

A303 Amesbury to Berwick Down

Applicant's provision of technical reports supporting the Environmental Information Review

Pumping Test Factual Report

Document reference: Redetermination 2.23

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

February 2022







PUMPING TEST FACTUAL REPORT

Stonehenge A303: Pumping test W617



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Rev.1	M. Welsford	M. Pickett	D. Wright	31/3/2021	First Issue
Rev.2	M. Welsford	M. Pickett	D. Wright	19/4/2021	Clients Comments



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1. Introduction

Stuart Wells Limited. (SWL) were appointed by RPS Consulting UK & Ireland to undertake a pumping test south of Stonehenge UNESCO World Heritage Site in accordance with BS EN ISO 14686:2003 Hydrometric determinations - Pumping tests for water wells - Considerations and guidelines for design, performance and use (supersedes BS6316:1992); and BS EN ISO22282-1:2012 Geotechnical investigation and testing - Geohydraulic testing Part 1: General Rules; and BS EN ISO22282-1:2012 Geotechnical investigation and testing - Geohydraulic testing Part 4. Additional water sampling was undertaken in accordance with BS ISO 5667-3:2018 Water quality. Sampling. Preservation and handling of water samples". All site works were undertaken in accordance with 'SWS-RAMS-PT-P2139'.

The pumping test scope of works was detailed in, 'A303 Phase 7B ICE SPECIFICATION SCHEDULE 5. Document Ref: HE551506-AMW-VGT-SW_ZZ_ZZ_ZZ-CD-GS-6000455 June 2020' (Appendix 2) and in accordance with, 'Environmental Agency CONSENT TO INVESTIGATE A GROUNDWATER SOURCE SWWGIC097-2' (Appendix 1). The objective of the test was to collect additional hydrogeological information of the Chalk South of Stonehenge to aid design for the proposed tunnel.

This pumping test was undertaken in an existing well W617, installed as part of Phase 6 A303 Ground Investigation in 2018 (BH log within Appendix), with abstracted groundwater discharged through a 200mm \emptyset pipeline to ground a nominal 800 metres south of the pumping well.

In summary the pumping test consisted of:

- Pre-test monitoring period
- Equipment test
- Post equipment test monitoring period
- 5no x 100min Step-tests
- 3-day Constant rate test at a flow rate of 14l/s.
- 4-day Post-Test Monitoring

Groundwater levels were monitored manually and electronically using Solinst dataloggers in 7no. monitoring wells and 1 no. pumping well;

- W617
- RX633
- R71907
- R618
- R619
- R620
- RX622

RX621

Atmospheric pressure was measured using two Solinst barometric loggers located at the well head and rainfall wasmeasured using a EML Rain Gauge with datalogger at the well head. In situ groundwater quality measurements were measured using an In-situ SmarTROLL located at the well head. Well locations and indicative pumping test layout is shown in Figure 1 below.



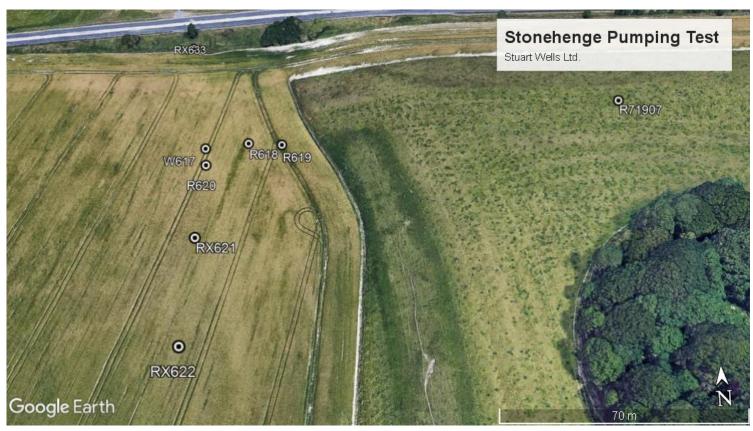


Figure 1: Pumping test well locations



2. Fieldwork

SWL mobilised to RPS's Stonehenge compound on 1st March 2021. Fully demobilising from site on 31st March 2021. A summary programme of works undertaken on site is outlined in Table 1 below.

Date	Works Undertaken
1st March 2021	Arrival on-site and Borehole Check
2 nd March 2021	Installation of Dataloggers
3 rd March – 10 th March 2021	Setting up Pumping test Equipment and Compound Caprari E8P95-6/5A-V Borehole Pump Installation on 10 th March
3 rd March – 11 th March 2021	Pre-Test Monitoring: Groundwater Loggers at 30 second intervals
11 th March 2021	Equipment Test Comprised of 4 no. pumping phases.
11 th – 15 th March	Equipment Test Recovery
15 th March 2021	Step-Testing 5 Steps; 7.6l/s, 10.5l/s, 13.3l/s, 16.2l/s and 19l/s
15 th – 16 th March 2021	Recovery Monitoring 96-hour monitoring period
16 th March – 19 th March 2021	 Constant Rate Pumping 3 no. days constant pumping at 14l/s On the 18th March 2021 the flow rate and groundwater level dropped. It was determined by the client that before the water level drew down to intake a controlled recovery would be undertaken. 2 no. sample. One after 1 hr and one prior recovery.
19 th to 23 rd March 2021	Recovery Monitoring 96-hour recovery monitoring period. Removal of all dataloggers on 23 rd March.
23 rd March – 31 st March 2021	Demobilisation Borehole pump removed 29 th March

Table 1: Programme of Site Works Undertaken

2.1 Equipment and Set-Up

SWL set-up the pumping test equipment at the abstraction well, W617. All the equipment utilised during the pumping test is summarised as follows.

- 2 no. 110kw Stuart Power FG Wilson generators (and associated cabling).
- 1 no. Stuart Power fuel bowser c/w long leads.
- 2 no. DN150 Mag 2000 flowmeters (and associated cabling).
- 1 no. AMF panel (and associated cabling).
- 1 no. distribution box (and associated cabling).
- 1 no. pump soft starter box.
- 1 no. Caprari E8P95/3A-V (415V 26kW) submersible borehole pump at 44 mBTOC on 3" galvanised steel riser.
- 1 no. well head with sampling tap and gate valve.
- 1 no. portable In-Situ SmarTROLL water quality probe for surface water quality measurements.
- 1 no. 32mm ID and 19mm ID piezometers for dipping and datalogger, installed in W417
- 2 no. Solinst barometric dataloggers.



- 8 no. Solinst water Level dataloggers.
- 1 no. rain gauge.
- 800m x 8" Bauer discharge pipeline, v-Notch tank and two further 150m 6" discharge lines with multiple outlets and scour protection at discharge points.

The Caprari E8P95/3A-V submersible borehole pump was installed in W617 on 3" steel riser on the 10th March 2021 using a Dando 4000 cable percussion drilling rig,. Following an instruction from AECOM during the equipment test, the borehole pump was deemed adequate to accommodate the predicted flowrates anticipated during testing and was utilised as such. The borehole pump was removed using the same method on 29th March 2021. Lifting operations were undertaken using an approved lift plan and lifting supervisor.







Figure 2: Discharge point and v-notch images



2.2 Monitoring Set-Up

SWL undertook monitoring of groundwater levels, rainfall, and atmospheric pressure during the pumping test, summarised in Table 2 below.

Parameter	Monitoring Undertaken
Groundwater Levels	Monitored in 8 no. boreholes. • W617 • RX633 • R71907 • R618 • R619 • R620 • RX621 • RX622
Flow Monitoring	 2 x DN150 Mag 2000 flowmeters located at the wellhead 1 x V-Notch located at the discharge location
Barometric Pressure	Measured using 2no x Solinst barometric pressure dataloggers installed at the pumping well.
Rain Gauge	Measured using an EML rain gauge c/w datalogger at the pumping well.
Water Sampling and Groundwater Quality Monitoring	 2no x water samples taken from the wellhead sample tap from pumping well, one within 1hr and one at the end of testing. Hourly for the first 12 hours water quality field parameter data on pH, specific conductivity (µS/cm) and temperature were taken from the pumping well. Thereafter twice daily.

Table 2: Monitoring Undertaken on-site by SWL

3. Testing

The following section outlines the results of the Pumping test.

3.1 Pre-Test Monitoring

Pre-test monitoring was undertaken from 3rd March – 11th March 2021 comprising of 8 days of groundwater, atmospheric pressure and rainfall monitoring. Dataloggers were set to 30 second readings, see *Table 3* for a summary of the groundwater level data. Table 3 outlines the range of groundwater levels seen in all wells associated with the pumping test and the groundwater level prior to the step test.



Well No	Water Level Variation (mAOD)	Groundwater Level Prior to Step-Test (mAOD)
W617	73.19 – 73.67	72.91
R618	73.19 – 73.57	72.91
R619	72.79 – 73.17	72.49
R620	72.60 – 72.98	72.31
RX621	72.98 – 73.37	72.69
RX622	72.90 – 73.31	72.29
RX633	72.58 – 72.96	72.35
R71907	72.64 – 73.02	72.34

Table 3: Summary of Pre-Test Monitoring Groundwater Level Data

3.2 Equipment Test

After the installation of the Caprari E8P95/3A-V submersible borehole pump on the 10th March 2021 an equipment test was undertaken on the 11th March 2021 between 10:00 - 15:00, to determine that allsite equipment was working accordingly, this comprised of 4 no. pumping phases testing flows from 4 – 19I/s. and comprised of checking the; generators, electrical equipment, borehole pump, flowmeters, pipework, v-notch and discharge point (please see section 2.1 for a full breakdown of equipment utilised for testing). The equipment test was undertaken successfully.

3.3 Step-Test

5 no x 100 min step tests were undertaken on the 15th March 2021, pumping at rates of:

- Step No.1 7.6 l/s 45780 litres abstracted (09:00 10:40)
- Step No.2 10.5 l/s 63089 litres abstracted (10:40 12:20)
- Step No.3 13.3 l/s 79547 litres abstracted (12:20 14:00)
- Step No.4 16.2 l/s 96968 litres abstracted (14:00 15:40)
- Step No.5 19 l/s 39967 litres abstracted (15:40 16:15 failed step)

See Table 4, Figure 5 and 6 for a summary of the step test data. For all data related to the step testing see associated excel file SWL2139-W617 Step-Testing data. Whilst undertaking the 5th step, the groundwater level drew down to pump intake and the test was terminated early to prevent damage to the borehole pump.

Well	Step 1		Step 2		Step 3		Step 4		Step 5	
No	Water Level (mAOD)	Drawdown (metres)								
W617	72.11	0.80	71.66	1.25	69.36	3.54	62.99	9.92	40.09	32.82
R618	72.60	0.09	72.55	0.14	72.44	0.25	72.31	0.38	72.24	0.45
R619	72.29	0.02	72.27	0.04	72.25	0.06	72.22	0.09	72.21	0.10
R620	72.36	0.25	72.22	0.39	71.94	0.67	71.68	0.93	71.59	1.02
RX621	72.24	0.05	72.18	0.10	72.12	0.17	72.04	0.24	72.01	0.27
RX622	72.34	0.01	72.32	0.03	72.30	0.06	72.26	0.09	72.23	0.12
RX633	72.89	0.02	72.87	0.05	72.84	0.08	72.80	0.11	72.78	0.13
R71907	72.49	0.01	72.48	0.02	72.47	0.03	72.46	0.04	72.44	0.05

Table 4: Summary of Step-Test Data



3.4 Constant Rate Test

The constant rate testing began at 12:30 on 16th March 2021 and ended at 09:30 on 19th March 2021, the test was undertaken at an abstraction rate of 14l/s. After 48 hours of pumping significant and unexpected drawdown was identified within the abstraction well whilst pumping at a stable rate of 14l/s.

The client instructed SWL to cease the pumping test and commence recovery at 09:30 on the 19th March 2021. See Table 5 and Figures 7,8 and 9 for a summary of the Constant Rate Testing data.

For all data related to the constant rate see associated excel data SWL2139-W617 Constant Rate Testing Data.

Well No.	Easting	Northing	Distance from Pumped Pell	Ground Elevation	Lowest Water Level	Maximum Drawdown
			(m)	(mAOD)	(mAOD)	(m)
W617	412751.0	141969.0	-	79.60	39.44	33.33
R620	412752.0	141959.0	10	79.56	70.88	1.59
R618	412771.0	141969.0	20	79.51	71.65	0.91
R619	412786.0	141969.0	35	79.58	71.70	0.49
RX621	412751.0	141919.0	50	79.87	71.31	0.84
RX622	412750.0	141870.0	99	80.58	71.61	0.62
RX633	412739.9	142040.3	72.15	80.91	72.20	0.59
R71907	412939.1	141968.9	188	98.35	71.93	0.45

Table 5: Constant Rate Distance Drawdown Summary



3.5 Groundwater Sampling

The certificates of analysis from the laboratory are provided in the appendix. Groundwater samples were taken from the wellhead sample tap on W617 during the constant rate test. The first within one hour of commencement of the constant rate test and the second just prior to the borehole pump being switched off, the end of the constant rate test. These were undertaken in accordance with BS ISO 5667-3:2018.

Spot groundwater measurements were undertaken hourly for the first 12 hours and then twice daily thereafter. Field parameter data was collected using a SmarTROLL MP measuring, pH, specific conductivity (μ S/cm) and temperature which were collected from the pumping well sample tap.

Table 6 below summarises stabilised field parameter water quality data from the constant rate test. Full results are available in excel SWL2139-W617 Water Quality Testing Data, which show all data collected at each spot test prior to stabilisation.

Date Time	Time	Actual Conductivity (µS/cm)	Temperature (°C)	Specific Conductivity (µS/cm)	рН (рН)
16/03/2021 13:38	13:38:49	497.53	12.17	659.02	7.33
16/03/2021 14:46	14:46:50	477.43	11.93	636.15	7.79
16/03/2021 15:16	15:16:10	494.19	11.93	658.45	7.46
16/03/2021 16:44	16:44:32	488.72	11.47	658.88	7.39
16/03/2021 17:43	17:43:16	485.04	11.24	657.92	7.38
16/03/2021 18:53	18:53:28	477.97	10.82	655.43	7.45
16/03/2021 19:45	19:45:03	478.38	10.81	656.18	7.40
16/03/2021 20:40	20:40:01	475.09	10.57	655.83	7.39
16/03/2021 21:40	21:40:03	475.00	10.45	657.77	7.30
16/03/2021 22:39	22:39:39	474.33	10.49	656.07	7.30
16/03/2021 23:40	23:40:01	469.12	10.21	653.67	7.33
17/03/2021 00:40	00:40:08	469.52	10.49	649.40	7.27
17/03/2021 09:17	09:17:46	434.34	10.76	596.59	6.97
17/03/2021 18:11	18:11:46	434.20	10.75	596.56	7.37
18/03/2021 09:02	09:02:10	458.15	11.01	625.19	7.28
18/03/2021 17:30	17:30:22	459.73	11.05	626.71	7.65
19/03/2021 09:22	09:22:03	449.26	11.10	611.53	7.19

Table 6: Water Quality Results for pumping

3.6 Recovery Monitoring

The recovery period was monitored for 96 hours using manual dips and dataloggers at 30 second intervals. SWL removed all monitoring equipment on the 23rd March 2021 as per AECOM's instruction, monitoring boreholes were re-installed with telemetry monitoring system by AECOM.

See Figures 7 and 8 for a summary of the recovery data. For all data related to the recovery see associated excel data SWL2139-W617 Constant Rate Testing Data.



3.7 Post-Test

Post-test, Stuart Wells Ltd. removed all equipment from site. During the installation of the Caprari E8P95/3A-V (415V 26kW) submersible borehole pump in W617, the well head protection had to be removed due to lifting restrictions, this was reinstated with post-crete post-pump removal. All dataloggers were removed on the 23rd March 2021 and all pipework and pumping equipment was dissembled and removed from site by 31st March 2021.

3.8 Data Files Associated with Report

Associated with this report and testing undertaken by Stuart Wells are the following data files.

