		Brown slightly sandy CLAY.	80		Tested at 12.9% mc
ATK-CP-08	29	8.20	8.65	B	1	Brown mottled grey slightly sandy CLAY.	68		
ATK-CP-09	18	4.65	5.20	B		Brown slightly sandy CLAY.	140		Tested at 22% mc
ATK-CP-09	18	4.65	5.20	B		Brown slightly sandy CLAY.	140		Tested at 19.9% mc
ATK-CP-09	18	4.65	5.20	B		Brown slightly sandy CLAY.	140		Tested at 17.3% mc
ATK-CP-09	18	4.65	5.20	B		Brown slightly sandy CLAY.	140		Tested at 15.3% mc
ATK-CP-09	18	4.65	5.20	B		Brown slightly sandy CLAY.	140		Tested at 13.3% mc
ATK-CP-09	24	6.50	6.95	B	1	Reddish brown slightly sandy CLAY.	56.7		
ATK-CP-09	25	6.95	7.20	B		Brown slightly sandy CLAY.	62		tested at 14.9% mc
ATK-CP-09	25	6.95	7.20	B		Brown slightly sandy CLAY.	58		tested at 116.6% mc
ATK-CP-09	25	6.95	7.20	B		Brown slightly sandy CLAY.	46		tested at 18.2% mc
ATK-CP-09	25	6.95	7.20	B		Brown slightly sandy CLAY.	40		tested at 22%mc
ATK-CP-09	25	6.95	7.20	B		Brown slightly sandy CLAY.	36		tested at 24.5% mc
ATK-CP-09	28	7.65	8.20	B		Brown slightly sandy CLAY.	68		Tested at 15.5% mc
ATK-CP-09	28	7.65	8.20	B		Brown slightly sandy CLAY.	60		Tested at 17% mc
ATK-CP-09	28	7.65	8.20	B		Brown slightly sandy CLAY.	54		Tested at 18.8% mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

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Project Name HAVANT THICKET WATER STORAGE

Figure

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-09	28	7.65	8.20	B		Brown slightly sandy CLAY.	50		Tested at 21% mc
ATK-CP-09	28	7.65	8.20	B		Brown slightly sandy CLAY.	42		Tested at 23.1%
ATK-CP-09	31	8.65	9.20	B	1	Brown slightly sandy CLAY.	69.3		
ATK-CP-10	5	1.20	1.65	UT	1	Brown slightly sandy CLAY.	70		
ATK-CP-10	14	3.50	4.00	B		Brown slightly sandy CLAY.	16		Tested at 30.2% mc
ATK-CP-10	14	3.50	4.00	B		Brown slightly sandy CLAY.	28		Tested at 26.8% mc
ATK-CP-10	14	3.50	4.00	B		Brown slightly sandy CLAY.	36		Tested at 23.8% mc
ATK-CP-10	14	3.50	4.00	B		Brown slightly sandy CLAY.	12		Tested at 32.2% mc
ATK-CP-10	14	3.50	4.00	B		Brown slightly sandy CLAY.	10		Tested at 34% mc
ATK-CP-11	8	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	68		Tested at 13.8% mc
ATK-CP-11	8	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	60		Tested at 15.2% mc
ATK-CP-11	8	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	50		Tested at 21.2% mc
ATK-CP-11	8	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	46		Tested at 20.7% mc
ATK-CP-11	8	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	40		Tesed at 18.4% mc
ATK-CP-11	24	5.00	5.50	B		Brown slightly sandy CLAY.	18		Tested at 29.7% mc
ATK-CP-11	24	5.00	5.50	B		Brown slightly sandy CLAY.	28		Tested at 25% mc
ATK-CP-11	24	5.00	5.50	B		Brown slightly sandy CLAY.	24		Tested at 26.5% mc
ATK-CP-11	24	5.00	5.50	B		Brown slightly sandy CLAY.	34		Tested at 22.9% mc
ATK-CP-11	24	5.00	5.50	B		Brown slightly sandy CLAY.	44		Tested at 20.7% mc
ATK-CP-12	6	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	62		Tested at 15.9% mc
ATK-CP-12	6	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	58		Tested at 17.6% mc
ATK-CP-12	6	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	48		Tested at 21.9% mc
ATK-CP-12	6	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	42		Tested at 19.9% mc
ATK-CP-12	6	1.20	1.70	B		Brown slightly sandy slightly gravelly CLAY.	36		Tested at 23.8% mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

QA Ref
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Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-12	8	2.00	2.45	UT	1	Brown slightly sandy CLAY.	20		
ATK-CP-12	12	3.00	3.50	B		Brown slightly sandy CLAY.	30		Tested at 13.6% mc
ATK-CP-12	12	3.00	3.50	B		Brown slightly sandy CLAY.	26		Tested at 17.2% mc
ATK-CP-12	12	3.00	3.50	B		Brown slightly sandy CLAY.	22		Tested at 20.2% mc
ATK-CP-12	12	3.00	3.50	B		Brown slightly sandy CLAY.	40		Tested at 11.8% mc
ATK-CP-12	12	3.00	3.50	B		Brown slightly sandy CLAY.	54		Tested at 9.8% mc
ATK-CP-12	19	5.00	5.45	UT	1	Reddish brown mottled grey slightly gravelly CLAY.	90		
ATK-CP-13A	4	0.50	0.80	B		Brown slightly sandy CLAY.	48		Tested at 34.8% mc
ATK-CP-13A	4	0.50	0.80	B		Brown slightly sandy CLAY.	52		Tested at 32% mc
ATK-CP-13A	4	0.50	0.80	B		Brown slightly sandy CLAY.	56		Tested at 29.4% mc
ATK-CP-13A	4	0.50	0.80	B		Brown slightly sandy CLAY.	60		Tested at 27.1% mc
ATK-CP-13A	4	0.50	0.80	B		Brown slightly sandy CLAY.	62		Tested at 24.1% mc
ATK-CP-13A	12	2.00	2.50	B		Brown slightly gravelly sandy CLAY.	88		tested at 13.1% mc
ATK-CP-13A	12	2.00	2.50	B		Brown slightly gravelly sandy CLAY.	80		tested at 17.3% mc
ATK-CP-13A	12	2.00	2.50	B		Brown slightly gravelly sandy CLAY.	66		tested at 18.% mc
ATK-CP-13A	12	2.00	2.50	B		Brown slightly gravelly sandy CLAY.	54		tested at 12.3% mc
ATK-CP-13A	12	2.00	2.50	B		Brown slightly gravelly sandy CLAY.	42		tested at 10% mc
ATK-CP-13A	24	5.00	5.50	B		Brown slightly sandy CLAY.	28		Tested at 27.6% mc
ATK-CP-13A	24	5.00	5.50	B		Brown slightly sandy CLAY.	20		Tested at 23.2% mc
ATK-CP-13A	24	5.00	5.50	B		Brown slightly sandy CLAY.	34		Tested at 21.3% mc
ATK-CP-13A	24	5.00	5.50	B		Brown slightly sandy CLAY.	60		Tested at 17.8% mc
ATK-CP-13A	24	5.00	5.50	B		Brown slightly sandy CLAY.	72		Tested at 16.9% mc
ATK-CP-13A	29	6.50	7.00	B		Brown slightly sandy CLAY.	30		Tested at 27.4% mc
ATK-CP-13A	29	6.50	7.00	B		Brown slightly sandy CLAY.	38		Tested at 18.55 mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

QA Ref
SLR Lvane
Rev 2.1
Sep 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

HV

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-13A	29	6.50	7.00	B		Brown slightly sandy CLAY.	46		Tested at 22.4% mc
ATK-CP-13A	29	6.50	7.00	B		Brown slightly sandy CLAY.	58		Tested at 16.6% mc
ATK-CP-13A	29	6.50	7.00	B		Brown slightly sandy CLAY.	64		Tested at 13.9% mc
ATK-CP-14	3	0.50	1.00	B		Brown slightly sandy CLAY.	54		Tested at 13.4% mc
ATK-CP-14	3	0.50	1.00	B		Brown slightly sandy CLAY.	50		Tested at 14.7% mc
ATK-CP-14	3	0.50	1.00	B		Brown slightly sandy CLAY.	46		Tested at 17.3% mc
ATK-CP-14	3	0.50	1.00	B		Brown slightly sandy CLAY.	40		Tested at 19.8% mc
ATK-CP-14	3	0.50	1.00	B		Brown slightly sandy CLAY.	28		Tested at 21.3% mc
ATK-CP-14	9	2.50	3.00	B		Brown slightly sandy CLAY.	18		Tested at 32.5% mc
ATK-CP-14	9	2.50	3.00	B		Brown slightly sandy CLAY.	26		Tested at 29.1% mc
ATK-CP-14	9	2.50	3.00	B		Brown slightly sandy CLAY.	38		Tested at 26.5% mc
ATK-CP-14	9	2.50	3.00	B		Brown slightly sandy CLAY.	44		Tested at 21.4% mc
ATK-CP-14	9	2.50	3.00	B		Brown slightly sandy CLAY.	62		Tested at 22.9% mc
ATK-CP-15	4	0.50	0.80	B	1	Brown slightly sandy CLAY.	34		
ATK-CP-15	11	2.00	2.50	B		Grey and brown slightly sandy CLAY.	74		tested at 14% mc
ATK-CP-15	11	2.00	2.50	B		Grey and brown slightly sandy CLAY.	70		tested at 16% mc
ATK-CP-15	11	2.00	2.50	B		Grey and brown slightly sandy CLAY.	63		tested at 18.9% mc
ATK-CP-15	11	2.00	2.50	B		Grey and brown slightly sandy CLAY.	54		tested at 20.1% mc
ATK-CP-15	11	2.00	2.50	B		Grey and brown slightly sandy CLAY.	46		tested at 22.8& mc
ATK-CP-15	26	6.00	6.50	B		Dark greyish brown slightly sandy CLAY.	48		tested at 16.7%mc
ATK-CP-15	26	6.00	6.50	B		Dark greyish brown slightly sandy CLAY.	40		tested at 17.5% mc
ATK-CP-15	26	6.00	6.50	B		Dark greyish brown slightly sandy CLAY.	36		tested at 21.9% mc
ATK-CP-15	26	6.00	6.50	B		Dark greyish brown slightly sandy CLAY.	30		tested at 19.8% mc
ATK-CP-15	26	6.00	6.50	B		Dark greyish brown slightly sandy CLAY.	26		tested at 24.4% mc

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SOCOTEC

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-CP-16	4	2.50	3.00	B		Brown slightly sandy CLAY.	68		Tested at 20% mc
ATK-CP-16	4	2.50	3.00	B		Brown slightly sandy CLAY.	64		Tested at 17.7% mc
ATK-CP-16	4	2.50	3.00	B		Brown slightly sandy CLAY.	60		Tested at 16% mc
ATK-CP-16	4	2.50	3.00	B		Brown slightly sandy CLAY.	50		Tested at 14% mc
ATK-CP-16	4	2.50	3.00	B		Brown slightly sandy CLAY.	42		Tested at 11.1% mc
ATK-CP-16	8	3.50	4.00	B	1	Brown slightly sandy CLAY.	32		
ATK-CP-16	16	5.50	6.00	B	1	Brown slightly sandy CLAY.	132.7		
ATK-CP-16	23	7.50	8.00	B		Brownish red mottled grey slightly sandy CLAY.	66		tested at 19.28%
ATK-CP-16	23	7.50	8.00	B		Brownish red mottled grey slightly sandy CLAY.	60		tested at 18.78% mc
ATK-CP-16	23	7.50	8.00	B		Brownish red mottled grey slightly sandy CLAY.	52		tested at 15.74% mc
ATK-CP-16	23	7.50	8.00	B		Brownish red mottled grey slightly sandy CLAY.	50		tested at 18.5% mc
ATK-CP-16	23	7.50	8.00	B		Brownish red mottled grey slightly sandy CLAY.	46		tested at 12.1% mc
ATK-TP-01	4	0.50	0.60	B		Brown slightly sandy CLAY.	22		tested at 15% mc
ATK-TP-01	4	0.50	0.60	B		Brown slightly sandy CLAY.	28		tested at 18.4% mc
ATK-TP-01	4	0.50	0.60	B		Brown slightly sandy CLAY.	36		tested at 19.8% mc
ATK-TP-01	4	0.50	0.60	B		Brown slightly sandy CLAY.	50		tested at 23.5% mc
ATK-TP-01	4	0.50	0.60	B		Brown slightly sandy CLAY.	60		tested at 27.6% mc
ATK-TP-01	8	1.00	1.20	B	1	Brown slightly sandy silty CLAY.	34.7		
ATK-TP-01	12	2.80	2.90	B		Brown slightly sandy CLAY.	26		Tested at 33.8% mc
ATK-TP-01	12	2.80	2.90	B		Brown slightly sandy CLAY.	36		Tested at 30.3% mc
ATK-TP-01	12	2.80	2.90	B		Brown slightly sandy CLAY.	52		Tested at 28.6% mc
ATK-TP-01	12	2.80	2.90	B		Brown slightly sandy CLAY.	66		Tested at 37.9% mc
ATK-TP-01	12	2.80	2.90	B		Brown slightly sandy CLAY.	74		Tested at 24.3% mc
ATK-TP-01	14	3.00	3.10	B		Brown slightly sandy CLAY.	16		Tested at 30.3% mc