Pumping Test Groundwater Data

- SWL2139- Stonehenge Pumping Test Pre-Test and Equipment Testing Data Rev.1.Excel
- SWL2139- Stonehenge Pumping Test Constant Rate Testing Data Rev.1.xcel
- SWL2139- Stonehenge Pumping Test Step-Testing Data Rev.1.Excel

Surface Water, Rainfall and Barometric Data

- SWL2139- Stonehenge Pumping Test Rain Gauge Data Rev.1.Excel
- SWL2139-W617 Stonehenge Pumping Test Barometric Data Rev.1.Excel
- March Amesbury-flow-15min-Measured.CSV
- Shrewton Met Data-StepT&CRT&Recovery.XLSX

Groundwater Quality and Laboratory Data

- SWL2139- Stonehenge Pumping Test In-Field Water Quality Testing Rev.1.Excel
- 21317-67-MCERTS-COMPLETE-2021-03-24.pdf

Borehole Logs

- ii.R618.pdf
- ii.R619.pdf
- ii.R620.pdf
- ii.R71907.pdf
- ii.RX621.pdf
- ii.RX622.pdf
- ii.RX633.pdf
- ii.W617.pdf

Calibration Records

- SWL2139-Stonehenge Pumping Test Datalogger Calibration Certs'
- SWL2139 Stonehenge Pumping Test DN150 Mag 2000 Flowmeters Calibration Records
- SmarTROLL MP Calibration 479040 2021 16-19 03 2021

Specification

- Annex D5 from June 2020 HE Spec
- 2054 210204 A303 Section 32 Consent_WR37_2021 Re-issue FINAL

Work RAMS

- Stonehenge Phase 7B Pumping Test RAMS Rev.02



For all pumping test data please see files and spreadsheets referenced and associated with this report.

Yours faithfully,



Martin Welsford BSc FGS

Groundwater Engineer
For & on behalf of Stuart Wells



Dr Mark Pickett PhD, MCSM, BEng (Hons) FGS

Technical Director
For & on behalf of Stuart Wells



David Wright BSc CGeol

Director & Principal Groundwater Engineer For & on behalf of Stuart Wells



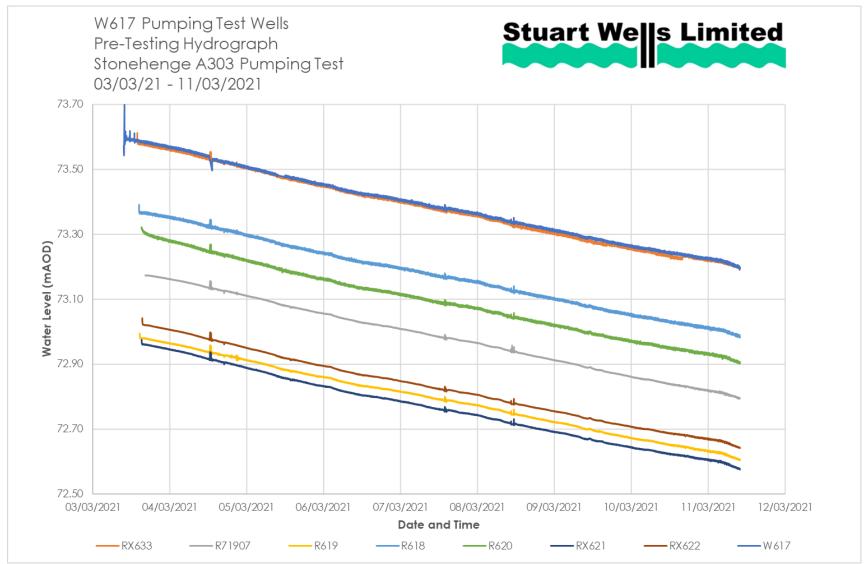


Figure 3 Pre-Test Monitoring Groundwater Levels Hydrograph



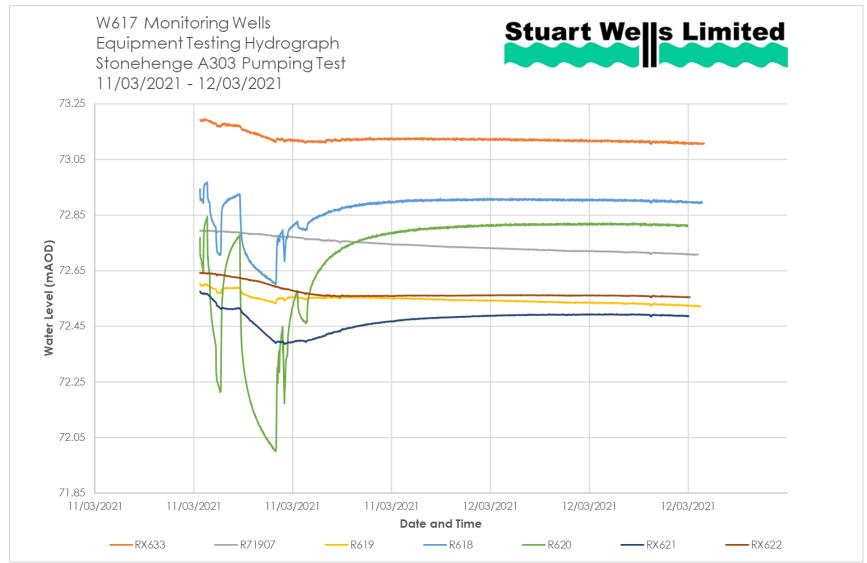


Figure 4: Equipment Test Monitoring Wells Groundwater Level Hydrograph



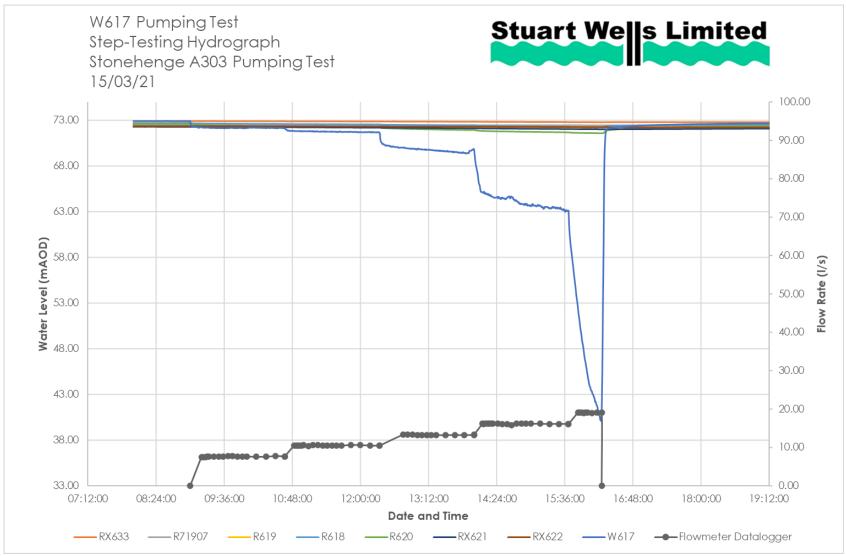


Figure 5 W617 Step-Test Groundwater Level Hydrograph



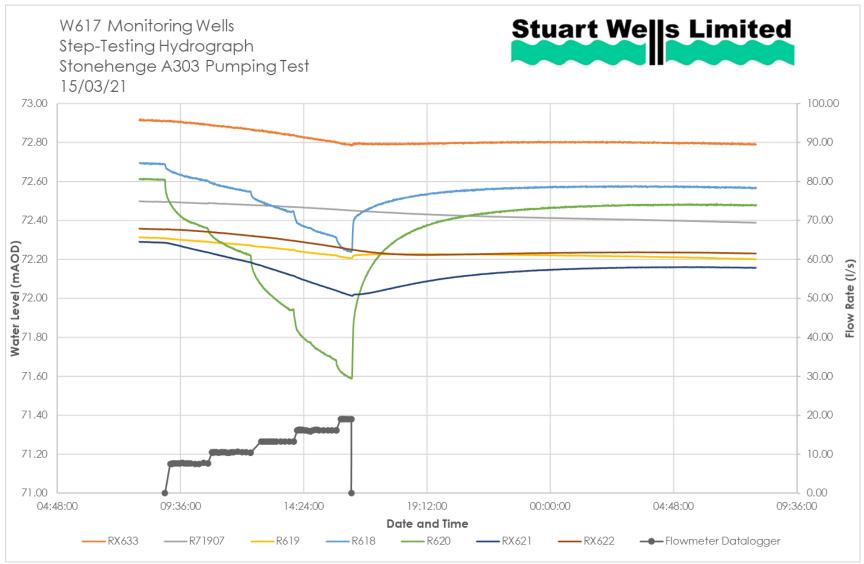


Figure 6 W617 Monitoring Wells Step-Test Groundwater Level Hydrograph



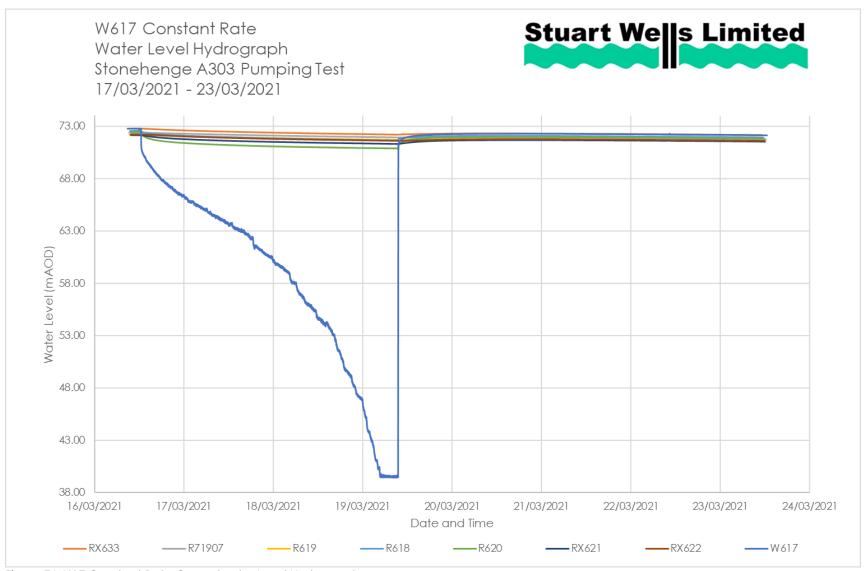


Figure 7 W617 Constant Rate Groundwater Level Hydrograph



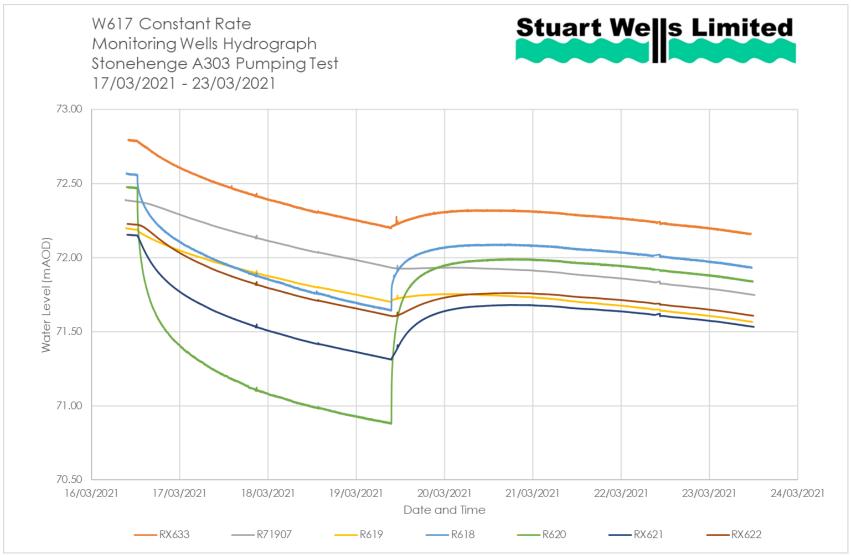


Figure 8 W617 Monitoring Wells Constant Rate Groundwater Level Hydrograph



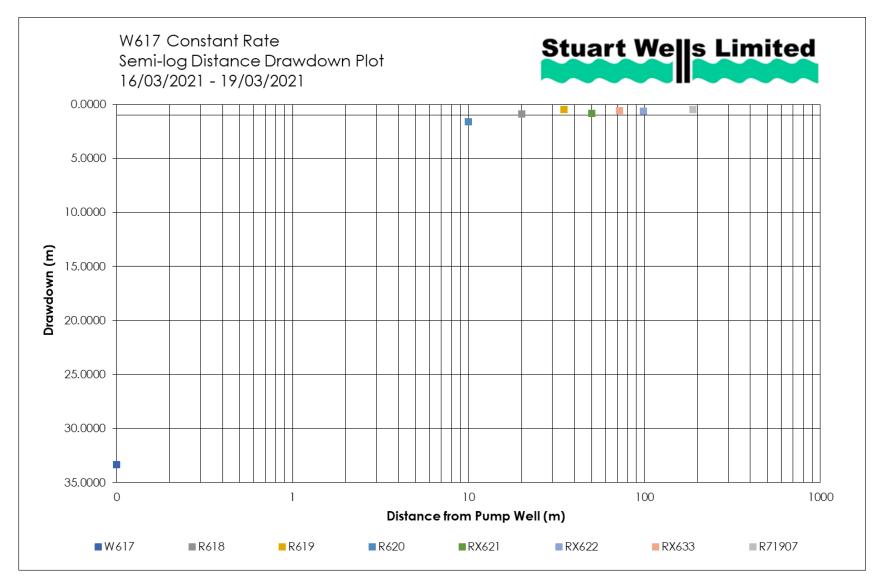


Figure 9 W617 Semi-Log Distance Drawdown Plot



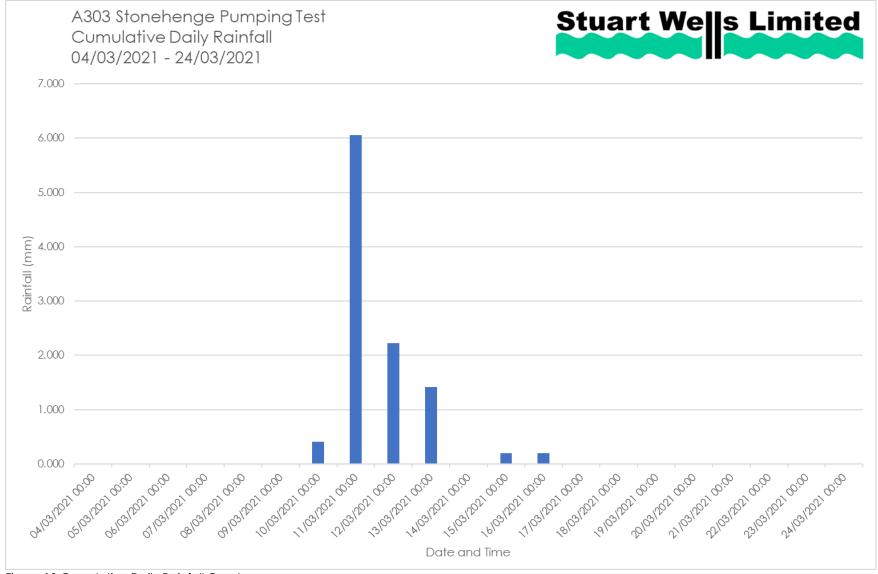


Figure 10 Cumulative Daily Rainfall Graph



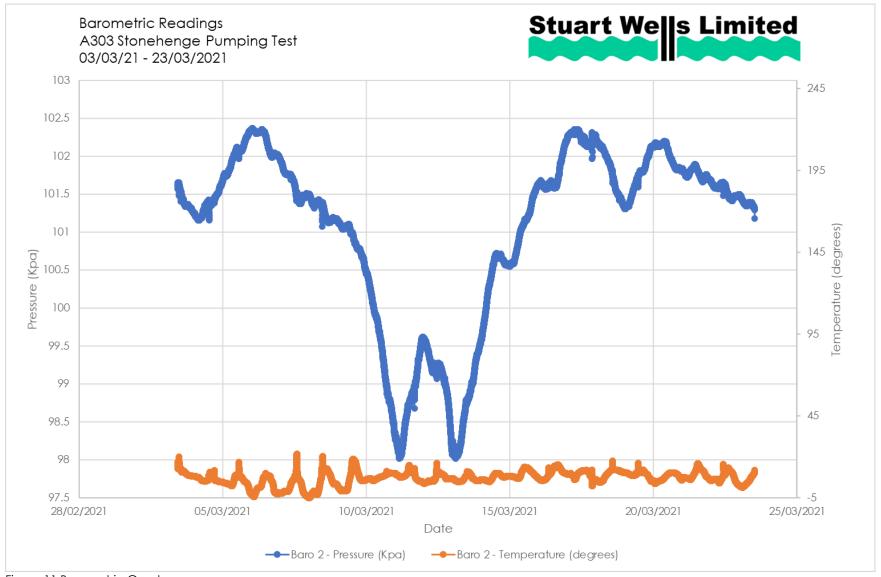


Figure 11 Barometric Graph

Stonehenge A303: Pumping Test W617 Rev.02



APPENDIX

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 1: CONSENT TO INVESTIGATE A GROUNDWATER SOURCE SWWGIC097-2

CONSENT TO INVESTIGATE A GROUNDWATER SOURCE

Section 32(3) Water Resources Act 1991



This **CONSENT** is issued by the Environment Agency ("the Agency") to:

Mr Andrew Clark

of Highways England, Bridge House, 1 Walnut Tree Close, Guildford, Surrey GU1 4LZ ("the Consent Holder").