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

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SLR Lvane
Rev 2.1
Sep 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TP-01	14	3.00	3.10	B		Brown slightly sandy CLAY.	34		Tested at 26.6% mc
ATK-TP-01	14	3.00	3.10	B		Brown slightly sandy CLAY.	26		Tested at 27.4% mc
ATK-TP-01	14	3.00	3.10	B		Brown slightly sandy CLAY.	44		Tested at 24.9% mc
ATK-TP-01	14	3.00	3.10	B		Brown slightly sandy CLAY.	60		Tested at 22.4% mc
ATK-TP-02	6	1.30	1.40	B		Brown slightly sandy slightly gravelly CLAY.	24		tested at 32.6% mc
ATK-TP-02	6	1.30	1.40	B		Brown slightly sandy slightly gravelly CLAY.	32		tested at 29.2% mc
ATK-TP-02	6	1.30	1.40	B		Brown slightly sandy slightly gravelly CLAY.	46		tested at 27.4% mc
ATK-TP-02	6	1.30	1.40	B		Brown slightly sandy slightly gravelly CLAY.	52		tested at 24.8% mc
ATK-TP-02	6	1.30	1.40	B		Brown slightly sandy slightly gravelly CLAY.	66		tested at 21.15 mc
ATK-TP-02	8	2.20	2.40	B		Brown slightly sandy CLAY.	41		Tested at 27.7% mc
ATK-TP-02	8	2.20	2.40	B		Brown slightly sandy CLAY.	52		Tested at 22.5% mc
ATK-TP-02	8	2.20	2.40	B		Brown slightly sandy CLAY.	74		Tested at 20% mc
ATK-TP-02	8	2.20	2.40	B		Brown slightly sandy CLAY.	77		Tested at 18% mc
ATK-TP-02	8	2.20	2.40	B		Brown slightly sandy CLAY.	58		Tested at 24% mc
ATK-TP-03	4	0.50	0.60	B		Brown slightly sandy slightly gravelly CLAY.	28		
ATK-TP-03	6	0.90	1.00	B	1	Brown slightly sandy CLAY.	30.7		
ATK-TP-03	9	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	30		Tested at 29.8% mc
ATK-TP-03	9	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	36		Tested at 26.3% mc
ATK-TP-03	9	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	42		Tested at 22.5% mc
ATK-TP-03	9	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	54		Tested at 32.3% mc
ATK-TP-03	9	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	64		Tested at 34.4% mc
ATK-TP-03	11	2.20	2.40	B	1	Brown slightly sandy CLAY.	38.7		
ATK-TP-04	3	0.30	0.40	B		Brown slightly sandy slightly gravelly CLAY.	6		
ATK-TP-04	5	1.00	1.20	B		Brown sandy CLAY.	48		Tested at 26.5% mc

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TP-04	5	1.00	1.20	B		Brown sandy CLAY.	56		Tested at 24% mc
ATK-TP-04	5	1.00	1.20	B		Brown sandy CLAY.	68		Tested at 20% mc
ATK-TP-04	5	1.00	1.20	B		Brown sandy CLAY.	58		Tested at 22% mc
ATK-TP-04	5	1.00	1.20	B		Brown sandy CLAY.	74		Tested at 18% mc
ATK-TP-04	8	1.40	1.50	B	1	Brown slightly sandy CLAY.	46		
ATK-TP-04	10	1.80	2.00	B		Brown slightly sandy slightly gravelly CLAY.	53		Tested at 24.5% mc
ATK-TP-04	10	1.80	2.00	B		Brown slightly sandy slightly gravelly CLAY.	70		Tested at 23.4% mc
ATK-TP-04	10	1.80	2.00	B		Brown slightly sandy slightly gravelly CLAY.	86		Tested at 20.3% mc
ATK-TP-04	10	1.80	2.00	B		Brown slightly sandy slightly gravelly CLAY.	104		Tested at 28.2% mc
ATK-TP-04	10	1.80	2.00	B		Brown slightly sandy slightly gravelly CLAY.	130		Tested at 25.4% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	44		Tested at 23.2% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	50		Tested at 20.4% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	36		Tested at 25.8% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	50		Tested at 19.83% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	54		Tested at 18.08% mc
ATK-TP-04	12	3.00	3.10	B		Reddish brown mottled grey slightly sandy CLAY.	54		Tested at 18.1% mc
ATK-TP-05	3	0.40	0.50	B		Brown slightly gravelly sandy silty CLAY.	24		Tested at 25.5% mc
ATK-TP-05	3	0.40	0.50	B		Brown slightly gravelly sandy silty CLAY.	30		Tested at 20.6% mc
ATK-TP-05	3	0.40	0.50	B		Brown slightly gravelly sandy silty CLAY.	42		Tested at 22.8% mc
ATK-TP-05	3	0.40	0.50	B		Brown slightly gravelly sandy silty CLAY.	54		Tested at 17.5% mc
ATK-TP-05	3	0.40	0.50	B		Brown slightly gravelly sandy silty CLAY.	60		Tested at 15.3% mc
ATK-TP-05	6	0.90	1.00	B		Brown clayey SAND.	20		Tested at 27.8% mc
ATK-TP-05	6	0.90	1.00	B		Brown clayey SAND.	38		Tested at 25% mc
ATK-TP-05	6	0.90	1.00	B		Brown clayey SAND.	46		Tested at 23.4% mc

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SLR Lvane
Rev 2.1
Sep 17

SOCOTEC

Project No A9031-19

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Figure

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TP-05	6	0.90	1.00	B		Brown clayey SAND.	60		Tested at 21.2% mc
ATK-TP-05	6	0.90	1.00	B		Brown clayey SAND.	68		Tested at 18.9% mc
ATK-TP-06	4	0.30	0.80	B		Brown slightly sandy silty CLAY.	8		Tested at 33.4% mc
ATK-TP-06	4	0.30	0.80	B		Brown slightly sandy silty CLAY.	14		Tested at 29.8% mc
ATK-TP-06	4	0.30	0.80	B		Brown slightly sandy silty CLAY.	16		Tested at 28% mc
ATK-TP-06	4	0.30	0.80	B		Brown slightly sandy silty CLAY.	28		Tested at 24.5% mc
ATK-TP-06	4	0.30	0.80	B		Brown slightly sandy silty CLAY.	30		Tested at 20.6% mc
ATK-TP-06	8	0.90	1.20	B		Brown slightly sandy CLAY.	14		tested at 33& mc
ATK-TP-06	8	0.90	1.20	B		Brown slightly sandy CLAY.	16		tested at 30.2% mc
ATK-TP-06	8	0.90	1.20	B		Brown slightly sandy CLAY.	22		Tested at 28.6% mc
ATK-TP-06	8	0.90	1.20	B		Brown slightly sandy CLAY.	28		Tested at 26.7% mc
ATK-TP-06	8	0.90	1.20	B		Brown slightly sandy CLAY.	34		Tested at 24.5% mc
ATK-TP-06	11	2.00	2.40	B		Brown slightly sandy CLAY.	16		Tested at 31.7% mc
ATK-TP-06	11	2.00	2.40	B		Brown slightly sandy CLAY.	20		Tested at 29.65 mc
ATK-TP-06	11	2.00	2.40	B		Brown slightly sandy CLAY.	36		Tested at 20.3% mc
ATK-TP-06	11	2.00	2.40	B		Brown slightly sandy CLAY.	30		Tested at 22.3% mc
ATK-TP-06	11	2.00	2.40	B		Brown slightly sandy CLAY.	48		Tested at 25.6% mc
ATK-TP-06	13	3.00	3.50	B		Brown slightly sandy CLAY.	26		tested at 27.65 mc
ATK-TP-06	13	3.00	3.50	B		Brown slightly sandy CLAY.	36		tested at 23.7% mc
ATK-TP-06	13	3.00	3.50	B		Brown slightly sandy CLAY.	42		tested at 25.5% mc
ATK-TP-06	13	3.00	3.50	B		Brown slightly sandy CLAY.	50		Tested at 20.4% mc
ATK-TP-06	13	3.00	3.50	B		Brown slightly sandy CLAY.	62		tested at 18.8% mc
ATK-TP-07	9	1.60	1.70	B		Brown clayey SAND.	18		Tested at 30% mc
ATK-TP-07	9	1.60	1.70	B		Brown clayey SAND.	30		Tested at 25.4% mc

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TP-07	9	1.60	1.70	B		Brown clayey SAND.	42		Tested at 21.2% mc
ATK-TP-07	9	1.60	1.70	B		Brown clayey SAND.	60		Tested at 18.5% mc
ATK-TP-07	9	1.60	1.70	B		Brown clayey SAND.	78		Tested at 16% mc
ATK-TP-08	8	0.90	1.00	B		Brown slightly sandy gravelly CLAY with one cobble.	26		Tested at 26.8% mc
ATK-TP-08	8	0.90	1.00	B		Brown slightly sandy gravelly CLAY with one cobble.	30		Tested at 24.7% mc
ATK-TP-08	8	0.90	1.00	B		Brown slightly sandy gravelly CLAY with one cobble.	20		Tested at 22% mc
ATK-TP-08	8	0.90	1.00	B		Brown slightly sandy gravelly CLAY with one cobble.	16		Tested at 20% mc
ATK-TP-08	8	0.90	1.00	B		Brown slightly sandy gravelly CLAY with one cobble.	10		Tested at 18% mc
ATK-TPM-02	2	0.40	0.50	B		Brown slightly sandy silty CLAY.	16		Tested at 25.4% mc
ATK-TPM-02	2	0.40	0.50	B		Brown slightly sandy silty CLAY.	22		Tested at 23% mc
ATK-TPM-02	2	0.40	0.50	B		Brown slightly sandy silty CLAY.	30		Tested at 23.8% mc
ATK-TPM-02	2	0.40	0.50	B		Brown slightly sandy silty CLAY.	36		Tested at 20.4% mc
ATK-TPM-02	2	0.40	0.50	B		Brown slightly sandy silty CLAY.	40		Tested at 17.8% mc
ATK-TPM-02	9	1.60	1.70	B		Brown slightly sandy CLAY.	26		Tested at 29.4% mc
ATK-TPM-02	9	1.60	1.70	B		Brown slightly sandy CLAY.	34		Tested at 26.7% mc
ATK-TPM-02	9	1.60	1.70	B		Brown slightly sandy CLAY.	46		Tested at 25.9% mc
ATK-TPM-02	9	1.60	1.70	B		Brown slightly sandy CLAY.	52		Tested at 20.6% mc
ATK-TPM-02	9	1.60	1.70	B		Brown slightly sandy CLAY.	66		Tested at 15% mc
ATK-TPM-03	3A	0.40	0.50	B	1	Brown slightly sandy CLAY.	32		
ATK-TPM-03	6	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	20		Tested at 25.5% mc
ATK-TPM-03	6	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	80		Tested at 23% mc
ATK-TPM-03	6	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	94		Tested at 20.8% mc
ATK-TPM-03	6	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	107		Tested at 27.7% mc
ATK-TPM-03	6	1.60	1.70	B		Brown slightly sandy slightly gravelly CLAY.	119		Tested at 30.1% mc

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TPM-03	12	3.60	3.70	B		Brown slightly sandy CLAY.	18		tested at 29.1% mc
ATK-TPM-03	12	3.60	3.70	B		Brown slightly sandy CLAY.	28		tested at 26.4% mc
ATK-TPM-03	12	3.60	3.70	B		Brown slightly sandy CLAY.	36		tested at 25.3% mc
ATK-TPM-03	12	3.60	3.70	B		Brown slightly sandy CLAY.	48		tested at 21.2% mc
ATK-TPM-03	12	3.60	3.70	B		Brown slightly sandy CLAY.	62		tested at 20.7% mc
ATK-TPM-04	4	0.50	0.60	B		Brown CLAY.	28		Tested at 26% mc
ATK-TPM-04	4	0.50	0.60	B		Brown CLAY.	58		Tested at -4% mc
ATK-TPM-04	4	0.50	0.60	B		Brown CLAY.	38		Tested at -2% mc
ATK-TPM-04	4	0.50	0.60	B		Brown CLAY.	66		Tested at 28% mc
ATK-TPM-04	4	0.50	0.60	B		Brown CLAY.	74		Tested at 26% mc
ATK-TPM-04	7	1.50	1.60	B			46.7		
ATK-TPM-05	4	0.70	1.00	B		Brown slightly sandy CLAY.	34		tested at 41.3% mc
ATK-TPM-05	4	0.70	1.00	B		Brown slightly sandy CLAY.	40		tested at 38.8% mc
ATK-TPM-05	4	0.70	1.00	B		Brown slightly sandy CLAY.	44		tested at 36.7% mc
ATK-TPM-05	4	0.70	1.00	B		Brown slightly sandy CLAY.	56		tested at 34.7% mc
ATK-TPM-05	4	0.70	1.00	B		Brown slightly sandy CLAY.	68		tested at 32.6% mc
ATK-TPM-05	8	1.60	1.70	B	1	Brown slightly sandy slightly gravelly CLAY.	52.7		
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	32		Tested at 29.6% mc
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	52		Tested at 26.2% mc
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	82		Tested at 24.6% mc
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	140		Tested at 20% mc
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	140		Tested at 18% mc
ATK-TPM-05	10	2.00	2.20	B		Brown slightly sandy slightly gravelly CLAY.	110		Tested at 22% mc
ATK-TPM-05	12	2.90	3.00	B	1	Brown slightly sandy slightly gravelly CLAY.	56		