This consent authorises the Consent Holder to abstract water for testing purposes from an existing borehole (W617) at Stonehenge Bottom, Wiltshire, National Grid Reference SU12751 41968

Subject to the conditions set out in the Schedules 1 and 2 to this consent.

This consent is effective from the date below and expires on 31 July 2021

Signature	Print name Eddie Stevens
Position	Date
Team Leader Groundwater Hydrology and Contaminated Land	22/01/2020

This consent is issued by the Environment Agency from its office at Rivers House, Sunrise Business Park, Blandford Forum, Dorset, DT11 8ST. The person whom the Consent Holder should contact during the carrying out of the works and if he has any queries is Ben Hayball, tel. 07825 852437, email Ben.Hayball@environment-agency.gov.uk.

SCHEDULE 1 - General Conditions

1 INTERPRETATION

- a) "The Consent Holder" means the person (whether an individual or organisation) to whom this consent is granted. Where the Consent Holder is two or more persons (e.g. a partnership) such persons shall be jointly and severally liable for the proper fulfilment of the conditions of this consent. In this consent the expression may also include, where the context so admits, a person who is the applicant for a consent i.e. before a consent is granted.
- b) "The works" means the activities authorised or required by this consent, including the survey, construction of the well, borehole, well points, catchpit, or other work, and/or test pumping of the same, as the context so requires. The expression "the works" does not include activities for which this consent is unnecessary, such as construction of ancillary buildings, access roads, pits for drill cuttings, etc.

2 CLEARANCE/DEVELOPMENT PUMPING

Clearance/development pumping to remove any products of the well drilling or well development treatment is permitted under this Consent for a period not exceeding 48 hours. Clearance/development pumping that extends beyond 48 hours must be agreed with the Agency prior to the commencement of pumping. There must be a full recovery of water levels before a proper test pumping commences. Condition 5 of Schedule 1 of this Consent concerning the discharge of water and potential for pollution/physical disturbance applies to any such pumping operations.

3 SURVEY

The works shall not proceed unless and until the Agency has informed the Consent Holder in writing to the effect that (i) it considers the survey of water sources and other features which may be relevant to the works as specified by the Agency has been carried out adequately and (ii) it appears unlikely that test pumping will significantly affect other water users.

4 NOTICES etc TO THE AGENCY

Unless other periods are agreed in writing with the Agency, the Consent Holder shall give written notice to the Agency as follows:-

- a) 5 days' notice before first commencing construction of the works
- 5 days' notice before commencing acidisation or other treatment of the works
- test pumping.

Notice, and other information required by the Agency, shall be sent to the person named on the front of this consent by email or post to the address on the front of this consent.

5 DISCHARGE OF WATER and POTENTIAL FOR POLLUTION/ PHYSICAL DISTURBANCE

 a) The Consent Holder shall construct and finish the works so that water is prevented from running to waste.
 Any artesian flow must be securely capped.

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- b) The Consent Holder shall secure any completed works so as to prevent pollution or other hazard through those works, for example by capping and locking a completed borehole.
- c) The Consent Holder shall ensure that pollution of, interference with, or damage to inland freshwaters or groundwater does not occur, whether from abstracted water or from substances or materials used in connection with the works.
- d) The Consent Holder shall be responsible for obtaining necessary consents in relation to structures in, over or under watercourses.
- e) The Consent Holder shall be responsible for the proper disposal of wastes from the works.
- f) The Consent Holder shall notify neighbouring landowners who may be affected by discharge from the works and, if applicable, the Internal Drainage Board for the area, and shall take all necessary steps to prevent flooding.
- g) The Consent Holder shall ensure that all persons engaged in the works are free from, and are not carriers of, waterborne diseases, and shall ensure that they operate to a high standard of hygiene.

6 EFFECTS ON OTHER WATER SOURCES

The Consent Holder shall immediately inform the Agency if any information or complaint is received by him about the consented operation, and shall immediately consult with the Agency as to the appropriate action to be taken.

7 RECORDS

The Consent Holder shall keep such records of strata encountered, construction of the works, results of any geophysical logging, water quality analyses, and test pumping data as may be required by the Agency. The information shall be given on forms provided by the Agency, and/or on compatible computer disk in a format agreed with the Agency. These records must be returned within one month of completion of the works or with any subsequent licence application (whichever is sooner).

8 PRESENTATION OF RESULTS

The Consent Holder shall present results and analysis of test pumping in the form specified in Schedule 2 to this consent.

- 9 INFORMATION TO THE BRITISH GEOLOGICAL SURVEY (BGS) ON BEHALF OF THE NATURAL ENVIRONMENT RESEARCH COUNCIL
- a) Where the proposed works are intended to be more than 15 metres (50 feet) deep, the Consent Holder must notify BGS before starting the works. BGS' address for the purpose is the Hydrogeology Group, British Geological Survey, Maclean Building, Crowmarsh Gifford, Wallingford, Oxon OX10 8BB.
- b) The Consent Holder shall send BGS stratigraphic and test pumping information as required by section 198 Water Resources Act 1991 within one month of completing the work. By arrangement with BGS, the Agency will do this on behalf of

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the Consent Holder unless the Consent Holder instructs otherwise.

c) Under "The Borehole Sites and Operations Regulations 1995"
HSE must be notified when drilling boreholes more than 30 metres deep into used or disused mining areas. The regulations define "mining area" as land within one kilometre in a horizontal or other direction of workings in a mine, or where a licence to mine for minerals has been granted.

10 DRILLING SAMPLES

Samples shall be taken whenever there is a change in stratum, or at 10 metre intervals, whichever is less. The samples shall be bagged or boxed and labelled with their location, depth below ground level, and date taken. The samples shall be kept available for inspection by the Agency for up to 30 days following completion of the works.

11 MEASUREMENT ACCESS

The Consent Holder shall provide an access tube of diameter adequate for measuring instruments to be lowered safely into the borehole. In the case of lagoons, the consent holder shall install a gauge board, of a design approved by the Agency, in a position in the lagoon so that at all times the full range of water levels from normal top water level

to the maximum drawdown level can be safely observed. The datum level on the gauge board shall be accordingly levelled to Ordnance Datum (Newlyn).

12 ENTRY BY THE AGENCY or BGS

The Consent Holder shall allow representatives of the Agency or BGS to enter the site at all reasonable hours, to inspect the works, to inspect and take copies or extracts of documents, and to take measurements and samples, as such representatives consider appropriate.

13 STANDARDS OF WORK

Unless otherwise specified in this consent or subsequently agreed with the Agency, the Consent Holder shall carry out the works and present data fully in accordance with British Standard ISO 14686 (2003) "Hydrometric determinations – pumping tests for water wells – considerations and guidelines for design, performance and use". Copies of this are available from BSI, 389 Chiswick High Road, London, W4 4AL. Tel: (020) 89969000.

SCHEDULE 2 - Special Conditions

1. CONSTRUCTION DETAILS

No construction of new boreholes is covered by this consent. Pump testing will use existing boreholes for abstraction and monitoring.

2. PROGRAMME.

- a. The Consent Holder shall carry out test pumping and measurement of water levels in the works and at other points using an equipment test, step test and constant rate test followed by monitoring of recovery of water levels.
- b. The constant rate test pumping rates shall not exceed a maximum of 90 m³/hr (25 l/s) unless agreed in writing with the Agency in advance. Equipment test and step tests should not exceed 180 m³/hr (50 l/s) with a maximum duration of 240 minutes and 500 minutes (5 steps of 100 minutes) respectively.
- c. Subsequent tests shall not begin until levels in all monitoring boreholes have recovered to within 5% of pre-pumping levels unless agreed in writing with the Agency.
- d. Test details (eg: pump rates and durations) may only be varied with prior written agreement from the Agency.
- e. The Agency reserves the right to change the requirements for test pumping at any time or instruct that pumping shall cease.

1. Pre-Test

Level monitoring for at least 7 days prior to the start of pumping tests.

2. Equipment Test

Pumping at a range of pump rates for a maximum of 4 hours.

3. Step Test

Five, 100 minute tests at increasing pump rates up to a maximum rate of 180 m³/hr (50 l/s).

4. Constant Rate Test

7 day constant rate test at 90 m³/hr (25 l/s) or such other rate and duration as may be directed by the Agency after completion of the step test.

5. Recovery Test

Level monitoring for a minimum of 24 hours or until levels in all monitoring boreholes have fully recovered, whichever is the longer.

3. WATER LEVEL MONITORING

Before, during and after test pumping the Consent Holder is required to monitor the following specified water features.

3.1. At the pumped source (W617)

- a. The Consent Holder shall measure and record water levels daily for 7 days before pumping commences in the pumped borehole. Thereafter the Consent Holder shall measure water levels at a minimum frequency as stated in British Standard BS ISO 14686:2003 from the commencement and completion of each pumping session <u>until water levels have recovered to</u> <u>within 5% of their original level</u>. Discharge rates or meter readings must be recorded at the same frequency as water levels during pumping.
- b. Water levels shall be measured relative to an accurately surveyed borehole datum. Where pressure transducers are used they shall be capable of resolving fluctuations in pressure equivalent to 0.01 metres of water or less.

3.2. Water Feature Monitoring Points

a. The Consent Holder shall measure and record water levels in the following monitoring boreholes before, during and after the pumping tests at the same frequency as the pumped source:

R618	NGR SU 12771 41969
R619	NGR SU 12786 41969
R620	NGR SU 12752 41959
R621	NGR SU 12751 41919
R622	NGR SU 12750 41870
RX633	NGR SU 12740 42040
R71907	NGR SU 12942 41962

b. Water levels in boreholes shall be measured relative to an accurately surveyed borehole datum. Where pressure transducers are used they shall be capable of resolving fluctuations in pressure equivalent to 0.01 metres of water or less.

Submission of Data from Data Loggers

Where continuous monitoring of the test source and/or any observation sites has been specified, the Consent Holder shall submit monitoring data recovered from data loggers to the Agency in Windows EXCEL format with copies of paper field records where held.

Any changes to monitoring arrangements must be agreed in writing with the Agency prior to the commencement of testing.

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4. DISCHARGE OF WATER

The pumped water should be disposed of in such a way as to prevent increased risk of flooding or pollution including erosion.

The Consent Holder

- a. shall discharge the abstracted water to the south of grid reference SU 12740 41340 as per the arrangement shown on drawing HE551506-AMW-VGT-SW_GN_000_Z-DR-CE-0001 and subject to conditions outlined above.
- b. shall be responsible for appropriate sampling and chemical analysis to ensure pollution is prevented.

The pumped water should be disposed of in such a way as to prevent recirculation back to the zone of influence of the test.

5. PUMPING TEST RESULTS

a. The Consent Holder shall provide the Agency with pumping test results and an interpretive report within six weeks of the end of testing. The report shall assess the hydrogeological impact of the tests and implications regarding any future dewatering operations in relation to the A303 Amesbury to Berwick Down Improvement project.

6. OTHER SPECIAL CONDITIONS 6.1 POLLUTION PREVENTION MEASURES

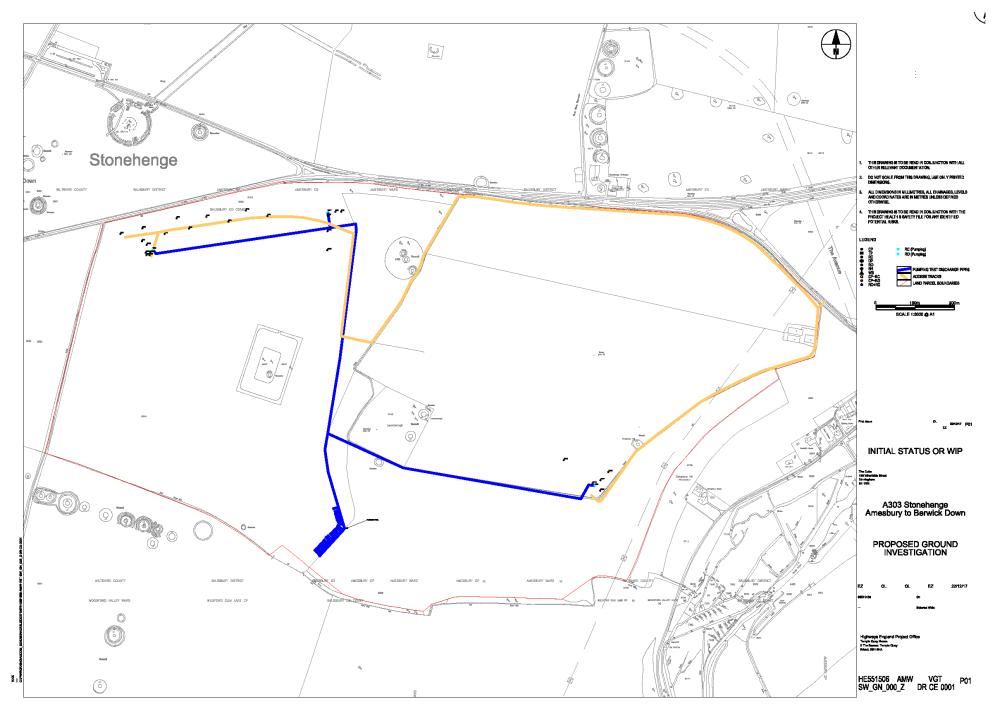
- a. All fuel, oil and chemical storage must be sited on an impervious base within a bunded area. The base and bund walls must be impermeable to the stored material and of an adequate capacity (c110% unless otherwise agreed in writing).
- b. The risk of spilling fuel is at its greatest during refuelling of plant. Where possible, refuel mobile plant in a designated area, preferably on an impermeable surface and away from any drains or watercourses. Keep a spill kit available. Never leave a vehicle unattended during refuelling or jam open a delivery valve. Check hoses and valves regularly for signs of wear and ensure they are turned off and securely locked when not in use. Diesel pumps and similar equipment should be place on drip trays to collect minor spillages. These should be checked regularly and any accumulated oil removed for disposal.

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c. In the event of a spillage on site, the material should be contained (using an absorbent material such as sand, soil or commercially available booms) and the Agency should be notified immediately on 0800 80 70 60.

6.2 GENERAL

- a. Any changes to the testing programme must be agreed in writing with the Agency prior to commencement of testing.
- b. The consent holder shall stop the testing of the source at the request of the Agency in response to emergency or unpredicted circumstances.
- c. If during the test, the discharge increases the risk of flooding further down the valley, the consent holder shall cease the test and inform the Agency.
- d. This Consent does not obviate the necessity for any other separate consents or permissions relating to other aspects of the Agency's activities.



Stonehenge A303: Pumping Test W617 Rev.02



Appendix 2: Annex D5 From June 2020 HE Spec

Annex D5: Pumping test

General

The area at Stonehenge Bottom has been identified as a priority for further pump test investigation. It is proposed to conduct a further pump test at this location using the existing pump well (W617) and the surrounding monitoring wells (R618, R619, R620, R621, R622, RX633 and R71907).

- The main objective of this pumping tests is to collect further hydrogeological information in relation to dewatering for the tunnel construction, in particular:
 - The hydraulic properties of the chalk aquifer at greater depth than previously investigated; and
 - The general permeability of the phosphatic chalk south of Stonehenge and the chemistry of the groundwater.

Industry Standards

- BS ISO 14686:2003 Hydrometric determinations Pumping tests for water wells -Considerations and guidelines for design, performance and use (supersedes BS6316:1992);
- BS EN ISO22282-1:2012 Geotechnical investigation and testing Geohydraulic testing Part 1: General Rules; and
- BS EN ISO22282-1:2012 Geotechnical investigation and testing Geohydraulic testing Part 4: Pumping tests.

Borehole Construction: Pumping Wells *Not required for Phase 7B*.