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Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Spec ref	Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type					
		from	to						
ATK-TPM-05	15	3.30	3.40	B		Dark grey slightly sandy CLAY.	110		Tested at 26% mc
ATK-TPM-05	15	3.30	3.40	B		Dark grey slightly sandy CLAY.	140		Tested at -4% mc
ATK-TPM-05	15	3.30	3.40	B		Dark grey slightly sandy CLAY.	112		Tested at -2 mc
ATK-TPM-05	15	3.30	3.40	B		Dark grey slightly sandy CLAY.	140		Tested at 17% mc
ATK-TPM-05	15	3.30	3.40	B		Dark grey slightly sandy CLAY.	108		Tested at 28% mc
ATK-TPM-05	17	4.40	4.50	B	1	Brown slightly sandy CLAY.	66.3		

Notes : 1 Tests carried out in accordance with Manufacturers Instructions

QA Ref
SLR Lvane
Rev 2.1
Sep 17

SOCOTEC

Project No A9031-19

Project Name HAVANT THICKET WATER STORAGE

Figure

HV

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

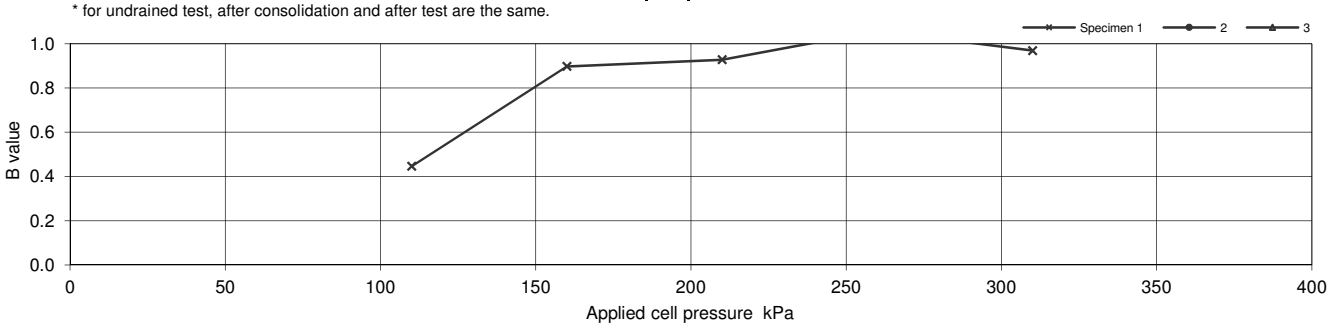
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-01	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	6.00	
			No	26	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	203.01		
	Diameter	mm	103.65		
	Bulk Density	Mg/m³	2.03		
	Water Content	%	25		
	Dry density	Mg/m³	1.62		
After consolidation	Length	mm	203.37		
	Diameter	mm	103.82		
	Bulk Density*	Mg/m³	2.03		
	Water Content*	%	26		
	Dry density*	Mg/m³	1.61		

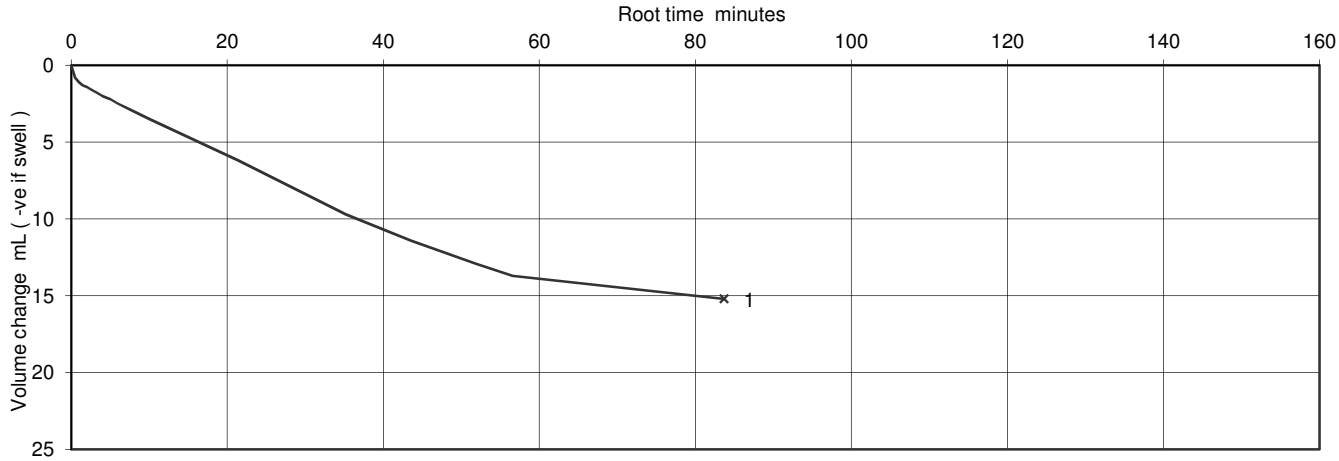
* for undrained test, after consolidation and after test are the same.

Soil Description	Firm greyish brown slightly sandy silty CLAY
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	310		
Final pore water pressure	kPa	272.2		
Final B Value		0.97		



Consolidation Details	Drainage Conditions		From one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		360			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		60			kPa
	Pore pressure at start of consolidation		321			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	6.66			m^2/year
	Coefficient of Compressibility	M_{vi}	0.42			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	8.7E-10			m/s



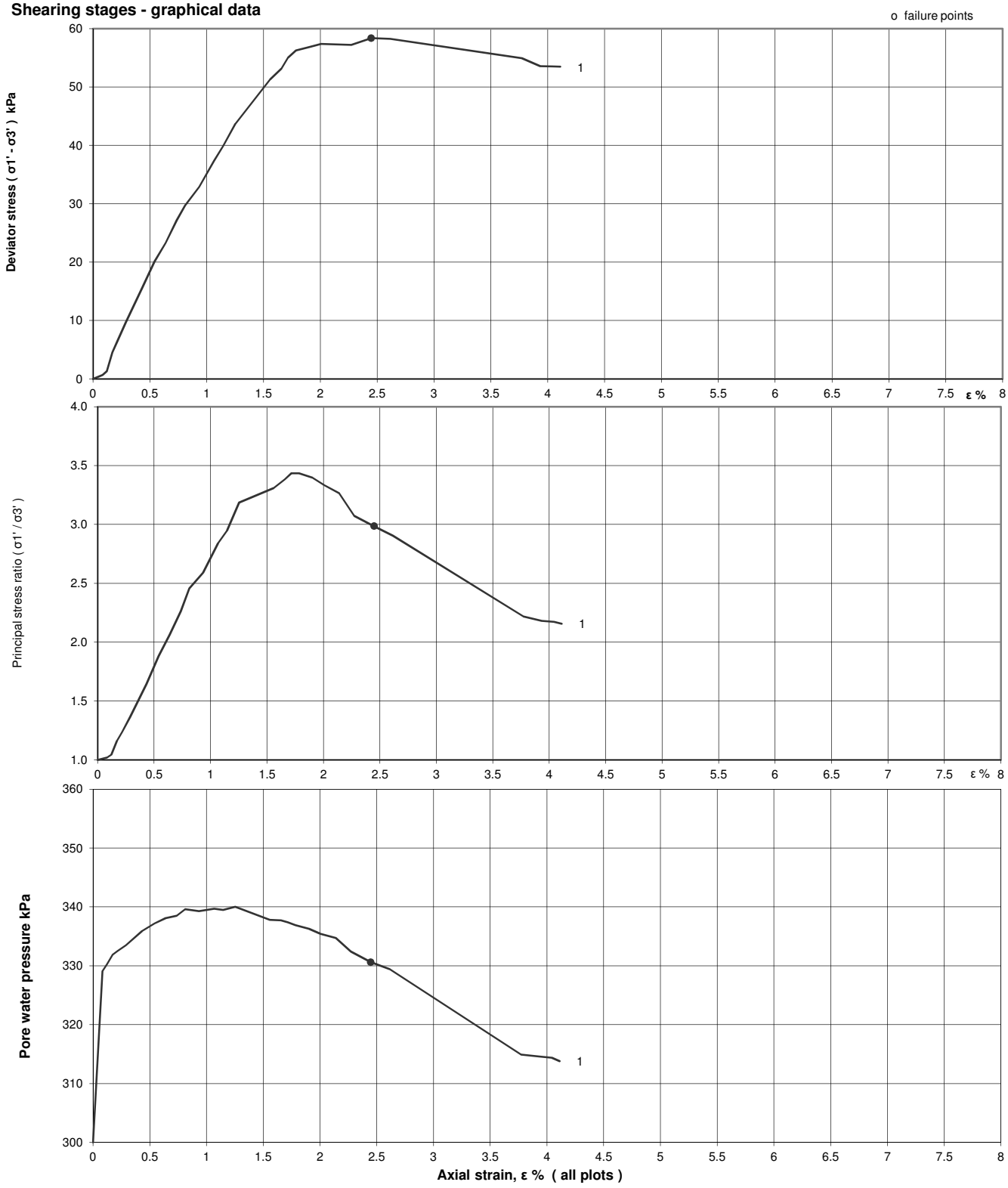
Ref			Figure
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	UKAS TESTING 1157		sheet 1 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-01		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	6.00		
			No	26	Type	UT
			ID			
			Spec Ref			

Shearing stages - graphical data



Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC	Printed:15/01/2020 09:07	**CU** sheet 2 of 3

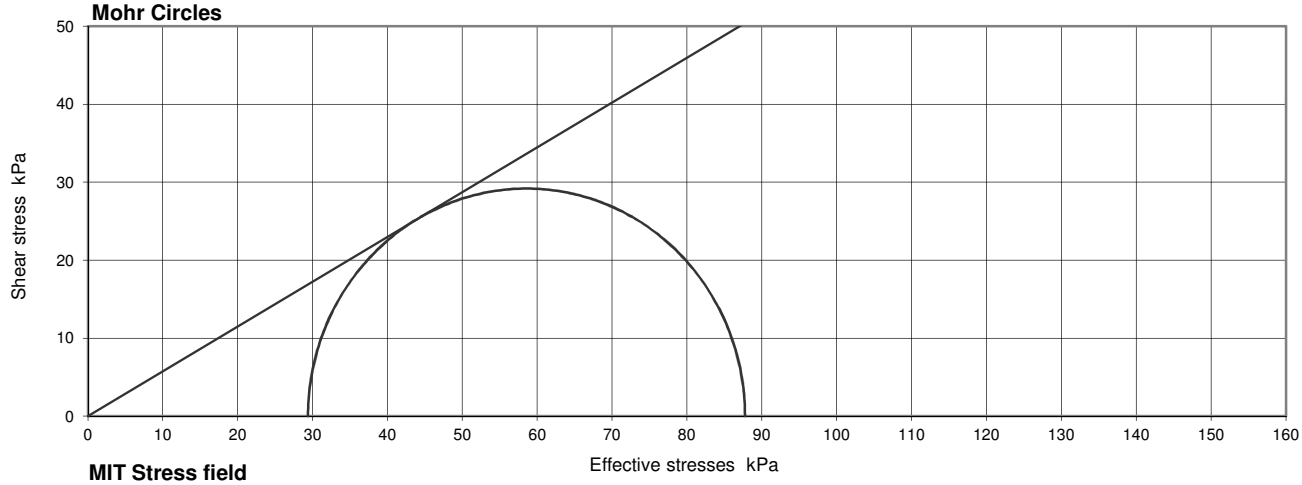
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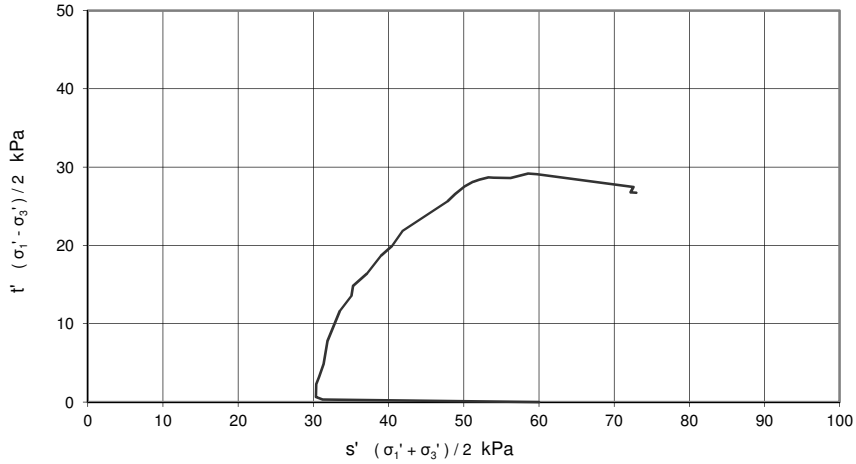
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-01		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	6.00		
			No	26	Type	UT
			ID			
			Spec Ref			