- The Ground Investigation Contractor shall drill the boreholes at adequate diameters to
 provide a minimum finished internal bore (plain cased and screened) of at least 250 mm ID.
 Surface casing of at least 406mm ID shall be used to seal the upper part of the borehole from
 the ground surface to a minimum depth of 5 m using an adequate grout seal with a minimum
 annulus of 34mm.
- The Ground Investigation Contractor shall install blank and slotted casing inside of the surface casing in order to provide protection for the pump unit and rising main. The slotted casing will be installed from expected seasonal groundwater high to the base of the hole, to be advised by the Investigation Supervisor, plain casing will be installed above to ground surface. The exception to this may be at Stonehenge Bottom where at least one length of plain casing may need to be installed from surface in order to grout the casing in place and create an adequate seal.
- The Ground Investigation Contractor shall ensure the slotted casing has sufficient open area and large enough slot size to keep the water entrance velocity low and reduce friction head loss. This is of significant importance in Stonehenge Bottom where flow rates during the seasonal high pumping test may be in excess of 25l/s (based on previous tests). The size of the slot openings, and details of the type and manufacture of the well screen and casing will be submitted the Investigation Supervisor for agreement at least one week prior to the commencement of drilling.
- A filter pack formed of clean, washed, well rounded 2-5 mm silt free gravel will be installed around the slotted casing in order to allow the inner casing to be grouted in place at the surface. The grading of the filter pack will be proposed by the Ground Investigation Contractor and will require the agreement of the Investigation Supervisor. The gravel pack shall be installed to from the bottom of the hole to a minimum of 5 m above the top of the screen.
- Following development of the borehole a 0.5 m thick fine sand blinding layer should be installed above the filter pack. A cement/bentonite grout should be installed above the sand blinding layer to ground surface using a tremie or grout pipe.
- In the eventuality that the ground is found to be competent from surface to the bottom of the hole the Investigation Supervisor may decide to install the pumping well without gravel pack around the casing. In this instance, the Ground Investigation Contractor shall ensure that the

- surface casing is properly grouted and remains permanently in place to provide a surface seal and avoid surface water running down the hole.
- The pumping wells will be completed at the surface with a lockable well cap around the headworks to demarcate its locations.
- The steel casing for the headworks shall be terminated approximately 200 mm above ground, and a flange shall be welded to the top of the steel casing. An approximately 300 mm long flanged extension piece with the same diameter as the steel casing shall be fixed to the flange plate. A 10 mm mild steel plate with a 25 mm screwed boss and cap/socket at the centre shall be bolted to the flange complete with a gasket. The cover plate should have a secure dipping access installed.
- The typical design of the pumping wells to be constructed are to TBC. Typical headworks for the pumping boreholes are TBC.
- Drilling muds, additives and foams used shall be degradable and approved (by the Environment Agency) for use in potable water wells. Bentonite shall not be used as a drilling mud for drilling through the Chalk. Water introduced into the well shall be potable water from the public supply.
- Drilling returns, and flush water shall be discharged to a nearby drilling tank (or other appropriate storage vessel). Water and spoil shall be disposed of by an appropriate and approved method. The Ground Investigation Contractor shall obtain all necessary permissions for disposal of all effluents and arisings.

Well Development (for pump test wells) *Not required for Phase 7B*.

- The Ground Investigation Contractor shall propose their methodology and equipment for sustaining the above pumping rates for well development and submit their methodology to the Investigation Supervisor no less than one week prior to the commencement of construction of these wells.
- Following completion of drilling, and before installation of the slotted casing, the abstraction
 wells shall be developed for a minimum of two hours by one of the following methods, to be
 agreed with the Investigation Supervisor on site 24hrs prior to well development.
 - High pressure water jetting of the open-hole section to remove any disturbed chalk residue;
 - o Airlift pumping of the borehole to remove any sediment.
- Following development and prior to installation of the internal slotted casing and filter pack, the Ground Investigation Contractor shall log the borehole using the geophysical methods set out in Annex E5.
- Following installation of the filter pack and slotted casing the borehole should be further
 developed by alternately surging and pumping to achieve a flow reversal into and out of the
 well through the screen and filter pack, for a minimum of 1 hour of actual development and
 until water runs clear of fines. This is intended to dislodge any drilling debris and fine silt
 particles present.
- Following development, the level of the gravel pack should be checked and topped up if necessary. The annulus will be then backfilled using bentonite pellets or bentonite grout to ensure a sufficient seal from the surface
- Following construction and development of the production well electrical submersible pumps and rigid uPVC dip tubes are to be installed. The uPVC dip tubes will need to be rigid and minimum diameter of 50 mm ID, consisting of slotted and plain lengths. The dip tube should be lowered to approximately 2 meters below the pump intake or the anticipated maximum drawdown level to facilitate groundwater level measurements. The installation depths of the pumps and dip tubes will be confirmed on site with the Investigation Supervisor.

Borehole Construction: Monitoring Wells *Not required for Phase 7B*.

 Each location shall have a single 50 mm PVC standpipe comprising of plain casing and screened sections. The screen section shall be installed from a depth relating to the

- expected seasonal maximum to the base of the borehole. Plain 50 mm casing will be installed above the screened section to surface including sufficient stick-up.
- Development of the monitoring wells (standpipe piezometers) shall comprise the pumping of at least three well response zone volumes of water, including filter pack volume. The wells should be developed until water runs clear of sediments unless the recharge rate prevents continuous pumping.
- A 2 5 mm dorsilit gravel pack shall be installed from the bottom of the hole to a minimum of 5 m above the screened section.
- Following development of the borehole a 0.5 m thick fine sand blinding layer should be installed above the filter pack. A cement/bentonite grout should be then installed above the sand blinding layer to ground surface using a tremie or grout pipe.
- At the surface a lockable well cover will be installed (cemented in place if necessary) which will be of sufficient diameter and depth to install and lock telemetry equipment at the borehole.
- The typical design for the construction of the monitoring wells is presented in Figure 11 as a reference.
- The Ground Investigation Contractor shall ensure that monitoring boreholes are straight and vertical and such that they can allow the proper installation of casings, slotted casings, filter gravel, bentonite/cement grout etc., the carrying out of development, and the functioning of the boreholes for the purpose of measuring of water levels either manually or by transducer/data loggers, and for the procurement of water samples by means of sampling devices or pumping using a Waterra type pump.
- All observation and monitoring wells must be competed a minimum of one week in advance of the pumping tests to allow time for the water levels in the wells and piezometers to stabilise before pump testing.
- On completion of all development activities, and prior to commencement of test pumping, the
 depth to the base of the borehole shall be recorded by plumbing with a weighted tape or other
 method to be submitted to and approved by the Investigation Supervisor.

Preparation for Pumping Tests

- The Pumping Tests will be carried out in accordance with the Code of Practice for Pump Testing of Water Wells, BS ISO 14686:2003.
- The Ground Investigation Contractor shall test their proposed pumping equipment for a range
 of pumping rates sufficient for the Investigation Supervisor to determine the five step flow
 rates for the full-scale pumping tests. The Ground Investigation Contractor shall submit their
 test findings to the Investigation Supervisor no less than 24hrs prior to commencement of the
 full-scale pumping tests.
- The Contractor shall provide at least two methods of measuring discharge during test pumping. At least one method shall provide an accurate measurement of instantaneous discharge, such as a digital in-line integrating flow meter or an electronic accumulating measure, while the second method shall either be a V-notch weir or an orifice plate and manometer assembly. A second in-line system must be brought as a backup. The equipment shall also provide a visual reference for suspended materials in the pumped water during well development.
- The arrangement of the pumping equipment should be such to include for a sample tap installed between the pump and the flow control valve. The sample tap should be placed so that there is a minimum of 500 mm below the sample tap to enable a sample contained to be filled.
- The pump and rising main must be fitted with a non-return valve to ensure no water flow back into the bore when the pump is turned off.
- The Ground Investigation Contractor shall provide the following monitoring data for no less than 7 days in advance of and for the duration of the pumping tests:
 - o Borehole water levels;

- Barometric (atmospheric) pressure measured on site or data procured from the Meteorological Office if a suitable local recording station is available;
- Rainfall data, this may be procured where local Meteorological Office data is available
 or via a rain gauge set up and managed by the Ground Investigation Contractor
 within the catchment; and
- Local river flow data (for the River Avon), this may be procured where the Environment Agency has local data available, or via a level sensor set up and managed by the Ground Investigation Contractor.
- The data shall be provided at the same time as the pumping test reports.

Equipment Testing

- The Contractor shall provide a test pump of a type and dimensions such that it can be accommodated within 200 mm internal diameter casing and capable of discharging at up to 180 m³/hr (50 l/s) against a head of up to 50 m. The contractor should also provide a smaller test pump capable of discharging at up to 36 m3/hr (10 l/s) in case higher pumping rates are not achievable.
- After completion of all construction, development and cleaning activities a test pump shall be
 run in the hole and all equipment required for a pumping test set up. The pump should be run
 at different rates for up to 4 hours in total, to test all the equipment and to determine the range
 of flow rates to be maintained during the step-drawdown test. The equipment settings
 required to achieve the pumping rates shall be recorded so that the step-drawdown and
 constant rate tests may be carried out efficiently and correctly.
- The Ground Investigation Contractor shall ensure that water levels have recovered overnight prior to undertaking any further pumping.

Undertaking Pumping Tests

- The raw data from the pumping tests shall be submitted to the Investigation Supervisor on site and as part of their factual reporting submission.
- Groundwater levels shall be measured at the abstraction well and the five nearby monitoring standpipes. Levels at all locations will be monitored continuously by pressure transducers and data loggers, which shall be installed by the Ground Investigation Contractor. The depths to which the loggers are installed shall be agreed with the Investigation Supervisor. Any failure of loggers is at the Ground Investigation Contractor's risk and may require work to be repeated should data be lost or not recorded. The loggers shall be set to a frequency which meets the requirements of data collection as set out in BS 14686 2003 Hydrometric determinations Pumping tests for water wells Considerations and guidelines for design, performance and use and agreed with the investigation supervisor.
- The time on all loggers must be synchronised and must be set to GMT time to avoid previously encountered problems with summer/winter time change. The use of a barometric pressure logger for atmospheric pressure correction is also required.
- The Contractor must supply sufficient pressure transducer and manual water level dipper to
 monitor water levels simultaneously in 6 boreholes. The contractor shall provide enough
 personnel to take manual readings at each monitoring boreholes according to BS standards
 during the Step Test, the first 300 mins of the constant rate test and the first 300 minutes of
 recovery.
- During the pumping test the Ground Investigation Contractor will take manual water level readings (and calculated drawdowns) and check abstraction rates at the following intervals:

One dip just before the commencement of the test

Time since pumping started/stopped
0 to 10 mins:
10 to 20 mins:
20 to 60 mins:
20 to 100 mins:

100 to 300 mins:

300 to 1000 mins:

1000 to 3000 mins:

2000 mins to the end of test

2000 minutes

2000 minutes

2000 minutes

2000 minutes

- The Contractor shall ensure that there are a sufficient number of electric dippers on site, in
 working order, to undertake the monitoring of water levels required by the specification.
 Dippers shall have a minimum length of tape of 100 m with centimetre and metre graduations.
 The time measurements should be taken to the nearest second during the first ten minutes of
 the constant rate test, and to the nearest 30 seconds for the remainder of the tests.
- During the pumping tests, the following records will be produced by the Ground Investigation Contractor:
- Daily record sheet of work done on each day; and
- Daily records of pumping test flow and manual dip results in digital format.
- Groundwater flow monitoring shall be undertaken during testing at the same frequency as the water level measurements. The flow meter instrumentation shall be capable of providing instantaneous and totaliser volumes.
- Discharge shall be maintained to within 10% of the rate ordered by the Investigation Supervisor.
- All flow meters used must be appropriately rated for the flow rates (i.e. a high flow meter must not be used in low flow situations as this will result in inaccurate flow measurements). The accuracy of the flow meter must be established during the pump calibration.
- The raw data shall be issued in Excel® format including, but not limited to elapsed and clock time, flow rate, data logger continual water level readings, manual dip readings and calculated drawdowns.

Step Drawdown Test

- A step test shall be undertaken prior to undertaking the constant rate test. The test shall be
 undertaken continuously and consist of five 100 minute steps. The pumping rates shall be
 approximately 40%, 60%, 80%, 100% and 120% of the maximum flow rate determined from
 the equipment test. The test shall be conducted in increasing flow increments so that the final
 step is the maximum tested flow. The flow rates shall be agreed with the Investigation
 Supervisor prior to undertaking the step test.
- The discharge rate shall be measured during the test at the same interval as required for groundwater level monitoring. Instantaneous and totaliser readings must be taken at the beginning and end of each step.
- Following completion of the test water level recovery monitoring shall be undertaken. The Ground Investigation Contractor shall ensure that water levels have recovered fully prior to undertaking the constant rate discharge test.

Constant rate discharge test

- The duration of each constant rate test shall be 7 days actual pumping. During the test, the abstraction well shall be pumped continuously and at a constant rate as determined from the results of the step-drawdown test. The abstraction rate shall be determined by the Ground Investigation Contractor and agreed by the Investigation Supervisor. The pumping rate shall not vary by more than 10% throughout the duration of the test. Persistent fluctuations beyond this tolerance will require abortion of the test, for which payment shall not be made. The pumping unit shall be capable of being operated without interruption for a minimum period of 24 hours. Water recovery measurements will be made immediately after switching off the test pump until the water level recovers to 95% its original level.
- Flow measurement shall be done manually by 90-degree vee notch set in a levelled weir tank together with a recording digital flow meter properly positioned in the discharge line. Groundwater flow monitoring shall be undertaken during testing at the same frequency as the water level measurements.

- Field meters shall be used to measure the pH, specific conductivity (μS/cm) and temperature of the water. Measurements shall be taken at hourly intervals for the first 12 hours followed by twice daily for the remainder of the test. All meters must be calibrated daily.
- Two groundwater samples shall be collected during the test, at 1 hour, and at the end of the test. The groundwater samples shall be taken at the wellhead by the Investigation Supervisor or the Ground Investigation Contractor. Both should be trained to carry out the groundwater sampling. The sample should be kept in a refrigerated container and given to the Investigation Supervisor as soon as possible. The samples will be sent to an accredited laboratory to be tested for the chemical parameters outlined in Schedule 2 (Suite F2).

Recovery Test

Water recovery measurements will be made immediately after switching off the test pump
until the water levels in each of the monitoring wells have recovered to 5% of their pre-test
levels (a minimum of 24 hours). Monitoring frequency shall be as set s set out in BS 14686
2003 Hydrometric determinations Pumping tests for water wells — Considerations and
quidelines for design, performance and use and agreed with the investigation supervisor.

Interruption to tests

- If the pump breaks down during the first 24 hours of the constant rate test, or if the test is aborted for more than 30 minutes thereafter, or if the flow rate has varied by 10% from the rate at which the test was started the test shall be aborted and the water levels in the abstraction well left to recover to within 0.1m of the rest water level at the start of the test. The test shall then be started again. No payment shall be made for aborted tests or for standing time during water level recovery after aborted tests.
- Replacement measurement equipment shall also be made available. Any malfunctioning of
 equipment shall be considered as equal to pump failure and if not solved in reasonable time
 the tests may need to be started over. This decision will be made with the agreement of the
 Investigation Supervisor.
- Any test that has been interrupted during the first 24 hours, or for more than 30 minutes thereafter, or in which the flow rate has varied by 10% from the rate at which the test was started, shall be aborted and restarted as in the first paragraph above.

Disposal of pumped waters

- The selected discharge point should ensure that any waste water is discharged downstream
 and outside the zone of influence of the pumping test and does not hydraulically interfere with
 the test. It should also not increase risk of flooding or pollution or cause erosion, degradation
 of vegetation and/or damage to local infrastructure.
- Should it be required to discharge water to a surface water coarse of ground water as and agreed point away from the test a discharge licence will need to be obtained prior to testes starting. Water should be discharged
- The Ground Investigation Contractor shall supply and shall maintain all necessary pipework
 or fully lined channels for the conveyance of the water discharge from the borehole to a
 discharged point specified above or as otherwise directed by the Investigation Supervisor.
 The Ground Investigation Contractor shall ensure that all pipelines are watertight, sufficient
 for the discharges to be pumped, and secure against tampering by vandals.

Reporting

 Ground Investigation Contractor to submit factual report containing well construction details, details of all equipment used during the pumping test including calibration certificates, original and fair copies of field recording sheets, electronic data in Excel format both raw and corrected showing clock time and elapsed time, water levels, depth to water and calculated drawdowns, flow rates and water quality fields measurements. Stonehenge A303: Pumping Test W617 Rev.02



Appendix 3: R618 Borehole Log

GINT_LIBRARY V8 06.GLB LibVersion: v8 06_018 PriVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

Used:

STRUCTURAL SOILS

BOREHOLE LOG

Contract:								Cli	ent:				Boreho	ole:	
A303 Ston	ehenge P	hase 6	6 Gro	ound	Inves	stigat	tion			Hiç	hways England				R618
Contract Ref:			St	tart:	01.0	5.18	Grour	nd Le	evel:		National Grid Co-ordinate:		Sheet:		
73	33442		Eı	nd:	10.0				79.5	1	E:412770.9 N:1419	68.9		1	of 46
Depth	Flush Returns & Details	TCR	echar SCR (%)	RQD	If	Sar	nples Type	ackfill & Instru-	entation		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphi Legend
0.50						101	ES			Cream CHALK gravelly content Gravel fine to Cobble subrout (Grade	nded chalk and rare flint.		79.21	(0.30)	× · · · · · · · · · · · · · · · · · · ·
	80% return Air+Mist	30	_	•						flint. Sa (Grade	sandy silty angular to nded GRAVEL with high content of flint. Sand is fine to		78.31	(0.50)	

[Drilling Pro	gress and	Water Ob	servations	3
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
01/05/18	18:00	1.20	1.35	N/R	Dry
03/05/18	08:00	1.20	1.35	N/R	Dry
03/05/18	17:25	9.70	1.35	146	6.10
04/05/18	09:20	9.70	1.35	146	6.04
04/05/18	13:40	12.70	9.00	146	5.44
08/05/18	11:00	12.70	9.00	146	6.01
08/05/18	17:00	36.70	9.00	146	5.40
09/05/18	09:10	36.70	9.00	146	6.01

(White)

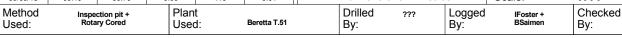
General Remarks

1. Location CAT scanned prior to excavation.

chalk. (Possible Superficial).

- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.20m depth on 26/03/2018.
- 4. No groundwater strikes noted by the driller.
- 5. Borehole drilled using a 146mm geobore S core barrel and air mist as the flush medium.
 6. 50mm PVC groundwater monitoring pipe installed as shown.

All dimensions in metres 1:11 Scale:





DRAFT

BOREHOLE LOG

Contract Ref: Start: 01.05.18 Ground Level: National Grid Co-ordinate: Sheet: 733442 End: 10.05.18 The start of	Contract:				Client:				Boreho	ole:	
733442 End: 10.05.18 79.51 E:412770.9 N:141968.9 2 Flush Mechanical Log Samples ≅ - 5 5 5 Depth	A303 Sto	nehenge Phase	6 Ground Inves	stigation		Hig	hways England				R618
Flush Mechanical Log Samples 💆 15 5 5 Depth	Contract Ref	f:	Start: 01.05	5.18 Groun	d Level:		National Grid Co-ordinate:		Sheet:		
Flush Mechanical Log Samples 💆 j 👼 Depth	7	733442	End: 10.05	5.18	79.51		E:412770.9 N:1419	68.9		2	of 46
Depth Returns & Details TCR SCR RQD If (%) (%) (%) (mm) No Type Experies Services Prove sandy eithy angular to	D 41-	Returns TCR	SCR RQD If		ackfill & Instru- entation Water		Description of Strata	racture Log	educed	(Thick	Material Graphic Legend

	Flush			anical		Sa	mples ≝ ≟:	틷	ē		n n	e ce	Depth	Mater
Depth	Returns & Details	TCR (%)	SCF (%)	RQ[(%)	O If (mm)	No	_	menta	Water	Description of Strata	Fracture Log	Reduced Level	(Thick ness)	Grapi Lege
	80% return Air+Mist (White)	30	0	0						Brown sandy silty angular to subrounded GRAVEL with high cobble content of flint. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint and chalk. (Possible Superficial). (stratum copied from 1.20m from previous sheet)		-	-	
2.20-2.95 (0:04)		X	*	¥								-	(1.75)	\$ 0. \$ 0. \$ 0. \$ 0. \$ 0. \$ 0. \$ 0. \$ 0.
	80% return Air+Mist (White)	33	0	0								-	-	
2.95-3.70 -(0:04)		X	X	X						Structureless CHALK composed of slightly sandy silty GRAVEL of white chalk.		76.56	2.95	
	80% return Air+Mist (White)	67	0	0						(Grade Dc)		-	(0.75)	
3.40-3.50						5	D					_	-	

٠,													
2	I	Drilling Pr	ogress and	Water 0	Observation	S			Car	aral I	Domorko		
2	Data	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks		
	Date	Time	Depth	Depth	(mm)	Depth							
!	09/05/18	13:00	48.70	9.00	146	5.45							
:													
)													
-													
;							Α	II dimensi	ons in metre	es	Scale:	1:11	
	Method Used:		ection pit + ary Cored	Pla		Beretta T.51		Drilled Bv:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS