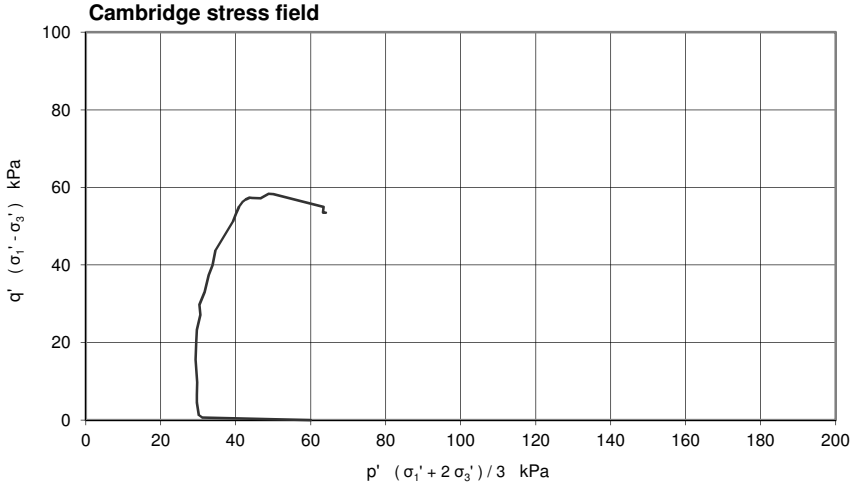
Mohr Circles



MIT Stress field



Cambridge stress field



Compression stages

Specimen	1	2	3	
Cell pressure	360			kPa
Initial pwp	300			kPa
Initial σ_3'	60			kPa
Rate of strain	0.40			%/hr

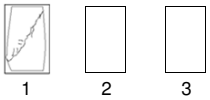
Failure conditions

Criterion	Maximum deviator stress			
Axial strain	2.45			%
$(\sigma_1' / \sigma_3')_f$	2.985			
$(\sigma_1' - \sigma_3')_f$	58.4			kPa
u_f	331			kPa
$\sigma_3'_f$	29			kPa
$\sigma_1'_f$	88			kPa
A_f	0.52			
Time to failure	6.1			hrs

Shear Strength Parameters

		Linear regression
c '	kPa	0.0
Ø '	degrees	29.9
		Manual re-assessment
c '	kPa	-
Ø '	degrees	-

Mode of failure



Notes : Deviator stresses corrected for area change, and 0.329 mm thick rubber membrane(s)

NO SIDE DRAINS

Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:15/01/2020 09:07	**CU** sheet 3 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

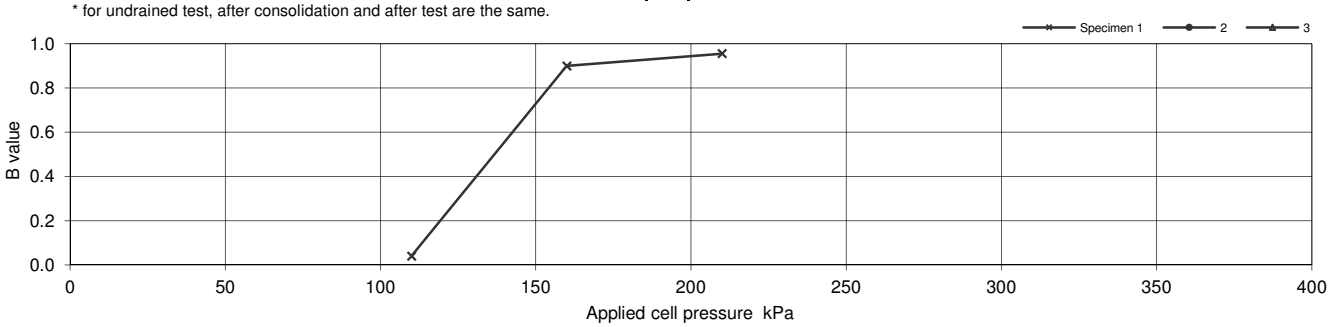
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-02	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45	
			No	22	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	203.30		
	Diameter	mm	103.40		
	Bulk Density	Mg/m³	2.06		
	Water Content	%	24		
	Dry density	Mg/m³	1.66		
After consolidation	Length	mm	202.32		
	Diameter	mm	102.90		
	Bulk Density*	Mg/m³	2.08		
	Water Content*	%	23		
	Dry density*	Mg/m³	1.69		

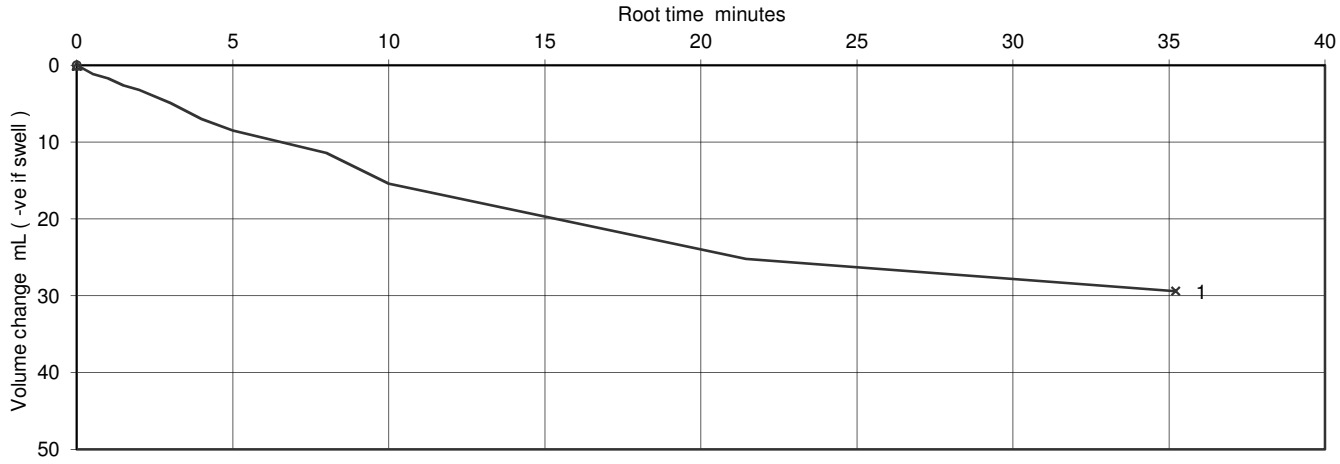
* for undrained test, after consolidation and after test are the same.

Soil Description	Soft brown slightly sandy silty CLAY
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	210		
Final pore water pressure	kPa	179.2		
Final B Value		0.96		



Consolidation Details	Drainage Conditions		From radial boundary and one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		380			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		80			kPa
	Pore pressure at start of consolidation		356			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	0.81			m^2/year
	Coefficient of Compressibility	M_{vi}	0.31			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	7.7E-11			m/s



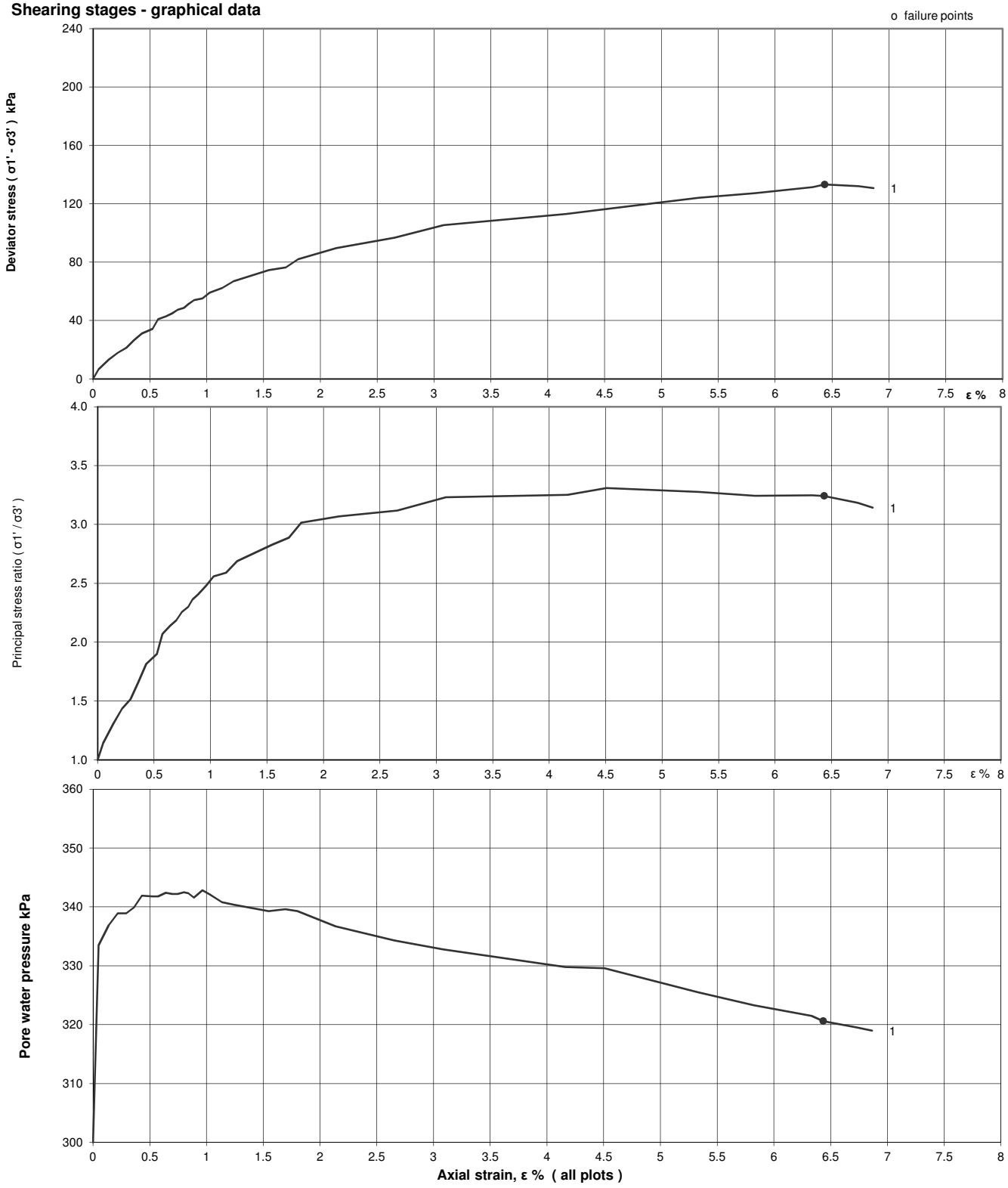
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SLR8.1 Rev 86.0 Feb18	SOCOTEC	Printed:10/01/2020 07:27	CU
	UKAS TESTING 1157		sheet 1 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-02		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45		
			No	22	Type	UT
			ID			
			Spec Ref			

Shearing stages - graphical data



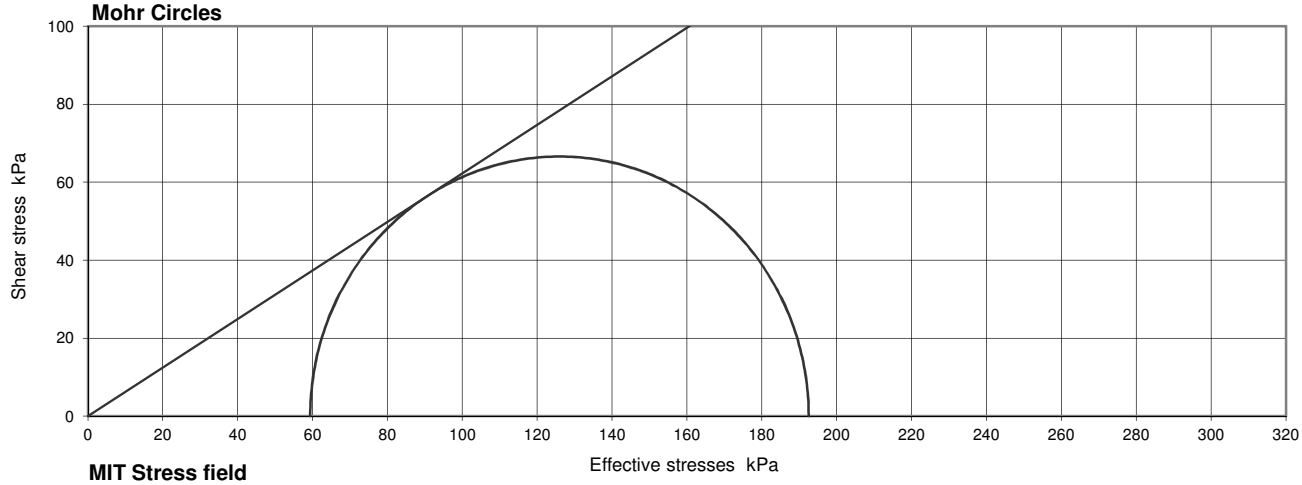
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SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:10/01/2020 07:27	**CU** sheet 2 of 3

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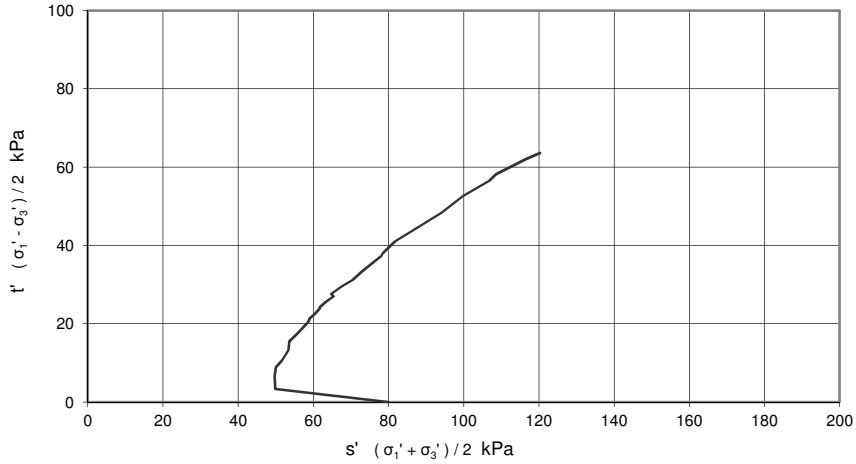
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-02		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45		
			No	22	Type	UT
			ID			
			Spec Ref			

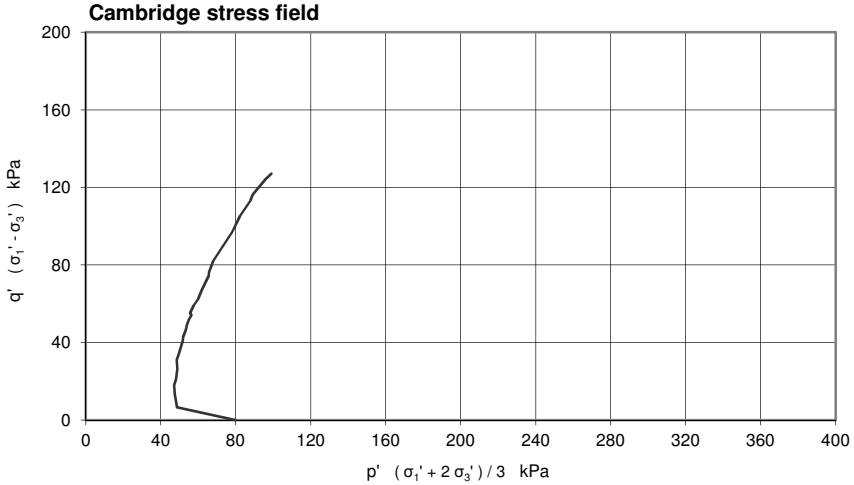
Mohr Circles



MIT Stress field



Cambridge stress field



Compression stages

Specimen	1	2	3	
Cell pressure	380			kPa
Initial pwp	300			kPa
Initial σ_3'	80			kPa
Rate of strain	2.00			%/hr

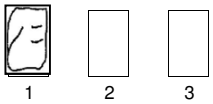
Failure conditions

Criterion	Maximum deviator stress			
Axial strain	6.44			%
$(\sigma_1' / \sigma_3')_f$	3.241			
$(\sigma_1' - \sigma_3')_f$	133.1			kPa
u_f	321			kPa
$\sigma_3'_f$	59			kPa
$\sigma_1'_f$	193			kPa
A_f	0.15			
Time to failure	3.2			hrs

Shear Strength Parameters

		Linear regression
c '	kPa	0.0
Ø '	degrees	31.9
		Manual re-assessment
c '	kPa	-
Ø '	degrees	-

Mode of failure



Notes : Deviator stresses corrected for area change, and 0.329 mm thick rubber membrane(s)

NO SIDE DRAINS

Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:10/01/2020 07:27	**CU** sheet 3 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

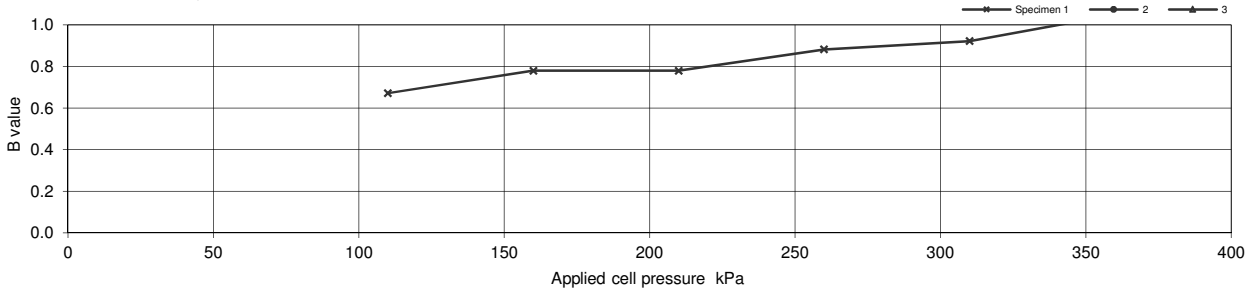
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-03	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45	
			No	30	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	203.29		
	Diameter	mm	103.13		
	Bulk Density	Mg/m³	1.96		
	Water Content	%	30		
	Dry density	Mg/m³	1.51		
After consolidation	Length	mm	203.36		
	Diameter	mm	103.17		
	Bulk Density*	Mg/m³	1.97		
	Water Content*	%	31		
	Dry density*	Mg/m³	1.51		

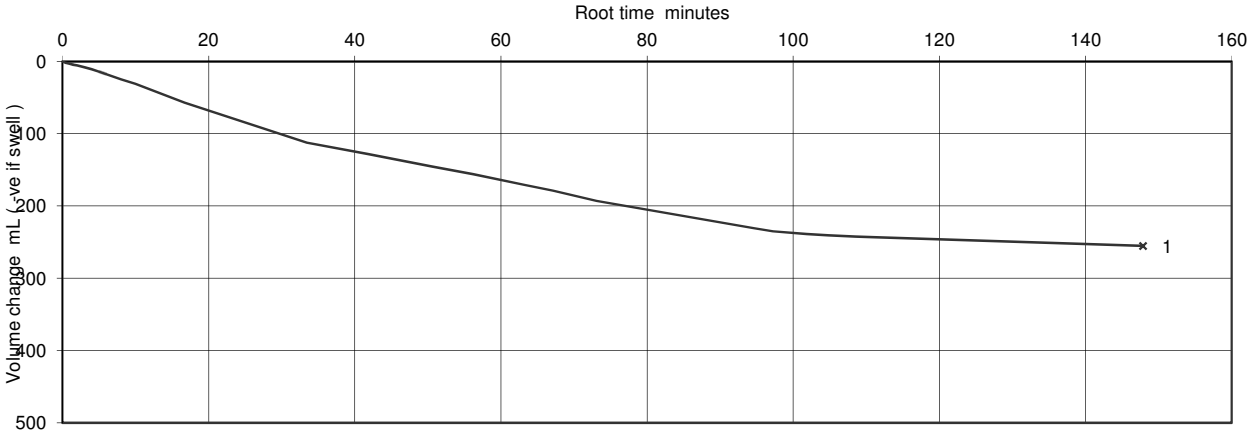
* for undrained test, after consolidation and after test are the same.

Soil Description	Firm brown slightly sandy CLAY.
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	360		
Final pore water pressure	kPa	347.5		
Final B Value		1.05		



Consolidation Details						
	Drainage Conditions		From radial boundary and one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		400			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		100			kPa
	Pore pressure at start of consolidation		378			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	0.04			m^2/year
	Coefficient of Compressibility	M_{vi}	1.66			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	2.2E-11			m/s



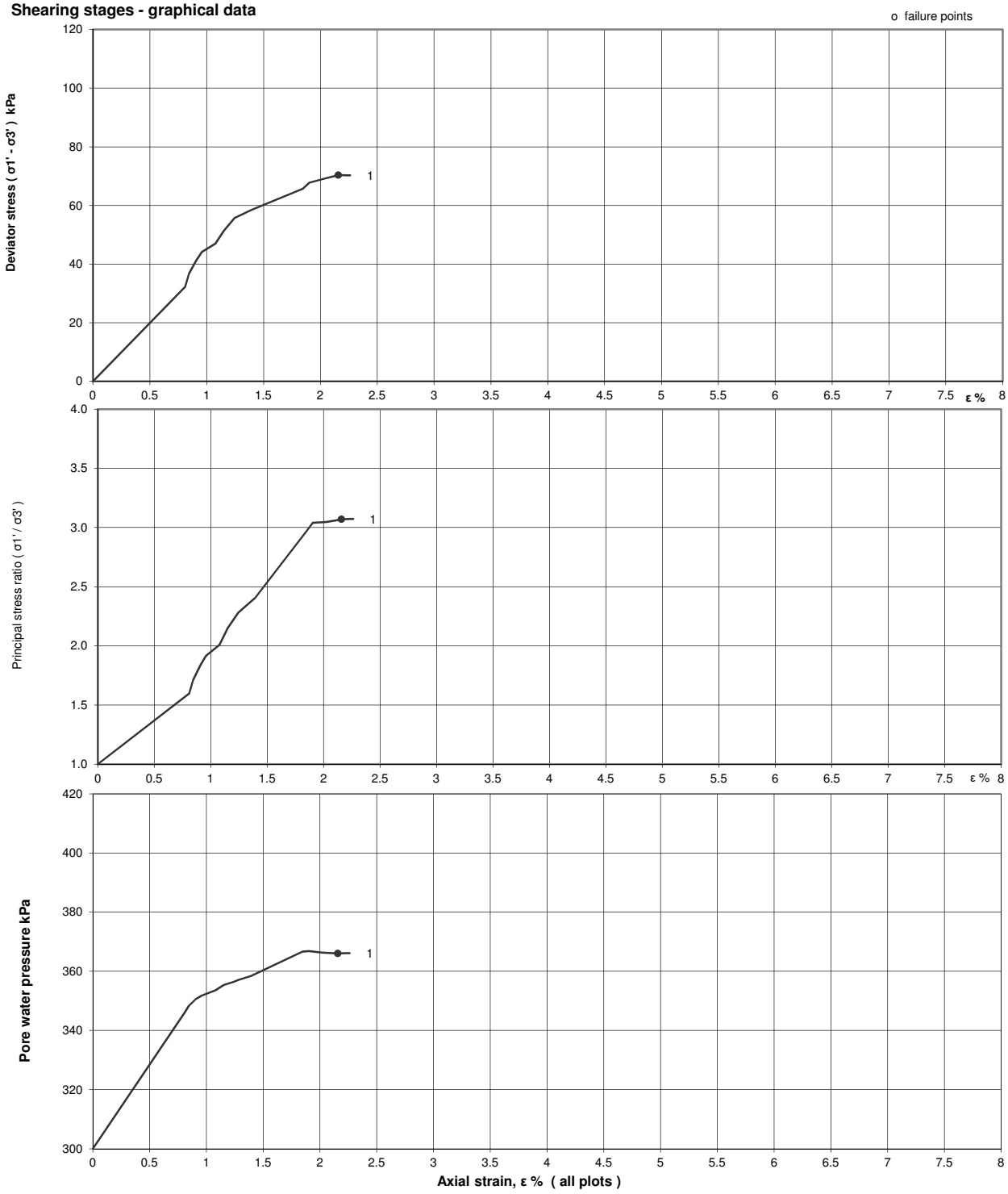
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SLR8.1 Rev 86.0 Feb18	SOCOTEC	Printed:28/02/2020 09:07	CU
	UKAS TESTING 1157		sheet 1 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-03		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45		
			No	30	Type	UT
			ID			
			Spec Ref			