BORFHOLF LOG

Contract: A303 St	onehe	nge P	hase	6 Gı	ound	d Inve	stiga	ion	Client	••	Hial	nways E	nglan	d		Boreho		R
Contract R		<u> </u>						Groun	⊥ ıd Leve	el:		National Gr				Sheet:		
	7334	42		E	End:	10.0	5.18		79	.51		E:4127	70.9 N	:14196	8.9		3	of
	Flu	ısh	N	lecha	ınical	Log	Sar	nples	& ⁷						e I	р _е _ (Depth	T
Depth		urns etails	TCR	SCF	RQI) If		Туре	Backfill & Instru- mentation	Water	С	Description	of Strata		Fracture Log	Reduced Level	(Thick ness)	_
Верин	4 50		(%)	(%)	(%)	(mm)	140	Турс			Structure	less CHAL	K comp	osed of	ш	Ř	11655)	
	80%	। return							$\otimes \otimes$			andy silty (
		Mist nite)	67	0	0				$\otimes \otimes$		(Grade D			_				I
	,	<u> </u>	Y.	Y	T Y				$\otimes \otimes$		√stratum √previous	copied from	om 2.95	m trom		75.81	3.70	ľ
3.70-4.20 (0:03)	'		1	1	1				$\otimes \otimes$			zone of co	re loss.					
									$\otimes \otimes$							-	-	
		return														<u> </u>	<u> </u>	
-		Mist	0	0	0				$\otimes \otimes$							L	L	
	```																	
																-	-	
																	(1.00)	
4.20-4.70			X	<b>X</b>	<b>X</b>	-			$\otimes \otimes$							-	(1.00)	Α
(0:03)																		
									$\otimes \otimes$							_	-	
		return ·Mist	0	0	0													
		nite)														-	}	
																-	<u> </u>	
	L ,															74.81	4.70	
4.70-5.20 (0:03)	-	1	1						$\otimes \otimes$			ak mediur brown s	n densit tained					F
/											Fracture	set 1: Frac	tures are	55-66°	1[i]	ļ	-	H'
											closely rough	with b	rown	dulating staining	2[i]/ 3[i]			Ë
4.90-5.00		∣ return					6	D			(100/150 Fractures	/200). Fra s are 80-85		set 2: spaced	4[i]	†	(0.50)	H
	Air+	Mist	100	0	0						partly op	en with ligh	nt brown	staining	/ _{Em}		(3.30)	H
-	(**)										(60/110/2 4.83m	20° un	gle fract dulating	rough	/ <b>5[i]</b> 			H
											moderate medium f	ely wide inf fragments o	filled with	fine to	/   6[i]	-	-	F
											(Grade C							
5.20-5.95	1	<b>X</b>	X	X	<b>X</b>						Verv we	ak mediur	n densit	v white		74.31	5.20	
(0:04)											CHALK r	ecovered a	as angula	r gravel				
		return									and cobb	ile sizeu cii	ain.			-	-	I
		Mist	67	0	0											_		I
	`																	F
																	L	T
D	illing Pı	rogres	s and	d Wa	er Ol	serva	tions					0.5	oral f	2022	rko			
Date	Time		ehole		sing	Boreh Diame	eter	Water				Ger	icidi i	Rema	INS			
		De	epth	De	pth	(mr		Depth										
										Δ	ul dimensio	ons in metre	es	Scale:		1:11		
 Method	Insr	ection p	it +		Plan	∟ t			Ш		Drilled	???	Logged	Scale:	r+	Check	ed	
Used:		tary Cor						eretta T.5										

o D O	Г	Orilling Pro	gress and	Water O	bservation	s			Cor	oral	Remarks		
9	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	lerari	Remarks		
<u>.</u>		111110	Depth	Depth	(mm)	Depth							
<u> </u>													
<u>1</u>													
5													
1 E													
g 2													
olls													
გ ლ							Α	II dimensio	ns in metre	s	Scale:	1:11	
Structure	Method Used:	Inspe Rota	ction pit + rry Cored	Plar Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:									Clier	nt:				Boreho	ole:	
A303 Sto	onehenge	Pł	nase								Hiç	hways England				R618
Contract Re	ef:				Start:	01.0	5.18	Grour	nd Lev	/el:	<u> </u>	National Grid Co-ordinate:		Sheet:		<u> </u>
7	733442				End:	10.0				9.51		E:412770.9 N:1419	68.9		4	of <b>46</b>
Depth	Flush Returns & Details			SCF	nical RQI (%)	Log O If O (mm)	Sa No	mples Type	Backfill & Instru-	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphic Legenc
5.80-5.95	80% retur Air+Mist (White)	rn t	67	0	0		7	D			CHALK and cot (stratun	reak medium density white recovered as angular gravel oble sized chalk. In copied from 5.20m from s sheet)		-	-	
5.95-6.65 -(0:04)	X		<b>X</b>	*	<b>X</b>									-	-	
6.35-6.45	80% retur Air+Mist (White)	t	71	0	0		8	D						_	-	
6.65-7.45 (0:04)	*		<b>X</b>	<b>X</b>	<b>X</b>						bet rinded f	ween 6.65m and 6.74m small lint.		-	(3.00)	
	80% retur Air+Mist (White)	t	38	0	0									-	-	
7.45-8.20	<b>X</b>		53	<b>V</b>	<b>▼</b>						at 7	7.45m small rinded flint.		_		

	Drilling Pro	ogress and	Water C	Observations	S			Cor	oral I	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks		
Date	Tillic	Depth	Depth		Depth							
		l l	ĺ									
			ĺ									
			ĺ									
		l l	ĺ									
			ĺ									
			ĺ			А	.ll dimensio	ons in metre	es	Scale:	1:11	
Method		ection pit +	Pla		Reretta T 51		Drilled	???	Logged		Checked	AGS
Method Used:		ection pit + ary Cored	Plai		Beretta T.51	A		1				ed

# STR

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

#### STRUCTURAL SOILS

Contract:								Clien	ıt:		Boreho	
	onehenge P	hase								Highways England		R618
Contract Re	ef:		S	tart:	01.0	5.18	Grour	nd Lev	el:	National Grid Co-ordinate:	Sheet:	
•	733442		E	nd:	10.0				.51	E:412770.9 N:141968.9		<b>5</b> of <b>46</b>
Depth	Flush Returns & Details	TCR	echar SCR	RQD		Sa No	mples Type	Sackfill & Instru-nentation	Water	Practure Fracture Practure Pra	Reduced Level	Depth Materia (Thick Graphic ness) Legend
(0:04)		(%)	(%)	(%)	(11111)		7,77	H L		Very weak medium density white CHALK recovered as angular gravel and cobble sized chalk. (stratum copied from 5.20m from previous sheet)	<u>~</u>	- " " " " " " " " " " " " " " " " " " "
- 7.85-8.10 -	80% return Air+Mist (White)	53	0	0		9	D	·			-	
8.20-9.70 (0:05)		*	*	<b>X</b>	<b>A</b>					Very weak medium density white slightly brown stained CHALK. Fracture set 1: Fractures are 20° closely spaced undulating rough partly open to open with rare fine	71.31	8.20
- 8.70-8.90 -	80% return Air+Mist (White)	60	6	0	NI NI 120	10	D		9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	chalk infill and brown staining/light black specks (20/100/630). Fracture set 2: Fractures are 45-65° closely spaced planar rough partly open to open clean rarely infilled with fine chalk and light brown staining/light black specks (40/65/165). Single fracture at 8.92m 85° undulating rough partly open with light brown staining. (Grade C4)		
- 9.30-9.50						11	D			13[i] 13[i] 14[i] at 9.40m very small rinded fragments of flint.		

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
2													
2													
)													
2													
ź													
j 2													
5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

### **BOREHOLE LOG**

Contract:								Client	:					Boreho	ole:	
	nehenge P	hase (	6 Gro	ound	Inve	stiga	tion			Highv	ways Engla	nd				R618
Contract Re								nd Leve	el:		ational Grid Co-c			Sheet:		
7	733442		E	nd:	10.0			79		I	E:412770.9	N:14196	8.9		6	of <b>46</b>
Depth	Flush Returns & Details	TCR	echar SCR	ROD	If	Sa	mples	Backfill & Instrumentation	Water	De	scription of Stra	ata	Fracture Log	Reduced	Depth (Thick	Material Graphic Legend
9.70-10.45 (0:03)	80% return Air+Mist (White)	60	6	0	(mm)	No	Туре			slightly b Fracture s closely sp partly oper chalk infill black spec set 2: Frac	k medium den prown stained set 1: Fractures paced undulati n to open with and brown st ks (20/100/630) ctures are 45-6	CHALK. s are 20° ng rough rare fine aining/light ). Fracture 5° closely	正 15[i]	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	(3.00)	Legend
- -	100% return Air+Mist (White)	53	0	0	NI NI 120					open clear chalk and black spe fracture ar rough part staining. (Grade C4) (stratum of previous sh at stained spo between	copied from 8. neet) 9.65m occasionges. en 9.70m and 1 overed as angu	with fine aining/light 5). Single undulating ght brown 20m from nal brown 0.45m non			-	
10.45-11.20 (0:04)	*	<b>X</b>	X	<b>X</b>	120	12	D			flint band i	45m and 10.66i recovered as al gravel sized flint.	m possible ngular fine		-	-	
	100% return Air+Mist (White)	93	13	0						recovered gravel em chalk.	30m and 10.92m as angular fine abedded in co 36m and 11.05m as angular fine	to coarse ommunited non intact		-	- - -	
11.20-11.95 (0:05)	100% return Air+Mist (White)	40	0	0	NI					Very weak	to weak mediu hite CHALK rec he to coarse gr	overed as		68.31	11.20	

		Orilling Pro	gress and	Water O	bservations	S			Con	orall	Remarks		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	ierai i	Remains		
5	Dute	11110	Depth	Depth	(mm)	Depth							
2													
3													
5													
·													
5 L													
							A	II dimensio	ns in metre	s	Scale:	1:11	
פוימטומיי	Method Used:	Inspe Rota	ction pit + ry Cored	Pla: Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

### STRUCTURAL SOILS

<b>0</b>											BU	<b>\</b>				
Contract:								Client	:					Boreho	ole:	D040
	nehenge P	hase									vays England					R618
Contract Ref								nd Leve			tional Grid Co-ordinate			Sheet:	_	
7	33442		E	nd:	10.0	5.18		79.	51	[	E:412770.9 N:14					of <b>46</b>
Depth	Flush Returns & Details	TCR	SCR (%)	RQE			mples Type	Backfill & Instru- mentation	Water	Des	scription of Strata		Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
11.50-11.65	100% return Air+Mist (White)	40	0	0	NI	13	D			density white angular fine chalk.	to weak medium to lite CHALK recovered to coarse gravel simplied from 11.20m to eet)	high I as ized		-	(0.75)	
11.95-12.70 -(0:05)	100% return Air+Mist (White)	47	25	23		14	D			specks CH Bedding fra to medium open infilled or light broder Fracture seemedium spa open clean and light (250/450/14 Fractures rough tight specks and infill. Single	#10). Fracture set are 70-85° undula to open clean with b di rare comminuted cle fracture at 13.47m partly open clean is.	1: sely ugh halk 40). -55° ht to infill hing 3: tting lack halk 25°	16[i]	67.56	11.95	
12.70-14.20 (0:06)	<b>X</b>	<b>X</b>	<b>X</b>	Ä	NI 80 240									-	-	
13.00-13.20	100% return Air+Mist (White)	87	16	7		15	D			at 13.00	0m small rinded flint.		17 [†] [i]	_	(2.25)	
-											3.30m very small rin t up to 30mm.	ded	-18[i] -19[i] -20[i]	- - -	- -	

[	Drilling Pr	ogress and	Water Ol	bservations	S			Cor	oroll	Domarko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ierai	Remarks		
			-									
						Д	II dimensio	ons in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan		Beretta T.51		Drilled Bv:	???	Logged Bv:	IFoster + BSaimen	Checked By:	AGS

## STI

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

#### STRUCTURAL SOILS

Contract:								Client	:		_	_		Boreho		
	nehenge P	hase								Hig	hways Engla					R618
Contract Ref	f:		S	tart:	01.0	5.18	Grour	nd Leve	el:		National Grid Co-	ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		<b>79</b> .	.51		E:412770.9	N:14196	8.9		8	of <b>46</b>
	Flush	M	lechar	nical I	_og	Sa	mples	& ' iöi	<u></u>				a re	e ed	Depth	Materia
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	mples Type	Backfil Instru mentat	Water		Description of Stra	ata	Fracture Log	Reduced Level	(Thick ness)	Graphic Legend
14.00-14.20	100% return Air+Mist (White)	87	16	7	NI 80 240	16	D			specks Bedding to medii open in or light Fracture medium open cle and (250/450 Fracture rough tip specks infill. Sii planar r black sp (Grade of (stratum)	C3) copied from 11	re set 1: 15° closely ating rough juted chalk 0/100/340), are 50-55° ugh tight to chalk infill staining e set 3: undulating with black uted chalk 3.47m 25° clean with	21[i] -22[i] -23[i] 24[i] 25[i] 26[i]	-	-	
14.20-15.70 (0:07)	A A	*	*	*	*					black sp Fracture widely partly of specks (30/80/1 Fracture medium partly of occasion	nigh density whicks CHALK. Fractions are 10-30° classification of the characteristics and fine characteristics are 45-60° spaced undulationed to open contacteristics and rare fine 900).	cture set 1: losely and losely and losely and losely rare black losely to	27[i] 28[i] 29[i] 30[i] 31[i] 32[i]	-		
15.00-15.10	100% return Air+Mist (White)	93	28	7	NI 120 300	17	D			recovere	5.10m and 15.24m ed as angular fine zed fragments of d	to coarse	33[i] 34[i] 35[i] 36[i] 37[i] 38[i]		-	

5	Г	Orilling Pro	ogress and	Water C	bservation	s			Cor	orali	Remarks		
פ	Date	Time	Borehole		Borehole Diameter	Water			Gei	ierai i	Remarks		
<u> </u>	Date	11110	Depth	Depth	(mm)	Depth							
2													
2													
2													
Ď													
į.													
2													
5							A	II dimensio	ns in metre	s	Scale:	1:11	
notal	Method Used:	Inspe Rota	ction pit + ary Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS
กี			-		, u.			٥,٠		٥,٠		5,.	1460

#### **BOREHOLE LOG**

Contract:								Clien	t:				Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Inve	stiga	ition			Hig	hways England				R618
Contract Re	f:		S	tart:	01.0	5.18	Grou	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0				.51		E:412770.9 N:1419	68.9		9	of <b>46</b>
	Flush Returns		lechai			Sa	mples Type	fill & rru- ation	Water		Description of Otroto	Fracture Log	Reduced Level	Depth	Material Graphic
Depth	& Details	(%)	SCR (%)	RQL (%)	lf (mm)	No	Туре	Back Inst	Ma		Description of Strata	Frac	Redu	(Thick ness)	Legend
15.70-17.20 (0:06)	100% return Air+Mist (White)	93	28	7	_					black sp Fracture widely partly of specks (30/80/1 Fracture medium partly of occasion specks	es are 45-60° closely to spaced undulating rough open to open clean with nal light brown staining/black and rare fine chalk infill	39[i]	-	-	
16.10-16.30	100% return					19	D			previous b medium	B3) copied from 14.20m from	40[i]		-	
-	Air+Mist (White)	90	22	7	NI 120 300							41[i] 42[i] 43[i]		-	
17.00-17.20 						20	D						-		
17.20-18.70 (0:06)	100% return Air+Mist (Brown)	96	27	9						recover	7.20m and 17.47m non intact ed as angular fine to coarse ized fragments of chalk.		-	-	

2	Ε	Drilling Pro	gress and	Water C	bservation	s			Cor	oral I	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lerai i	Remarks		
2													
ווא רומ,													
3							A	II dimensio	ns in metre	s	Scale:	1:11	
Glactare	Method Used:	Inspe Rota	ction pit + rry Cored	Pla Us		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS

Contract:								Clien	t:			Boreho		
	nehenge P	hase								Highways England				R618
Contract Ref	f:		S	tart:	01.0	5.18	Grour	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		79	.51	E:412770.9 N:14196	8.9		10	of <b>46</b>
	Flush		1echai			Sa	mples	ii ∾ Hion	er	·	ure	ced	Depth	Materia
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	mples Type	Backf Instr menta	Water	Description of Strata	Fracture Log	Reduced Level	(Thick ness)	Graphic Legend
17.55-17.75	100% return Air+Mist (Brown)	96	27	9	NI 120	21	D			Weak high density white slightly black specks CHALK. Fracture set 1: Fractures are 10-30° closely and widely spaced undulating rough partly open clean with rare black specks and fine chalk infill (30/80/1470). Fracture set 2: Fractures are 45-60° closely to medium spaced undulating rough partly open to open clean with occasional light brown staining/black specks and rare fine chalk infill (30/150/900). (Grade B3) (stratum copied from 14.20m from previous sheet)  between 17.95m and 18.13m non intact recovered as angular fine to coarse crushed fragments of chalk.  at 18.00m very small rinded flint.	44[i] 45[i] 46[i]	-	-	
18.70-20.20 (0:08)	100% return Air+Mist (White)		•		120 300	23	U				_47[i]	-	-	

5	Г	Drilling Pro	ogress and	Water O	bservation	s			Cor	oral	Remarks		
פֿ	Date	Time	Borehole		Borehole Diameter	Water			Gei	ierai i	Remarks		
<u> </u>			Depth	Depth	(mm)	Depth							
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2													
5							A	II dimensio	ns in metre	s	Scale:	1:11	
ון מכומיני	Method Used:	Inspe Rota	ection pit + ary Cored	Plar Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

### **BOREHOLE LOG**

Contract:						Client:			Boreho	
	nehenge P						Highways England			R61
Contract Ref	f:		Start:	01.05.	18 Grou	ınd Level:	National Grid Co-ordinate:		Sheet:	
7	33442		End:	10.05.		79.5°	E:412770.9 N:141	68.9		<b>11</b> of <b>4</b> 0
Depth	Flush Returns & Details	TCR SCI	anical L	og :	Samples	Sackfill & Instru-nentation	Description of Strata	Fracture	Reduced Level	Depth Mate (Thick Grap ness) Lege
20.10-20.20 20.20-21.70 (0:08)	100% return Air+Mist (White)	(%) (%		NI 120 300	4 D		Weak high density white slightly black specks CHALK. Fractures et 1 Fractures are 10-30° closely and widely spaced undulating rough partly open clean with rare black specks and fine chalk infit (30/80/1470). Fracture set 2 Fractures are 45-60° closely to medium spaced undulating rough partly open to open clean with occasional light brown staining/black specks and rare fine chalk infit (30/150/900). (Grade B3)  (stratum copied from 14.20m from previous sheet)  Weak high density white with black specks CHALK. Fracture set 1 Fractures are 5-20° medium spaced planar to undulating rough clean with occasional black speck (80/300/1620). Fracture set 2 Fractures are generally 35-50 medium spaced planar to undulating rough partly open clean with rare brown staining and comminute chalk infill (50/400/2525). Fracture set 3: Fractures are 65-85° medium spaced undulating rough partly open clean with occasional black specks/brown staining (115/400/1465). (Grade B2)  at 20.26m brown stainer sponges.  at 21.20m brown stainer sponges.  at 21.20m wispy marl.	48[i] 49[i] 50[i] 51 52[i]	-	20.00
21.40-21.60				2	6 D			55[i]		

	Dri	lling Prc	gress and	Water C	Observations	s			Cor	oral I	Remarks		
Da	ıte	Time	Borehole		Diameter	vvalci			Gei	lerai r	Remains		
	+		Depth	Depth	(mm)	Depth							
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		ļ		İ									
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		ļ		İ								4.44	
							A	II dimension	ons in metre	s	Scale:	1:11	
Meth			ection pit + ary Cored	Plai		Beretta T.51		Drilled Bv:	???	Logged Bv:	lFoster + BSaimen	Checked Bv:	AGS

### **BOREHOLE LOG**

Contract:								Client	t:		Boreh	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England			R618
Contract Re	f:		S	tart:	01.0	5.18	Grour	nd Leve	el:	National Grid Co-ordinate:	Sheet:		
7	33442		E	nd:	10.0	5.18		79	.51	E:412770.9 N:141968.9		12	of <b>46</b>
	Flush	М	echa	nical	Log	Sa	mples	% - 7 ii	Į.	95	pe e	Depth	Material
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	lf (mm)	No	mples Type	Backfi Instru mentar	Water	Description of Strata	Log Reduced Level	(Thick ness)	
21.70-23.20 (0:07)	100% return Air+Mist (White)	•		•		27	D			Weak high density white with black specks CHALK. Fracture set 1: Fractures are 5-20° medium spaced planar to undulating rough clean with occasional black specks (80/300/1620). Fracture set 2: Fractures are generally 35-50° medium spaced planar to undulating rough partly open clean with rare brown staining and comminuted chalk infill (50/400/2525). Fracture set 3: Fractures are 65-85° medium spaced undulating rough partly open clean with occasional black specks/brown staining (115/400/1465). (Grade B2) (stratum copied from 20.00m from previous sheet)		-	
-	100% return Air+Mist (White)	93	10	0	NI 200 400					at 22.40m rare shells of possible micraster.	/-	_	
22.90-23.05						28	D			at 22.70m and 22.76m small rinded flint (possible flint band).	/ [	-	
_										at 23.00m and 23.20m non intact recovered as angular fine to coarse gravel of chalk.	-	(6.20)	
23.20-24.70 (0:08)	100% return Air+Mist (White)	100	67	57						—66	-  -  -  -	-	

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
2													
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j 2													
5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:								Client	:		Boreho	ole:
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England		R618
Contract Ref								nd Leve	el:	National Grid Co-ordinate:	Sheet:	
7	33442		E	nd:	10.0	5.18		79	.51	E:412770.9 N:141968.9		<b>13</b> of <b>46</b>
Depth	Flush Returns & Details	TCR	SCR	nical RQD	If	Sa	mples	Backfill & Instru- mentation	Water	Description of Strata	Reduced Level	Depth Material (Thick Graphic ness) Legend
23.65-23.90	100% return Air+Mist (White)	100	67	57	(mm)	29	D	B		Weak high density white with black specks CHALK. Fracture set 1: Fractures are 5-20° medium spaced planar to undulating rough clean with occasional black specks (80/300/1620). Fracture set 2: Fractures are generally 35-50° medium spaced planar to undulating rough partly open clean with rare brown staining and comminuted chalk infill (50/400/2525). Fracture set 3: Fractures are 65-85° medium spaced undulating rough partly open clean with occasional black specks/brown staining (115/400/1465). (Grade B2) (stratum copied from 20.00m from previous sheet) at 24.156m very small rinded nodular flint up to 35mm.		ness) Legend
24.40-24.60					NI 200 400		U			71[i] 68[i] 72[i]	/ <u></u>	
24.70-26.20 (0:06)	100% return	70	100	*						73[i] 74[i]	-	
25.35-25.45	Air+Mist (White)	73	32	30		31	D			at 25.20m small rinded nodular flint and non intact between 25.00m and 25.50m.	-	

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
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ź													
j 2													
5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

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### STRUCTURAL SOILS

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Contract:								Client	:				Boreho	ole:	
	nehenge P	hase								Hiç	hways England				R618
Contract Ref			S	tart:	01.0	5.18	Grour				National Grid Co-ordinate:		Sheet:		
7	33442				10.0			79			E:412770.9 N:1419			14	of <b>46</b>
Depth	Flush Returns & Details	TCR (%)	lecha SCR (%)	nical RQE (%)	Log If (mm)	Sai No	mples Type	Backfill & Instru- mentation	Water		Description of Strata	Fracture Log	Reduced	Depth (Thick ness)	Material Graphic Legend
- 25.75-25.85 -	100% return Air+Mist (White)	73	32	30	NI 200 400	32	D			specks Fracture planar t occasio (80/300 Fracture medium rough brown chalk i set 3: F	71620). Fracture set 2: es are generally 35-50° is spaced planar to undulating partly open clean with rare staining and comminuted fill (50/400/2525). Fracture Fractures are 65-85° medium undulating rough partly open with occasional black	—75[i]—	-	-	
26.20-27.70 (0:10) - 26.28-26.38	*	<b>X</b>	<b>X</b>	*	*	33	D			(115/40) (Grade (stratum previou occasion sponge occasion and noi 25.10m) (Heak It	0/1465). B2) n copied from 20.00m from s sheet) . at 25.50m and 25.70m nal clusters of brown s. 25.80m very small rinded flint intact between 25.03m and	76[i]	53.31	26.20	
-	100% return Air+Mist (White)	100	52	45	NI 300 600					wispy meet 1: F widely so clean warm fracture widely so open to Fracture medium rough plack (100/50 (Grade at 2	parls and thick marls. Fracture ractures are 0-25° medium to appaced undulating rough open with occasional comminuted agments of chalk and rare staining (70/400/980). See Set 2: Fractures are 30-55° spaced udulating rough partly open clean (100/1800/3530). See set 3: Fractures are 55-80° a spaced planar to undulating artly open to open clean with specks and slickensides 0/3480). C2)	77[i] 78[i]_	-	-	
27.20-27.35						34	D			26.90m slickens	26.44m wispy marl. at 26.80m and 26.59m and and 27.05m conjugated sided fractures/minor faults. etween 27.00m and 27.20m d brown sponge.	79[i]	-	-	

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
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5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

### **BOREHOLE LOG**

Contract:								Clien	t:		Boreho	ole:
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	ition			Highways England		R618
Contract Ref	 f:		S	tart:	01.0	5.18	Grou	nd Leve	el:	National Grid Co-ordinate:	Sheet:	
7	33442		E	nd:	10.0	5.18	;	79	.51	E:412770.9 N:141968.9		<b>15</b> of <b>46</b>
	Flush	M	echa	nical	Log	Sa	mples	≈ - roi	<u></u>	e .	ped le	Depth Materia
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	lf (mm)	No	mples Type	Backfi Instru mental	Water	Description of Strata	Reduced	(Thick Graphic ness) Legend
27.70-29.20 (0:10) 27.75-28.25	100% return Air+Mist (White)	100	52	45		35	U			Weak high density white light brown stained CHALK with occasional wispy marls and thick marls. Fracture set 1: Fractures are 0-25° medium to widely spaced undulating rough open clean with occasional comminuted and fragments of chalk and rare brown staining (70/400/980). Fracture Set 2: Fractures are 30-55° widely spaced udulating rough partly open to open clean (100/1800/3530). Fracture set 3: Fractures are 55-80° medium spaced planar to undulating rough partly open to open clean with black specks and slickensides (100/500/3480). (Grade C2) (stratum copied from 26.20m from previous sheet)	-	
	100% return Air+Mist (White)	93	53	47	NI 300 600					at 28.20m very small rinded nodular flint.  82[i]  82[i]	-	
28.75-28.85						36	D			at 28.70m and 28.85m occasional brown sponges.	- -	
29.20-30.70 (0:11)	100% return Air+Mist (White)	100	59	48						86[i] at 29.30m and 29.37m group of wispy marl.	-	

	Drilling Pr	ogress and	Water Ol	servations	S			onoral	Domorko		
Date	Time	Borehole		Borehole Diameter	Water		G	enerar	Remarks		
2410		Depth	Depth	(mm)	Depth						
						All dimen	sions in me	etres	Scale:	1:11	
Method		ection pit +	Plan		Beretta T.51	Drilled	???	Logged	IFoster + BSaimen	Checked By:	AGS

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### STRUCTURAL SOILS

Contract:								Client	t:			Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	l Inve	stiga	tion			Highways England				R618
Contract Ref	:		S	tart:	01.0	5.18	Groui	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		79	.51	E:412770.9 N:14196	8.9		16	of <b>46</b>
Depth	Flush Returns & Details	TCP	echa SCR	POL			mples Type	Backfill & Instru- mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
29.65-29.90		(78)	(78)	(%)		37	D			Weak high density white light brown stained CHALK with occasional wispy marls and thick marls. Fracture set 1: Fractures are 0-25° medium to widely spaced undulating rough open clean with occasional comminuted and fragments of chalk and rare brown staining (70/400/980). Fracture Set 2: Fractures are 30-55° widely spaced udulating rough partly open to open clean (100/1800/3530). Fracture set 3: Fractures are 55-80° medium spaced planar to undulating	87[i]	-	-	
30.35-30.40	100% return Air+Mist (White)	100	59	48		38	D			rough partly open to open clean with black specks and slickensides (100/500/3480). (Grade C2) (stratum copied from 26.20m from previous sheet) at 29.65m very small nodular flint at 29.83m and 29.95m occasional clusters of orange brown sponges between 30.32m and 30.45m occasional brown stained clusters of sponges.	89[i] 90[i] 91[i] 92[i] 93[i]	-	-	
30.70-32.00 (0:10)	¥	*	<u> </u>	X	NI 300 600						94[i]	-	-	
30.95-31.30	100% return Air+Mist (White)	96	62	62		39	U			at 31.10m clusters of brown sponges and very small nodular flint up to 30mm at 31.25m wispy marl at 31.40m very small nodular flint up to 30mm.	95[i]	-	-	

5	Г	Orilling Pro	ogress and	Water C	bservation	s			Cor	orali	Remarks		
פ	Date	Time	Borehole		Borehole Diameter	Water			Gei	ierai i	Remarks		
<u> </u>	Date	11110	Depth	Depth	(mm)	Depth							
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5							A	II dimensio	ns in metre	s	Scale:	1:11	
notal	Method Used:	Inspe Rota	ction pit + ary Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS
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GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

### STRUCTURAL SOILS

Contract:								Client	:					Boreho	ole:	
A303 Sto	nehenge F	hase	6 Gr	ound	Inve	stiga	tion				ways Eng	<i>*</i>				R618
Contract Ref	:		S	tart:	01.0	5.18	Grour	nd Leve	el:	Na	itional Grid C	o-ordinate:		Sheet:		
7	33442		E	nd:	10.0			79.			E:412770	.9 N:14196	88.9		17	of <b>46</b>
Depth	Flush Returns & Details	TCR	SCR (%)	RQD	If	Sa No	mples Type	Backfill & Instru- mentation	Water	De	scription of S	Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
31.65-32.00	100% return Air+Mist (White)	96	62	62		40	U			stained C wispy marks set 1: Fract widely spac clean with and fragm brown Fracture Se widely spac open to ope Fracture se medium sp	CHALK with a and thick m tures are 0-2 ced undulatin occasional lents of chastaining et 2: Fracture ced udulatingen clean (100 ct 3: Fracture acced planar	e light brown occasional arls. Fracture 5° medium to g rough open comminuted alk and rare (70/400/980). es are 30-55° g rough partly 0/1800/3530). es are 55-80° to undulating	96[i] 97[i]	-	-	
32.00-33.40 (0:10) 32.25-32.45		<b>X</b>	*	*		41	D			black spe (100/500/34 (Grade C2) (stratum control previous shorts at 31 possible incontrol at 31.7 at 3 nodular flin	ecks and 480). opied from leet) .50m occasing corramids. 0m shell frag 32.24m very t up to 50mm 3m tabular fli	small rinded	98	-	(11.80) _ _	
32.80-33.00	100% return Air+Mist (White)	100	69	62	NI 300 600	42	D				at 32.48m us (with para	occasional llel ribs).	—100[i]—	-	-	
-										flint at 33.1 Platyceram	10m fragmen us.	small nodular ts of possible thick marl up	101[i] _102[i]	-	_	
33.40-33.70 (0:10)	*	100	100	100										_		

Γ	[	Orilling Pro	ogress and	Water C	bservation	s			Cor	oral I	Domarka		
	Date	Time	Borehole		Borehole Diameter	Water			Ger	ierai i	Remarks		
<u>;</u>			Depth	Depth	(mm)	Depth							
:													
							А	II dimensi	ons in metre	s	Scale:	1:11	
	Method Used:		ection pit + ary Cored	Pla		Beretta T.51		Drilled Bv:	???	Logged Bv	lFoster + BSaimen	Checked By:	AGS

# STRL

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Litd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

### STRUCTURAL SOILS BOREHOLE LOG

Contract:								Clier	nt:				Boreho	ole:	
A303 Sto	nehenge P	hase								Hig	hways England				R618
Contract Ref	f:		S	tart:	01.05	5.18	Grou	nd Lev	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.05	5.18		79	9.51		E:412770.9 N:1419	968.9		18	of <b>46</b>
Depth	Flush Returns & Details	TCD	echai SCR (%)	BOD			mples Type	Backfill & Instru-	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
33.65-33.75 33.70-35.20 (0:10)	100% return Air+Mist (White)	100				43	D			stained wispy m set 1: F widely s clean v and fra brown Fracture widely s open to	righ density white light brown CHALK with occasional arls and thick marls. Fractures are 0-25° medium to paced undulating rough oper with occasional comminuter gements of chalk and rare staining (70/400/980) as Set 2: Fractures are 30-55 spaced udulating rough partly open clean (100/1800/3530)	103[i]	-	-	
34.20-34.70	100% return Air+Mist (White)	100	47	333	NI 300 600	44	U			Fracture medium rough p black (100/50 (Grade (stratum previous	e set 3: Fractures are 55-80 i spaced planar to undulating artly open to open clean with specks and slickensides 0/3480). C2) in copied from 26.20m from a sheet) 33.80m group of wispy mai	0   104[i] 0   105[i] 1   105[i]	-	-	
						45	D			and thic at phospha	34.65m group of wispy mark marl up to 3mm. 34.70m a pebble up to 5mn ate. etween 34.75m and 34.87n 20mm thick) rinded nodula	107[i]-	-	-	
35.20-36.70 (0:11)	100% return Air+Mist (White)	100	95	87		40	ט				35.20m group of wispy mar e brown sponges.	·l 108[i]=	-	-	

	Drilling Pr	ogress and	Water Ot	oservation:	S		Cor	oral I	Remarks		
Date	Time	Borehole		Borehole Diameter	Water		Gei	lerai i	Remarks		
		Depth	Depth	(mm)	Depth						
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						All dimension	ns in metre	es	Scale:	1:11	
Method		ection pit +	Plan		Beretta T.51	Drilled By:	???	Logged	IFoster + BSaimen	Checked By:	VG S

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

### STRUCTURAL SOILS

Contract: A303 Stor Contract Ref															
								Client	:				Boreho	ole:	
Contract Dof	nehenge P	hase (	6 Gr	ound	Inve	stiga	tion			Hig	hways England				R618
Contract Rei	:		S	tart:	01.0	5.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		79.	.51		E:412770.9 N:1419	68.9		19	of <b>46</b>
Depth	Flush Returns & Details	TCP	SCB	nical RQE		Sa No	mples Type	Backfill & Instru- nentation	Water		Description of Strata	Fracture Log	Reduced	Depth (Thick ness)	
35.65-36.20	100% return Air+Mist (White)	100	95	87		46	U			stained wispy m set 1: F widely s clean \( \text{v} \) and fra brown Fracture widely s open to Fracture medium rough p black (100/50 (Grade (stratun previous 50mm r at 3	n copied from 26.20m from s sheet) at 35.50m very small up to nodular flint. 35.62m wispy marl. t 35.70m rounded prospheric	-109[i]- 110[i]	-	-	
36.50-36.70 36.70-38.20 (0:05)	¥	¥.	\ \ \ \	*	NI 300 600	47	D			flintat rinded r  Platyce	ponges. t 35.80m very small nodular 36.20m small (up to 70mm) nodular flint at 36.30m possible ramus with parallel ribs. etween 36.60m and 36.70m f wispy marl up to 2mm.		-	-	
37.35-37.75	100% return Air+Mist (White)	93	73	72		48	U			chlamys umbo). at up to 1r a flint up t	at 36.90m possible mirma is cretosa (radiating ribs from 37.20m group of wispy marl nm. t 37.22m very small nodular to 25mm.		-	-	

		Orilling Pro	ogress and	Water O	bservations	S			Cor	oral I	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lerai i	Remarks		
i													
3							Δ	II dimension	ns in metre	s	Scale:	1:11	
	/lethod /sed:		ction pit + ary Cored	Plar Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS



GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

#### **DRAFT**

Contract:								Client	:				Boreho	ıle:	
A303 Sto	nehenge F	hase	6 Gr	ound	Inve	stiga	tion			Hig	hways England				<b>R618</b>
Contract Re	 f:		S	tart:	01.0	5.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		79	.51		E:412770.9 N:1419	8.9		20	of <b>46</b>
	Flush		lecha			Sa	mples	ill & ru- rtion	er			ure	ced	Depth	Materia
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	lf (mm)	No	mples Type	Backf Instr menta	Water		Description of Strata	Fracture Log	Reduced Level	(Thick ness)	Graphic Legend
37.90-38.00  38.20-39.70 (0:05)	100% return Air+Mist (White)  100% return Air+Mist (White)	93	73	577	NII 3000 6000 450	50	D			density fracture undulaticommin Single undulaticommin (Grade at up to 15	uted chalk (600/650/730). fracture at 40.04m 0° ng rough open infilled with uted chalk.	111[i]	41.51	38.00	

	Drilling Pro	ogress and	Water O	bservation	S			Cor	oral I	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ierari	Remarks		
						А	II dimensio	ons in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plar Use		Beretta T.51		Drilled Bv:	???	Logged Bv:	IFoster + BSaimen	Checked By:	AGS

### **BOREHOLE LOG**

Contract:								Clien	t:	Borehole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England	<b>R618</b>
Contract Ref	f:		S	tart:	01.0	5.18	Grour	nd Leve	el:	National Grid Co-ordinate: Sheet:	
7	33442		E	nd:	10.0	5.18		79	.51		of <b>46</b>
	Flush		lecha			Sa	mples	fill &	ē	Debi	h Materia
Depth	Returns & Details	TCR (%)	SCR (%)		lf (mm)	No	mples Type	Back Inst menta	Water	Description of Strata  Log Code Code Code Code Code Code Code Code	
39.50-39.70	100% return Air+Mist (White)	93	60	57		51	D			Very weak to weak medium to high density white CHALK. Fracture set 1: fractures are 45-50° widely spaced undulating rough open with comminuted chalk (600/650/730).  Single fracture at 40.04m 0°	
39.70-41.20 (0:05)			•	À	240 200 450	52	D			undulating rough open infilled with comminuted chalk. (Grade C2) (stratum copied from 38.00m from previous sheet) at 39.82m very small nodular rinded flint up to 20mm at 39.85m rounded brown sponges.	
40.60-40.90	100% return Air+Mist (White)	100	83	83	20 210 850	53	U			Weak very high density white CHALK with thick marl beds and wispy marls. Fracture set 1: Fractures are 0-10° generally medium to widely spaced undulating rough open to moderately wide infilled with comminuted chalk frequently associated with marl layers with orange brown staining (20/450/1100). Fracture set 2: Fractures are 55-70° medium to widely spaced undulating rough moderately wide to wide infilled with comminuted chalk and occasional orange staining (470/680/2545). Single fracture at 42.05m 30° undulating rough open associated with marl layer.	
41.20-42.70 (0:05) 41.30-41.45	100% return Air+Mist (White)	100	93	85		54	D			(LEWES NODULAR CHALK FORMATION Grade C2) between 40.40m and 40.47m wispy marl between 40.50m and 40.60m thick marl seams up to 20mm with some nodular chalk at 40.95m fragments of possible Platyceramus at 41.25m thick (5mm) seam of marl between 41.25m and 41.35m occasional brown sponges.	

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
2													
2													
)													
2													
ź													
j 2													
5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:								Client	:				Boreho	ole:	
	nehenge P	hase	6 Gr	ounc	Inve	stiga	tion			Hic	hways England				R618
Contract Re								nd Leve	1:		National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	10.0	5.18		79.	51		E:412770.9 N:1419	68.9		22	of <b>46</b>
Depth	Flush Returns & Details	M TCR	lecha SCR	nical RQE	Log	Sa	mples	Backfill & Instru- mentation	Water		Description of Strata	Fracture Log	Reduced	Depth (Thick ness)	Graphi
										marlat tup to 1 Weak CHALK wispy Fracture medium	very high density white with thick marl beds and marls. Fracture set 1:		-	-	
-	100% return Air+Mist (White)	100	93	85						infilled frequen layers (20/450 Fractur widely modera commir orange Single	open to imoderately wide with comminuted chalk tity associated with marl with orange brown staining /1100). Fracture set 2: es are 55-70° medium to spaced undulating rough tely wide to wide infilled with uted chalk and occasional staining (470/680/2545). fracture at 42.05m 30° ing rough open associated	118[i] -119[i] 120[i]	-	-	
42.30-42.50					20 210 850	55	U			with ma (LEWE FORMA b wispy 40.40m a nodular at filled tal	url layer.  S NODULAR CHALK ATION Grade C2) between 40.40m and 40.47m marl.(stratum copied from from previous sheet) at 41.75m very small rinded	-121[i]- 122[i]	-	-	
42.70-44.20 (0:06)		*	X	*	-					at minor fa at flint.	42.30m and 42.50m possible ault with slickensides on it. 42.67m small nodular tabular t 42.80m very small nodular		-	-	
43.10-43.20	100% return Air+Mist (White)	97	93	90		56	D			seam.	at 43.05m thick (40cm) marl	—123[i]—		(5.45)	
43.25-43.60						57	U				at 43.20m shells of possible ramus (with parallel ribs).	—124[i] [—]	-	-	

I	Drilling Pro	gress and	Water O		S			Cor	oral I	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliains		
		,	· ·		,							
											4.44	
						_ A	ll dimensior	ns in metre	S	Scale:	1:11	
Method Used:		ction pit + ary Cored	Plar Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster+ BSaimen	Checked By:	AGS

# ST

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