Shearing stages - graphical data



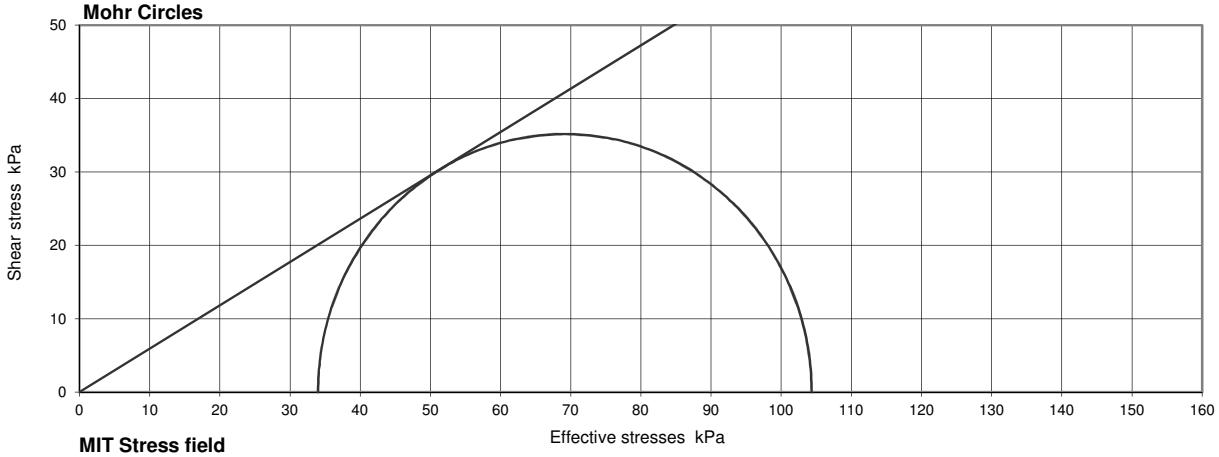
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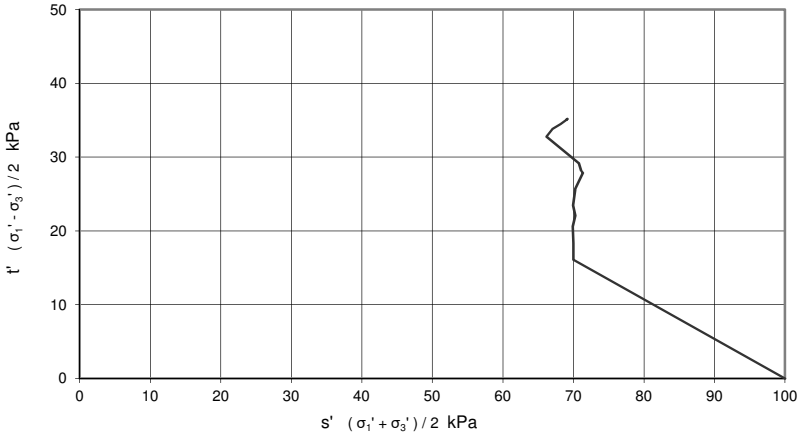
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure (BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-03		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	7.00-7.45		
			No	30	Type	UT
			ID			
			Spec Ref			

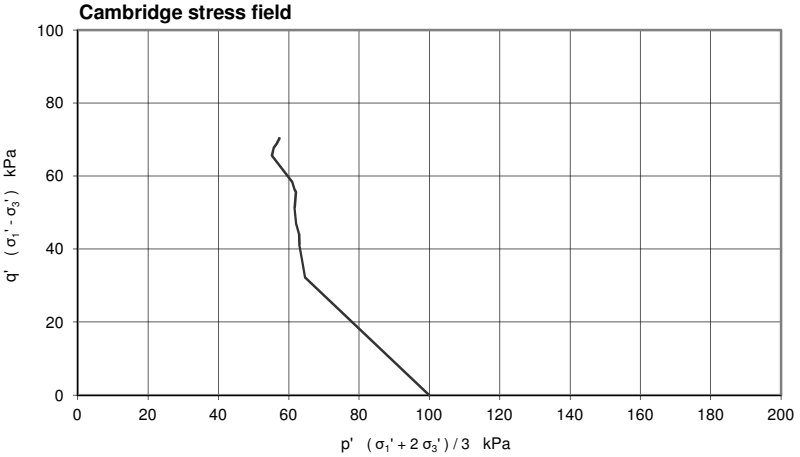
Mohr Circles



MIT Stress field



Cambridge stress field



Compression stages

Specimen	1	2	3	
Cell pressure	400			kPa
Initial pwp	300			kPa
Initial σ_3'	100			kPa
Rate of strain	0.06			%/hr

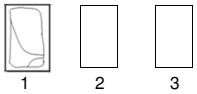
Failure conditions

Criterion	Maximum deviator stress			
Axial strain	2.16			%
$(\sigma_1' / \sigma_3')_f$	3.069			
$(\sigma_1' - \sigma_3')_f$	70.3			kPa
u_f	366			kPa
$\sigma_3'_f$	34			kPa
$\sigma_1'_f$	104			kPa
A_f	0.94			
Time to failure	36.0			hrs

Shear Strength Parameters

		Linear regression
c '	kPa	0.0
Ø '	degrees	30.6
		Manual re-assessment
c '	kPa	-
Ø '	degrees	-

Mode of failure



Notes : Deviator stresses corrected for area change, vertical side drains and 0.329 mm thick rubber membrane(s)

Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:28/02/2020 09:07	CU sheet 3 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
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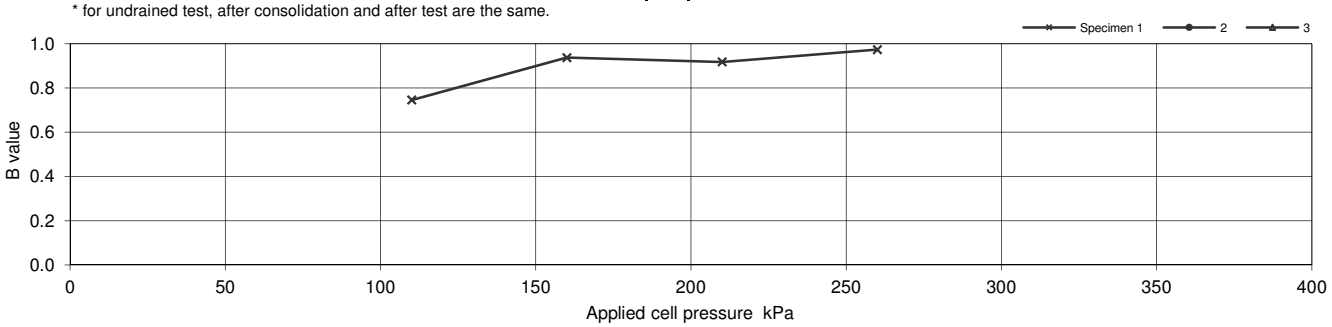
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	4.00	
			No	19	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	203.39		
	Diameter	mm	103.09		
	Bulk Density	Mg/m³	1.98		
	Water Content	%	29		
	Dry density	Mg/m³	1.53		
After consolidation	Length	mm	204.17		
	Diameter	mm	103.49		
	Bulk Density*	Mg/m³	1.97		
	Water Content*	%	30		
	Dry density*	Mg/m³	1.52		

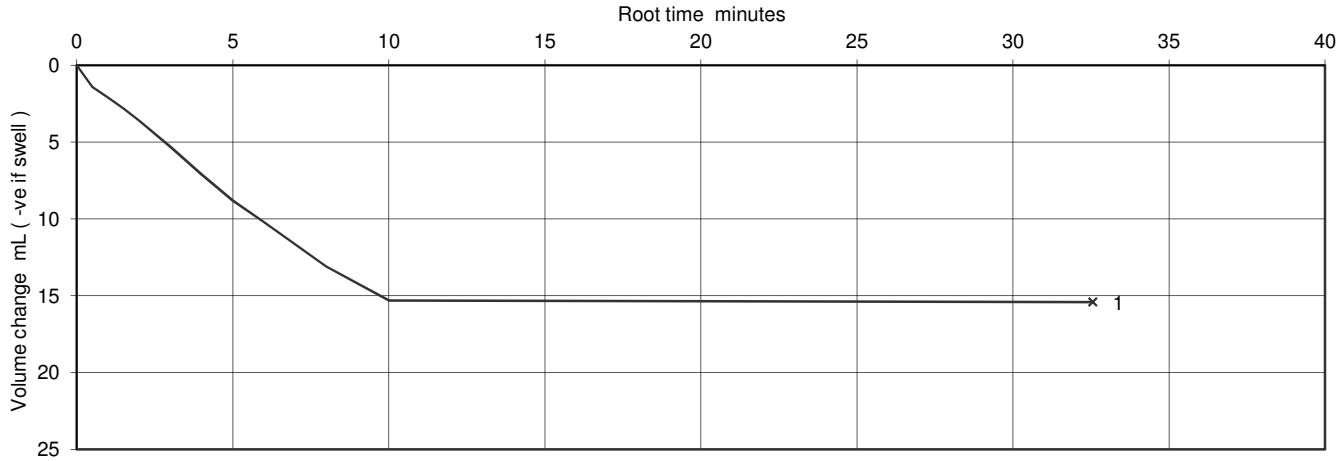
* for undrained test, after consolidation and after test are the same.

Soil Description	Firm brown laminated CLAY with silt on laminae.
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	260		
Final pore water pressure	kPa	233.7		
Final B Value		0.97		



Consolidation Details	Drainage Conditions		From radial boundary and one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		350			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		50			kPa
	Pore pressure at start of consolidation		331			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	2.89			m^2/year
	Coefficient of Compressibility	M_{vi}	0.29			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	2.6E-10			m/s

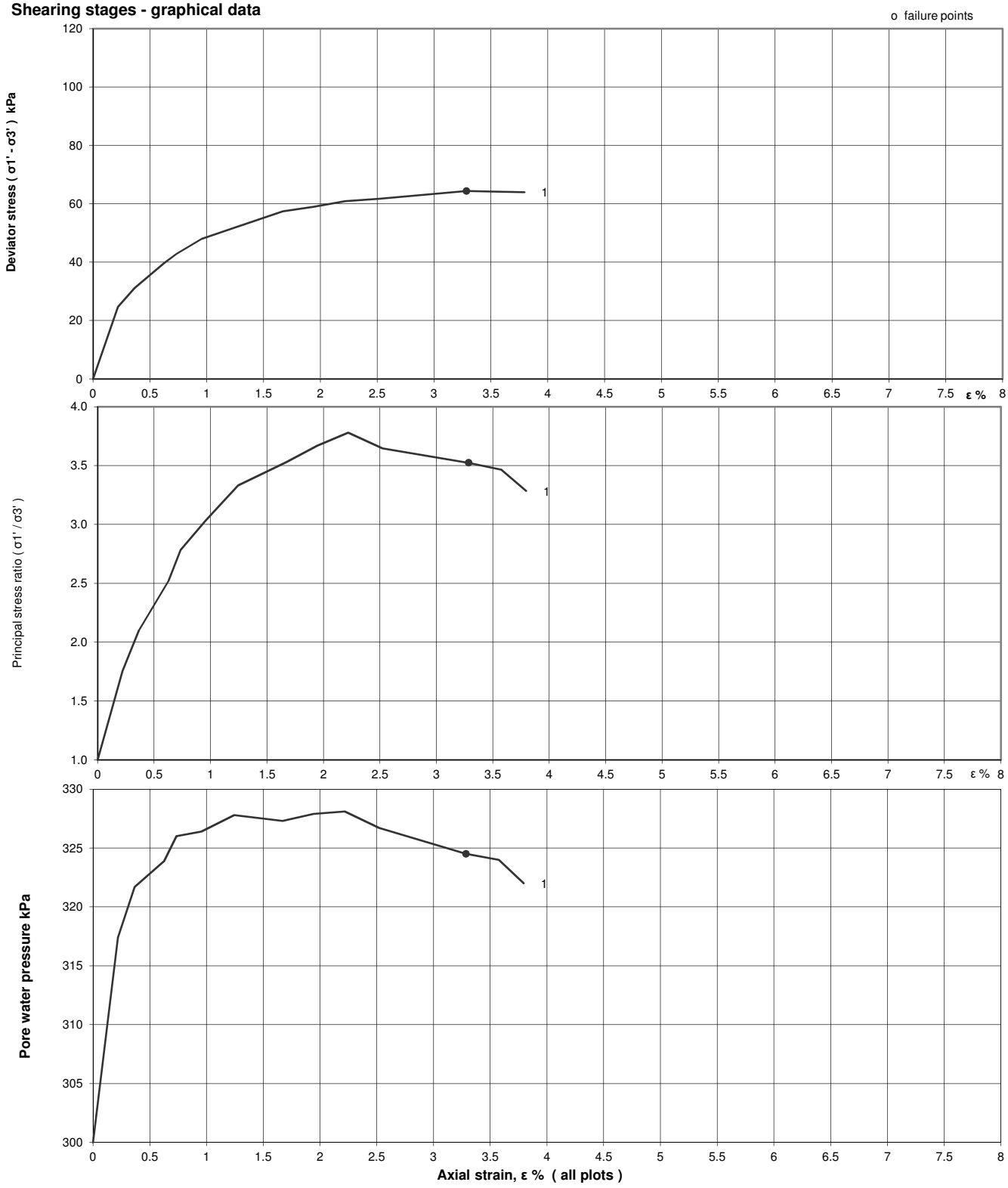


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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	4.00		
			No	19	Type	UT
			ID			
			Spec Ref			

Shearing stages - graphical data



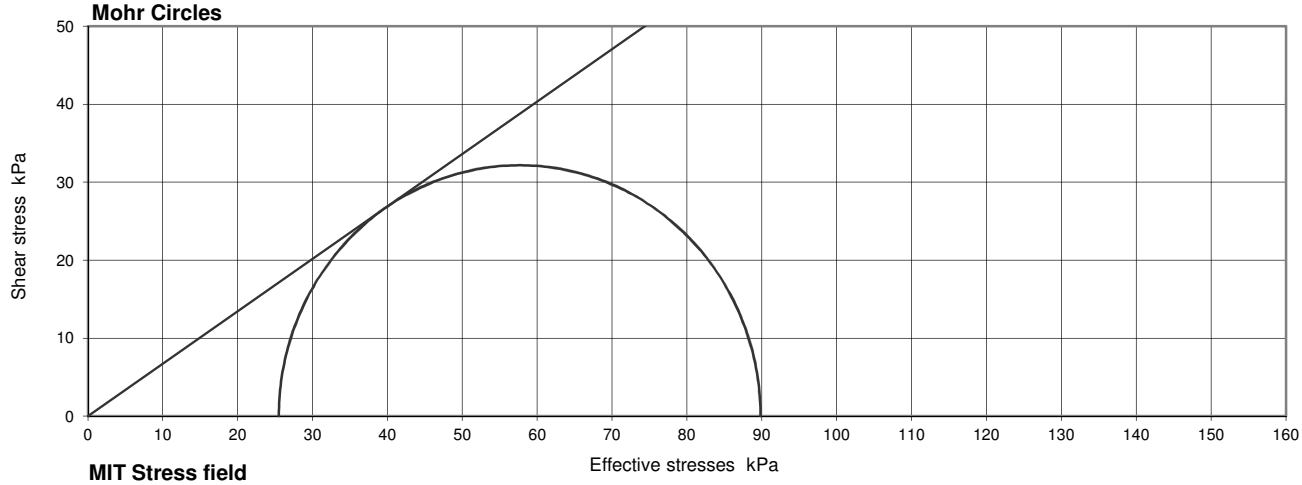
Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC	1157	**CU**
		Printed:15/01/2020 09:14	sheet 2 of 3

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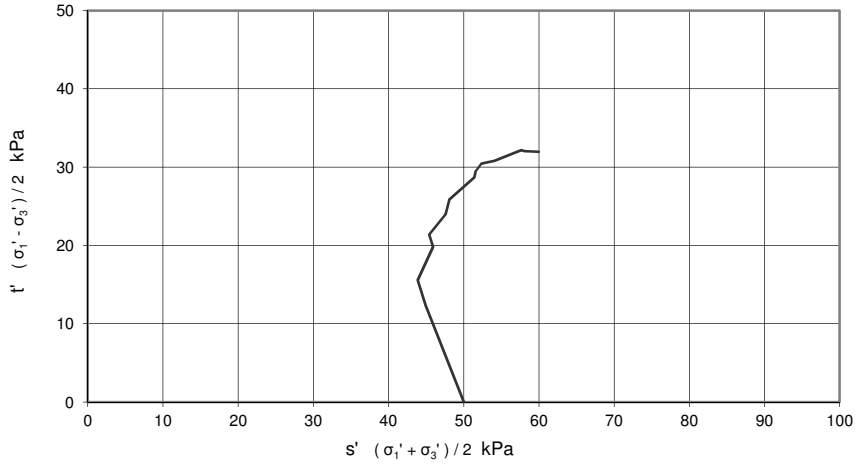
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	4.00		
			No	19	Type	UT
			ID			
			Spec Ref			

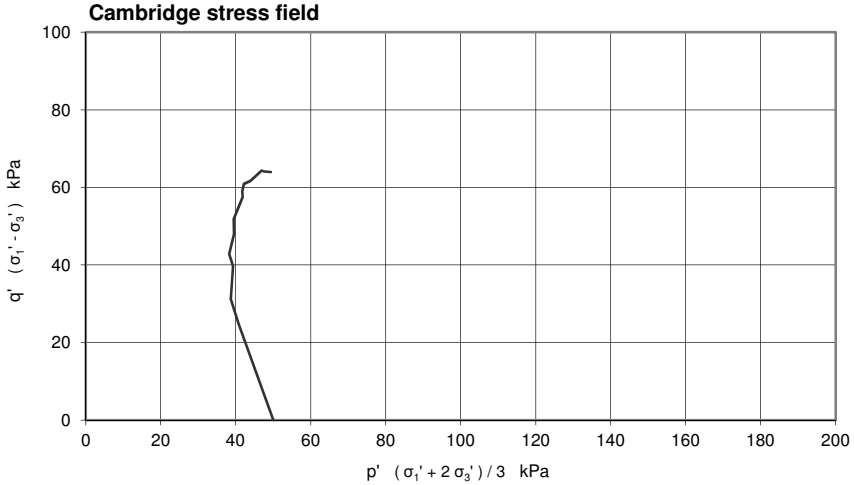
Mohr Circles



MIT Stress field



Cambridge stress field



Compression stages

Specimen	1	2	3	
Cell pressure	350			kPa
Initial pwp	300			kPa
Initial σ_3'	50			kPa
Rate of strain	2.00			%/hr

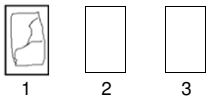
Failure conditions

Criterion	Maximum deviator stress			
Axial strain	3.29			%
$(\sigma_1' / \sigma_3')_f$	3.523			
$(\sigma_1' - \sigma_3')_f$	64.3			kPa
u_f	325			kPa
$\sigma_3'_f$	26			kPa
$\sigma_1'_f$	90			kPa
A_f	0.38			
Time to failure	1.6			hrs

Shear Strength Parameters

		Linear regression
c '	kPa	0.0
Ø '	degrees	33.9
		Manual re-assessment
c '	kPa	-
Ø '	degrees	-

Mode of failure



Notes : Deviator stresses corrected for area change, vertical side drains and 0.329 mm thick rubber membrane(s)

Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:15/01/2020 09:14	**CU** sheet 3 of 3

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

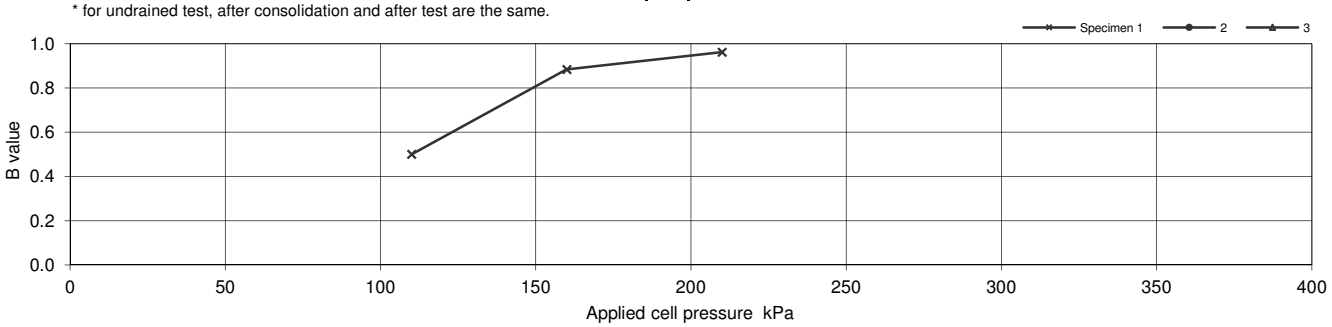
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	8.00	
			No	34	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	202.86		
	Diameter	mm	103.14		
	Bulk Density	Mg/m³	2.01		
	Water Content	%	27		
	Dry density	Mg/m³	1.59		
After consolidation	Length	mm	202.67		
	Diameter	mm	103.04		
	Bulk Density*	Mg/m³	2.02		
	Water Content*	%	27		
	Dry density*	Mg/m³	1.59		

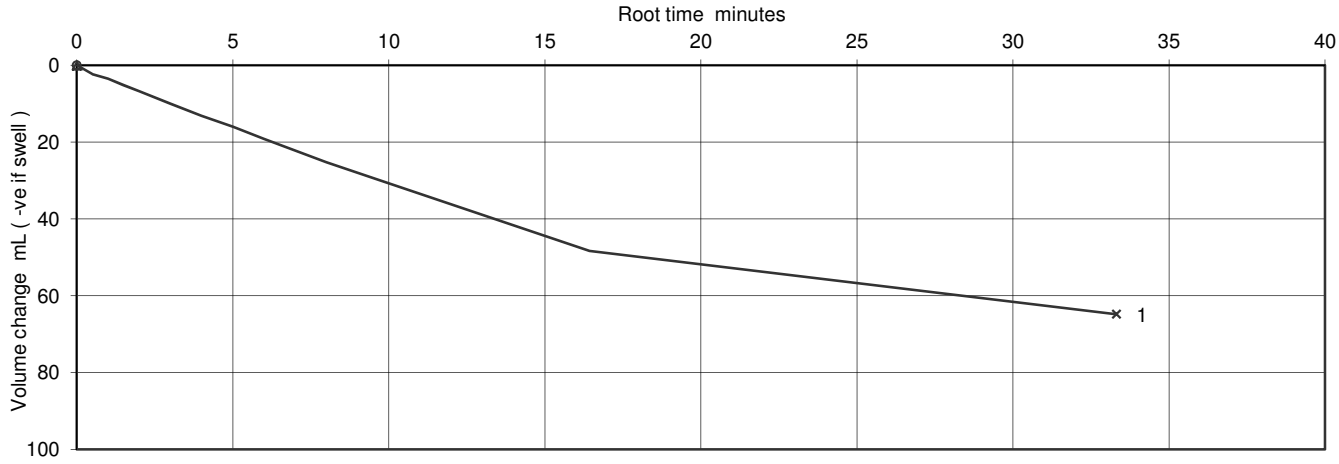
* for undrained test, after consolidation and after test are the same.

Soil Description	Stiff brown laminated CLAY. Laminae are silt.
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	210		
Final pore water pressure	kPa	181.6		
Final B Value		0.96		



Consolidation Details	Drainage Conditions		From radial boundary and one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		470			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		170			kPa
	Pore pressure at start of consolidation		442			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	0.55			m^2/year
	Coefficient of Compressibility	M_{vi}	0.26			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	4.4E-11			m/s

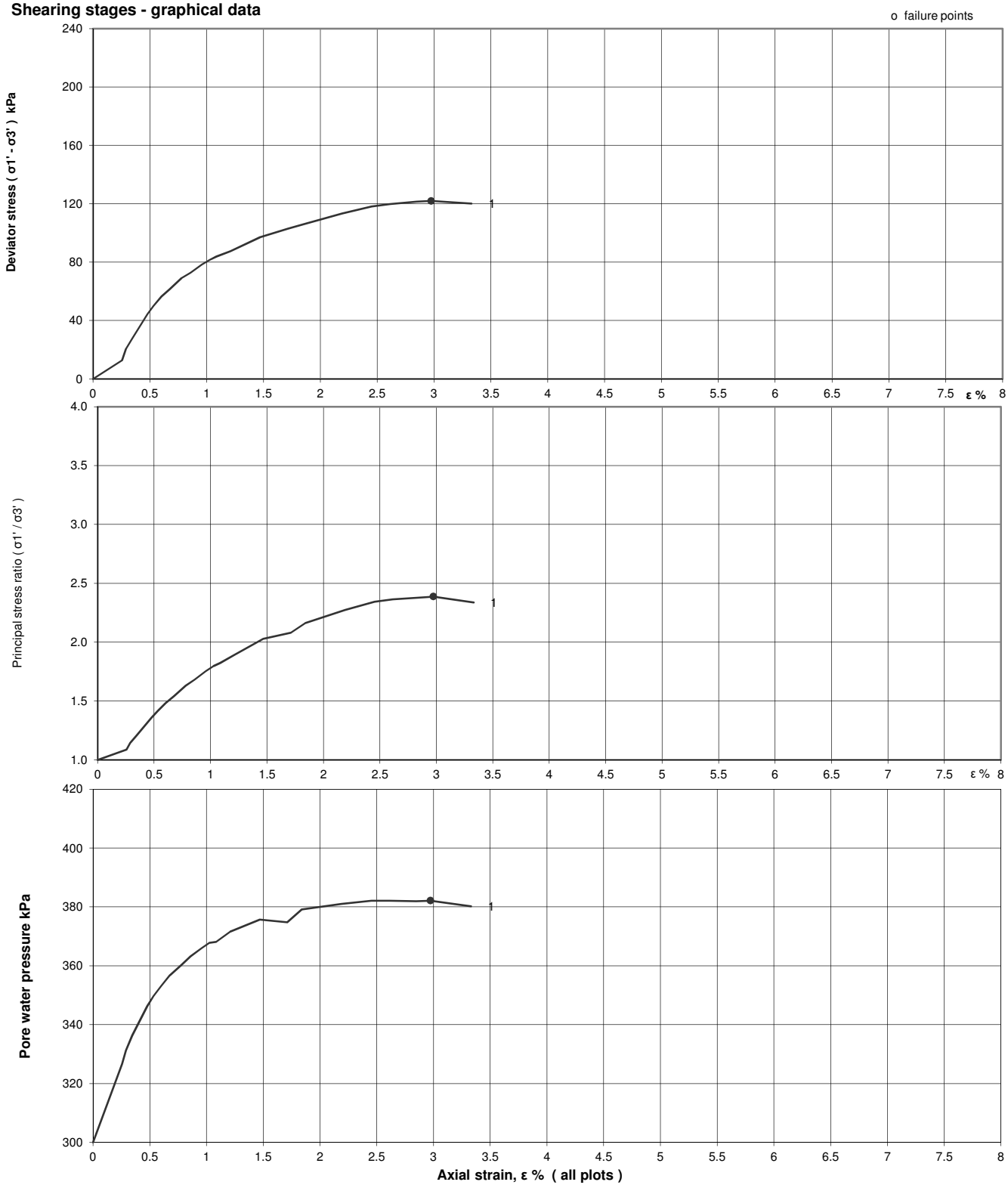


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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	8.00		
			No	34	Type	UT
			ID			
			Spec Ref			

Shearing stages - graphical data



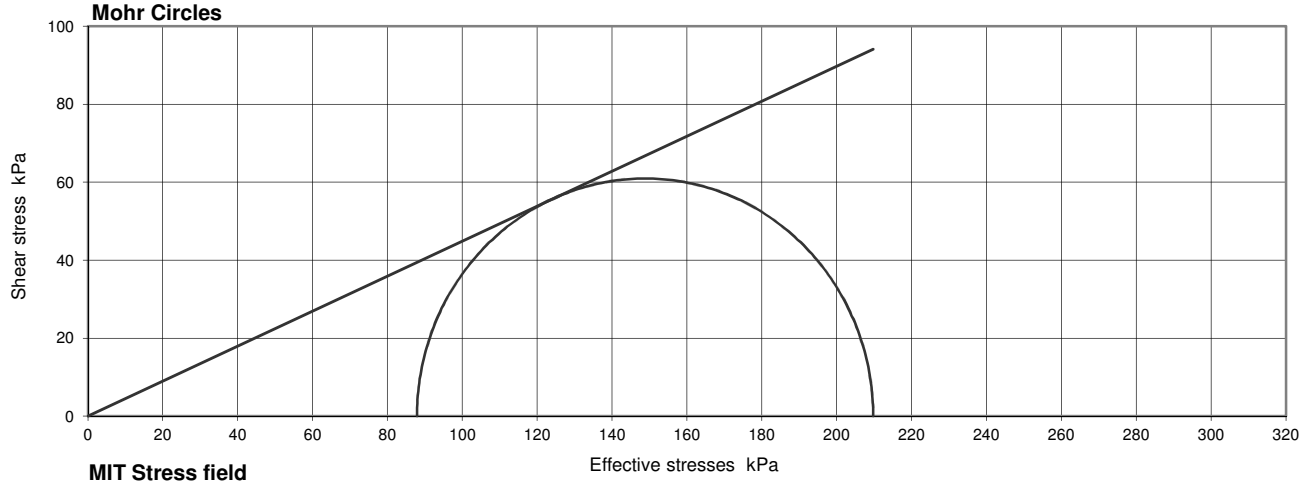
Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC UKAS TESTING 1157	Printed:15/01/2020 08:23	**CU** sheet 2 of 3

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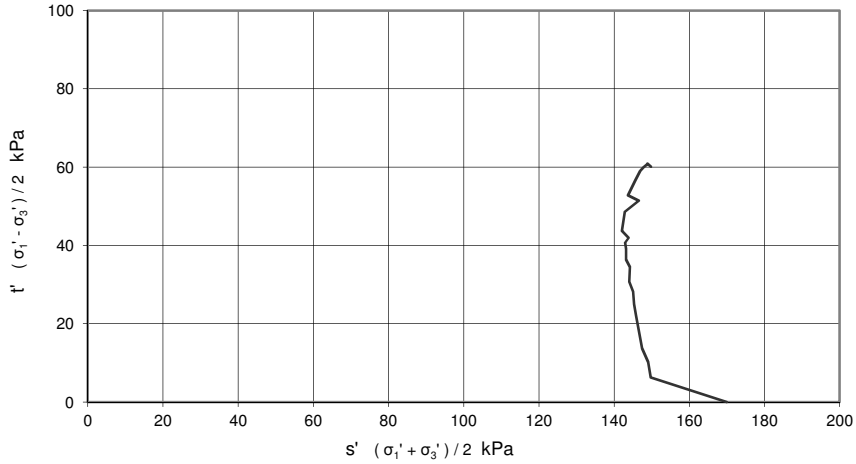
Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

Project No	A9031-19	Sample Details:	Hole No	ATK-CP-04		
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	8.00		
			No	34	Type	UT
			ID			
			Spec Ref			

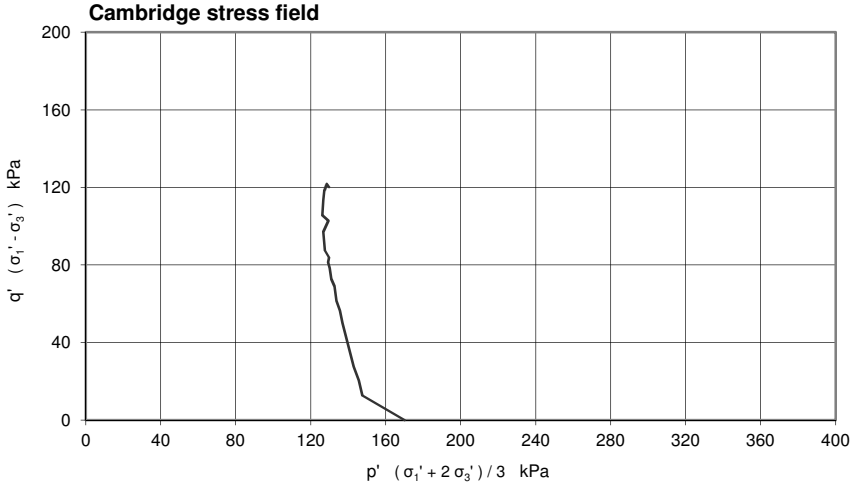
Mohr Circles



MIT Stress field



Cambridge stress field



Compression stages

Specimen	1	2	3	
Cell pressure	470			kPa
Initial pwp	300			kPa
Initial σ_3'	170			kPa
Rate of strain	0.39			%/hr

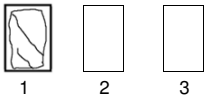
Failure conditions

Criterion	Maximum deviator stress			
Axial strain	2.98			%
$(\sigma_1' / \sigma_3')_f$	2.386			
$(\sigma_1' - \sigma_3')_f$	121.9			kPa
u_f	382			kPa
$\sigma_3'_f$	88			kPa
$\sigma_1'_f$	210			kPa
A_f	0.67			
Time to failure	7.6			hrs

Shear Strength Parameters

		Linear regression
c '	kPa	0.0
Ø '	degrees	24.2
		Manual re-assessment
c '	kPa	-
Ø '	degrees	-

Mode of failure



Notes : Deviator stresses corrected for area change, vertical side drains and 0.329 mm thick rubber membrane(s)

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Consolidated Undrained Triaxial Compression test with Measurement of Pore Water Pressure
(BS1377 : Part 8 : 1990)

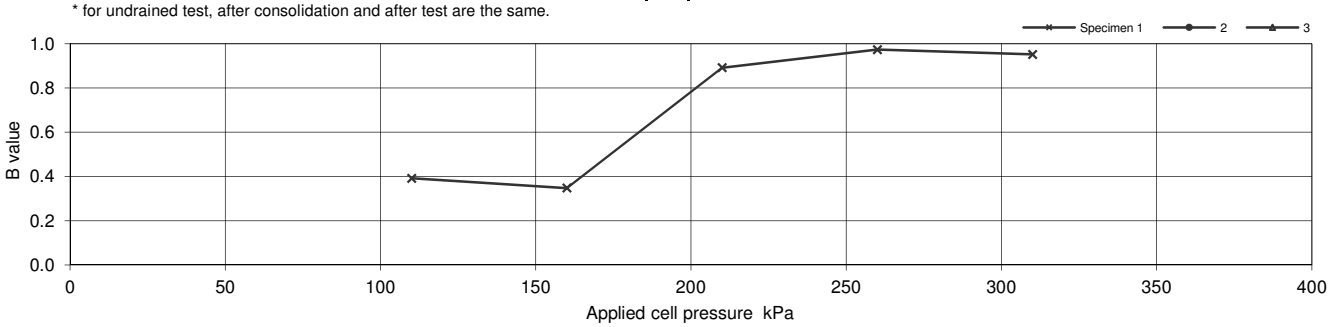
Project No	A9031-19	Sample Details:	Hole No	ATK-CP-05	
Project Name	HAVANT THICKET WATER STORAGE		Depth (m BGL)	4.00	
			No	19	Type UT
			ID		
			Spec Ref		

Specimen Details			1	2	3
Initial	Length	mm	203.31		
	Diameter	mm	103.32		
	Bulk Density	Mg/m³	1.97		
	Water Content	%	28		
	Dry density	Mg/m³	1.54		
After consolidation	Length	mm	204.39		
	Diameter	mm	103.87		
	Bulk Density*	Mg/m³	1.96		
	Water Content*	%	29		
	Dry density*	Mg/m³	1.52		

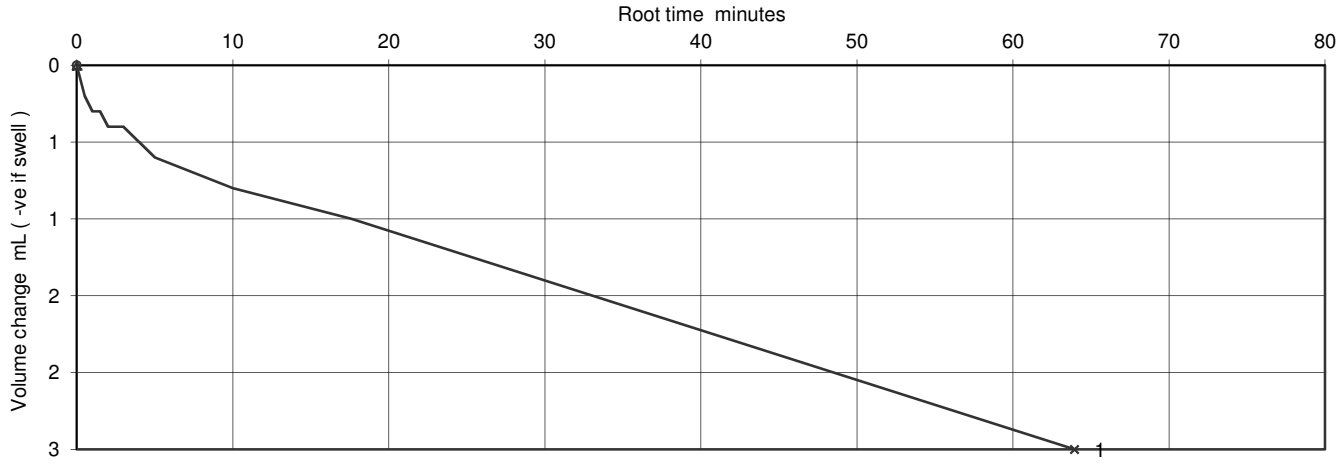
* for undrained test, after consolidation and after test are the same.

Soil Description	Stiff brown silty CLAY
Specimen Type /Preparation	UNDISTURBED

Saturation Details		Method of Saturation		
		Increments of cell and back pressure		
Cell pressure increments	kPa	50		
Differential Pressure	kPa	10		
Final Cell Pressure	kPa	260		
Final pore water pressure	kPa	262.8		
Final B Value		0.95		



Consolidation Details	Drainage Conditions		From one end			
	Specimen No.		1	2	3	
	Cell Pressure applied		350			kPa
	Back Pressure applied		300			kPa
	Effective Pressure		50			kPa
	Pore pressure at start of consolidation		309			kPa
	Pore pressure at end of consolidation		300			kPa
	Pore pressure dissipation at end of consolidation		100			%
Consolidation parameters (see note to BS1377 : pt 8, clause 6.3.4)	Coefficient of Consolidation	C_{vi}	122.45			m^2/year
	Coefficient of Compressibility	M_{vi}	0.15			m^2/MN
	Coefficient of Permeability (calculated)	k_{vi}	5.9E-09			m/s



Ref			Figure
SLR8.1 Rev 86.0 Feb18	SOCOTEC	Printed:14/01/2020 09:17	CU
	UKAS TESTING 1157		sheet 1 of 3

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