### STRUCTURAL SOILS

Contract Ref: Start: 01.05.18 Ground Level: National Grid Co-ordinate: Sheet:  733442 End: 10.05.18 79.51 E:412770.9 N:141968.9 23 of 46  Flush Returns TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD If State TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR SCR ROD IF STATE TCR	Contract:								Clien	t:		Boreho	
Flush Returns   Mechanical Log   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   Samples   S	A303 Stoneher	nge P	hase 6										R618
Pepth   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Returns   Return	Contract Ref:			St	art:	01.0	5.18	Grou	nd Leve	el:	National Grid Co-ordinate:	Sheet:	
Weak very high density white CHALK with thick marl beds and wispy marls. Fracture set 1: Fractures are 0.10 generally medium to widely spaced undulating rough open to moderately wide infilled with committed chalk frequently associated with marl layers with orange brown staining (20/450/1100). Fracture set 2: Fractures are 5.70° medium to widely spaced undulating rough moderately wide to wide infilled with committed chalk and occasional orange staining (470/680/2545). Single fracture at 42.05m 30° undulating rough open associated with marl layer. (LEWES NODULAR CHALK FORMATION Grade C2)  100% (14)  44.40-44.90  44.40-44.90  58 U  20 210 850  44.40-44.90  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% return Air-Milist (White)  100% ret	7334	42		Er	nd:	10.0	5.18				E:412770.9 N:141968.9		<b>23</b> of <b>46</b>
Weak very high density white CHALK with thick mart beds and wispy marls. Fracture set 1: Fractures are 0.10 generally medium to widely spaced undulating rough open to moderately wide infilled with comminuted chalk frequently associated with mart layers with orange brown staining (20/450/1100). Fracture set 2: Fractures are 5.70° medium to widely spaced undulating rough moderately wide to wide infilled with comminuted chalk frequently associated with mart layers with orange brown staining (20/450/1100). Fracture set 2: Fractures are 55-70° medium to widely spaced undulating rough moderately wide to wide infilled with comminuted chalk and occasional orange staining (470/680/2545). Single fracture at 42.05m 30° undulating rough open associated with mart layer. (LEWES NODULAR CHALK FORMATION Grade C2)  10. between 40.40m and 40.47m wispy marl. (stratum copied from 40.40m from previous sheet)  10. at 43.90m and 44.05m group of thick mart seams (6mm) with wispy marl.  10. at 43.90m and 44.08m occasional thick mart seam up to 5mm with wispy marls.  10. at 43.90m and 44.08m occasional thick mart seam up to 5mm with wispy marls.  10. at 44.10m very small nodular filmt.	Retu	urns	TODIS	CD		ı£			Sackfill & Instru- nentation	Water	Description of Strata	Reduced	(Thick Graphic
	44.20-45.70 (0:14) 44.40-44.90	00% urn Mist iite)	97	93	90	20 210					Weak very high density white CHALK with thick marl beds and wispy marls. Fracture set 1: Fractures are 0-10° generally medium to widely spaced undulating rough open to moderately wide infilled with comminuted chalk frequently associated with marl layers with orange brown staining (20/450/1100). Fracture set 2: Fractures are 55-70° medium to widely spaced undulating rough moderately wide to wide infilled with comminuted chalk and occasional orange staining (470/680/2545). Single fracture at 42.05m 30° undulating rough open associated with marl layer.  (LEWES NODULAR CHALK FORMATION Grade C2) between 40.40m and 40.47m wispy marl.(stratum copied from 40.40m from previous sheet) at 43.65m very small nodular ringed flint up to 30mm at 43.90m and 44.05m group of thick marl seams (6mm) with wispy marl at 43.93m and 44.08m occasional thick marl seam up to 5mm with wispy marls at 44.10m very small nodular flint.	-	
at 45.06m sheet flint up to 3mm at 45.10m fragments of possible Platyceramus (with parallel ribs).	- - 45.25-45.45						59	D			at 45.10m fragments of possible		

[	Drilling Pro	gress and	Water O		S			Gor	orall	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliaiks		
						A	II dimensio	ns in metre	s	Scale:	1:11	
Method Used:	Inspe Rota	ction pit + ary Cored	Plar Use		Beretta T.51		Drilled By:	???	Logged By:	lFoster + BSaimen	Checked By:	AGS

## STR

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:40 | KJ2 |

#### STRUCTURAL SOILS

Contract:								Clien	t:				Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Hig	hways England				R618
Contract Re	f:		S	start:	01.0	5.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	10.0	5.18		79	.51		E:412770.9 N:1419	68.9		24	of <b>46</b>
	Flush	M	1echa	nical	Log	Sa	mples	⊗ - roi	<u></u>			a_re	9 <u>-</u>	Depth	Materia
Depth	Returns & Details	TCR (%)	SCR (%)	RQE (%)	If (mm)	No	mples Type	Backfil Instru	Water	1	Description of Strata	Fracture Log	Reduced	(Thick ness)	Graphic
45.70-47.20 (0:12)	100% return Air+Mist (White)	100	93	90	20 210 850						etween 45.58m and 45.68m nt along a fracture.	128[i]	-	-	
-										occasion Fracture spaced clean w infill. (LEWES FORMA' at flint.	gh density white CHALK with hal wispy thick marl seams. s are generally 5-15° closely undulating rough party open with rare comminuted chalk S NODULAR CHALK TION Grade B2) 46.00m very small nodular		33.66		
46.35-46.45	100% return Air+Mist (White)	100	97	62	100 200 1170	60	D			marl up t	46.40m and 47.20m wispy to 2mm at 46.50m possible amus (with parallel ribs). 6.54m thick marl seam up to	_130[i]- _131[i]- _132[i]- _133[i]-		-	
46.85-47.05						61	D					_134[i] [_]		-	
-												_135[i] ⁻	<u>-</u>	<del>-</del>	
47.20-48.70 (0:07)	100% return Air+Mist (White)	100	100	94	_							_136[i] [_]	-	(2.85)	

	Drilling Pr	ogress and	Water Ol	servations	S			onoral	Domorko		
Date	Time	Borehole		Borehole Diameter	Water		G	enerar	Remarks		
2410		Depth	Depth	(mm)	Depth						
						All dimen	sions in me	etres	Scale:	1:11	
Method		ection pit +	Plan		Beretta T.51	Drilled	???	Logged	IFoster + BSaimen	Checked By:	AGS



#### **DRAFT**

#### **BOREHOLE LOG**

Contract:									Clien	ıt·	Borehole:	
A303 Sto	nohonac	م D	haea	6 Gr	ounc	llnvo	etina	tion	Cilcii	ιι.	Highways England	R618
Contract Ret		<b>C</b> 1	ilase					Grou	nd Lev	el:	National Grid Co-ordinate: Sheet:	11010
	'33442	2				10.0				 ).51		of <b>46</b>
_	Flush		M	lecha								
Depth	Returns & Detail	ıs	TCR	SCR	RQE		No	mples Type	Backfill Instru- mentati	Water	Description of Strata  Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading Leading	Graphic
47.60-48.00							62	U			Weak high density white CHALK with occasional wispy thick marl seams. Fractures are generally 5-15° closely spaced undulating rough party open clean with rare comminuted chalk infill. (LEWES NODULAR CHALK FORMATION Grade B2) (stratum copied from 45.85m from	
48.00-48.20	100% return Air+Mis (White	n st	100	100	94	100 200 1170		D			previous sheet)  at 48.08m very small rinded nodular flint between 48.12m and 48.34m group of thick marl up to 5mm and wispy marl.	
-	•			•		•	-			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	at 48.60m possible  Platyceramus	
-											depth.	

3	Г	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
2	Date	Time	Borehole	U	Borehole Diameter	Water			Gei	ierai i	Remarks		
5			Depth	Depth	(mm)	Depth							
2													
2													
)													
2													
ź													
j 2													
5							Α	II dimension	ns in metre	s	Scale:	1:11	
Oli doldini	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		Beretta T.51		Drilled By:	???	Logged By:	IFoster + BSaimen	Checked By:	AGS

Stonehenge A303: Pumping Test W617 Rev.01



Appendix 4: R619 Borehole Log





#### **BOREHOLE LOG**

Contract:						CI	ient	:				Boreho	ole:	
A303 Stonehenge	Phase 6	Ground	Inves	stigat	tion				Hiç	hways England				R619
Contract Ref:		Start:	20.04	1.18	Grour	nd L	eve	el:		National Grid Co-ordinate:		Sheet:		
733442		End:	30.04	1.18				.63		E:412785.8 N:1419	69.2		1	of <b>49</b>
Flush Returns Depth & Details	TCR S	chanical CR RQD %) (%)	) If		mples Type	Backfill &	mentation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphi Legen
0.50				101	ES				with lov to coar subrour and flir subrour Cream CHALK SILT. Sis suba	slightly gravelly sandy SILT v cobble content. Sand is fine se. Gravel is subangular to ded fine to coarse of chalk and pale brown structureless comprising sandy gravelly and is fine to coarse. Grave ngular to subrounded fine to of chalk and rare flint.		79.33	(0.30)	**************************************
0.80				102	ES				silty su to coars flint with fine to	and cream structureless comprising slightly sandy bangular to subrounded fine se GRAVEL of chalk and raren low cobble content. Sand is coarse. Cobbles are angular bunded chalk and flint.		78.83	0.80	

1	Drilling Pro	gress and	Water Ob	servations	3
Date	Time	Borehole	Casing	Borehole Diameter	Water
Date	Tille	Depth	Depth	(mm)	Depth
20/04/18	14:00	6.00	1.50	146	5.20
23/04/18	08:00	6.00	1.50	146	5.20
23/04/18	17:30	18.50	1.50	146	5.20
24/04/18	08:00	18.50	1.50	146	5.20
24/04/18	17:00	21.40	12.00	146	5.20
25/04/18	08:00	21.40	12.00	146	5.40
25/04/18	17:30	39.10	12.00	146	5.50
26/04/18	08:00	39.10	12.00	146	5.40

#### **General Remarks**

- 1. Location CAT scanned prior to excavation.
- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.50m depth on 27/03/2018.
- 4. No groundwater strikes noted by the driller.
- 5. Borehole drilled using a 146mm geobore S core barrel and air mist as the flush medium.

  6. 50mm PVC groundwater monitoring pipe installed as shown.

1:11 All dimensions in metres Scale:

GINT_LIBRARY V8 06.GLB LibVersion: v8 06_018 PriVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:58 | KJ2 | Method Used:

Inspection pit + Rotary Cored

Plant Used:

Comacchio MC450

Drilled Stuart Crawford Logged By:

IFoster + BSaimen

Checked Ву:



# STRI

### STRUCTURAL SOILS

#### **BOREHOLE LOG**

an											BURI	=	JLI		.UG
Contract:								Clie	nt:				Boreho	ole:	
A303 St	onehenge F	hase	6 Gr	ound	Inves	stiga	tion			Hig	hways England				R619
Contract R	ef:		S	Start:	20.04	4.18	Grour	nd Le	vel:		National Grid Co-ordinate:		Sheet:		
	733442		E	nd:	30.04				9.63	}	E:412785.8 N:1419	69.2		2	of <b>49</b>
	Flush Returns	TCP	SCB	nical RQD	lf.	Sa	mples Type	ckfill & Istru-	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Graphic
Depth	& Details	(%)	(%)	(%)	(mm)	No	Туре	Ba	<u> </u>			F.	Re	ness)	Legend
1.50-3.00 (0:08)	90% return Air+Mist (White)		0	0	NI 40 70					slightly Bedding closely rough commir brown fracture 20° and open a staining (Grade  (<50mm	C4) at 1.50m small fragment of n) thinly rinded flint.		-		
2.50-3.00						5	D		******	locally 6	t 2.47m and 2.53m chalk is extremely weak.  at 2.75m very small rinded	—1[i]— —2[i]—	-	-	
_											flint (30mm).	3[i] 5[i] 4[i]	]	_	
3.00-4.50 (0:09)	90% return Air+Mist (White)	60	8	0	NI 50 95				******	Fracture 10° close open in and r (20/70/5 are 45 undulat occasion light be fracture	high density white CHALK. e set 1: Bedding fractures are sely spaced undulating rough filled with comminuted chalk are light brown staining 10). Fracture set 2: Fractures and 50° medium spaced ng rough open infilled with nal comminuted chalk and rown staining (375). Single at 3.80m 85° undulating pen brown staining and black CC4)	. 1	76.73	2.90	

5		Drilling Pro	ogress and	Water Ol	oservations	6			Cor	oral I	Domorko		
0	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai i	Remarks		
ź	26/04/18	16:30	42.10	12.00	146	-							
	27/04/18	08:00	42.10	12.00	146	6.90							
2	27/04/18	16:30	48.10	12.00	146	-							
2	30/04/18	08:30	48.10	12.00	146	5.80							
2	30/04/18	16:45	48.10	12.00	146	6.08							
į,													
2													
							A	ll dimen	sions in metre	es es	Scale:	1:11	
Or deres.	Method Used:		ction pit + ary Cored	Plan Use		omacchio MC450	)	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

#### RORFHOI F I OG

Contract:									Client	:					Boreho	ole:	
	tonehen	ge Ph	nase									ys Englan					R61
Contract F								Grour				nal Grid Co-ord			Sheet:		
	73344	12		E	nd:	30.0	4.18			.63	E:4	412785.8 N	N:14196			3	of <b>4</b>
	Flus			lecha			Sar	nples	Backfill & Instru- mentation	ter				Fracture Log	Reduced Level	Depth	
Depth	Retu & De		TCR (%)	SCR	RQI (%)	O If (mm)	No	Туре	Back Inst	Water	Descr	iption of Strata	3	Frac	Sedt Le	(Thick ness)	
4.35-4.50	90% rd (Wh	eturn Mist ite)	60	8	0	NI 50 95	6	D			nodular rinded at 4.2 fossil at 4.30m (fibrous calcite	: Bedding fractivaced undulating with comminute ight brown racture set 2: F 50° medium ugh open infilipminuted chataining (375) 8.80m 85° urrown staining a field from 2.90° t) 4.00m and 4.00° filint up to 60m (23m inflated fragment of ince).	tures are ng rough ed chalk staining Fractures spaced lled with alk and . Single ndulating nd black Om from 8m large nm.  Micraster oceramid	6[i] 7[i] -8[i] -10[i] -11[i] 12[i]		(3.10)	
	rilling Pro	Bore		_	er Oi sing	Boreh Diame	nole	Water	$\parallel$		(	General	Rema	rks			
Date	Time	De	pth_	De	pth	(mn		Depth									
										А	II dimensions in	metres	Scale:		1:11		

	С	rilling Pro	gress and	Water O	oservation	S			Cor	orall	Remarks		
Da	ate	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Remarks		
						,							
								II P			0 1	4.44	
							μ Α	ıı aimen	sions in metre	S	Scale:	1:11	
Meth Used			ction pit + rry Cored	Plar Use		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:58 | KJ2 |

Contract:			Client:		Borehole:
A303 Stonehenge P	hase 6 Ground	d Investigation		Highways England	R619
Contract Ref:	Start:	<b>20.04.18</b> Grou	nd Level:	National Grid Co-ordinate:	Sheet:
733442		30.04.18	79.63	E:412785.8 N:141969.2	4 of 49
Flush Returns Depth & Details	Mechanical TCR SCR RQE (%) (%) (%)		Backfill & Instru- mentation Water	Description of Strata	Depth Materia Graphiness) Legend
Depth & Details  5.50-6.00  90% return Air+Mist (White)  90% return Air+Mist (White)	27 0 0	NI Type	We Fra 10° ope and (20) are und occ ligh frac roug spe (Grant pre) flint	eak high density white CHALK. acture set 1: Bedding fractures are closely spaced undulating rough en infilled with comminuted chalk drare light brown staining 1/70/90). Fracture set 2: Fractures et 45° and 50° medium spaced dulating rough open infilled with casional comminuted chalk and in brown staining (375). Single cture at 3.80m 85° undulating 1/20 glp open brown staining and black ecks. The committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of the committee of th	73.63 6.00 AZCI

	Drilling Pro	ogress and	Water Ol	servation	S			Cor	oral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	lerari	Remarks		
		Depth	Depth	(mm)	Depth							
						A	II dimen	sions in metre	es	Scale:	1:11	
Method Used:	Inspe	ection pit + ary Cored	Plan Use		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:58 | KJ2 |

#### **DRAFT**

<b>7</b>								0				DUK				
Contract:		\bar			l lucare	41	41a	Clier	nt:	<b>⊔:</b> -	hwa	s England		Boreho		R619
Contract Re	onehenge P	nase					Grour	nd Lev	رجا.	Пίζ		Grid Co-ordinate:		Sheet:		KOIÐ
	733442				30.04		Sioui		9.63			12785.8 N:1419	169 2	Oneet.		of <b>49</b>
	Flush		/lecha				mples				L.71	12700.0 14.1410		 		Materia
Depth	Returns & Details		SCR	RQE	) If	No	mples Type	Backfill Instru-	Water			tion of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Graphic
7.50-8.50 (0:05) 7.50-7.85	90% return Air+Mist (White)		0	0		1	SPT			(stratun	ed zone o n copied s sheet)	of core loss. If from 6.00m from		-	(4.50)	
8.50-9.50 (0:05)	90% return Air+Mist (White)	0	0	0												AZCI

Drilling Progress and Water Observations								```					
Date	Time	Borehole		Borehole Diameter	Water	General Remarks							
		Depth	Depth	(mm)	Depth								
						ΔΙ	dimensions in m	netre	) c	Scale:	1:11		
Method			Diar								Checked		
Wetnod   Inspection pit +   Used:   Rotary Cored				Plant Used: Comacchio MC450			By: Stuart Crawf	ford	Logged Bv:	lFoster + BSaimen	By:	AGS	

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### STRUCTURAL SOILS

#### **BOREHOLE LOG**

											D(	JKE	_	JLI		UG
Contract:								Client	:					Boreho	ole:	
	nehenge P	hase 6								Hiç	hways England					R619
Contract Re			S	tart:	20.0	4.18	Grour	nd Leve			National Grid Co-ordi			Sheet:		
7	733442		E	nd:	30.0	4.18	1		.63		E:412785.8 N	:14196	9.2		6	of <b>49</b>
Depth	Flush Returns & Details	TCR	SCR	nical RQD (%)			mples Type	Backfill & Instru- mentation	Water		Description of Strata		Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.50-10.50 (0:10) 9.50-9.95	90% return Air+Mist (White)	•	0	0		2	SPT			(stratun	ed zone of core loss. n copied from 6.00n s sheet)	m from		-	-	AZCL
10.50-11.00 (0:08)	80% return Air+Mist (White)	80	0	0	NI	8	D			chalk. I brown v	weak white ( red as angular gra Fractures surface are vith black specks. t 10.50m small fragm to 30mm.	slightly		69.13	10.50	
- 11.00-11.70 (0:05)	80% return Air+Mist (White)  90% return Air+Mist (White)	100	0	0	NI NI 60					white losingle 11.30m and up brown specks. (Grade b small (possib thick at		CHALK. m and ar rough en with black  11.10m ar flint 50mm on intact	13[i]    -    14[i]	-	-	

	Orilling Pro	ogress and	Water Ol	oservations	3	Con	orali	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	Gen	lerai i	Remains		
		Берш	Берит	(11111)	Берит					
						All dimensions in metre	_	Scale:	1:11	
N 4 - 4			 				_			
Method Used:		ection pit + ary Cored	Plan		macchio MC450		Logged Bv:	lFoster + BSaimen	Checked Bv:	AGS

#### **BOREHOLE LOG**

Contract:								Clien	t:			Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			<b>Highways England</b>				R619
Contract Re	f:		S	tart:	20.0	4.18	Grour	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	30.0	4.18		79	.63	E:412785.8 N:1419	69.2		7	of <b>49</b>
Depth	Flush Returns & Details	M TCR (%)	echai	nical I	_og _f (mm)	Sa No	mples Type	tackfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphic Legend
11.50-11.70	90% return Air+Mist (White)	100	0	0	(11111)	9	D			gravel size fragments. Very weak to weak medium density white locally brown stained CHALK. Single fractures at 11.19m and 11.30m are 50° and 80° planar rough	ш	<u>«</u>	_(1.20)	
11.70-12.20 (0:10)	90% return Air+Mist (White)	80	0	0	NI NI 60	10	D			and undulating rough open with brown staining and rear black specks.  (Grade B4) between 11.00m and 11.10m small fragments of nodular flint (possible flint band) up to 50mm thick.(stratum copied from 11.00m from previous sheet) at 11.55m brown stained sponges at 11.57m wispy thin marl up to 1mm at 11.80m thin wispy marl up to		-	-	
12.20-13.50 (0:15)		*	*	*	*					1mm at 11.82m possible brown sponge at 11.90m wispy marl up to 1mm between 11.90m and 12.20m non intact recovered as angular fine to coarse gravel size chalk at 12.00m very small rinded flint 90 x 25mm.  Very weak to weak white medium to	15[i]	67.43	12.20	
12.80-13.00	90% return Air+Mist (White)	85	0	0	NI 100 140	11	D			high density CHALK with occasional rinded flints. Fracture set 1: Fractures are 45-55° widely spaced planar to undulating rough and striated open with occasional black specks and rare brown staining. Fracture Set 2: Fractures are 80-85° planar rough partly open with black specks. Single fracture at 13.02m 25° undulating rough open infilled with fine gravel of chalk. (Grade B3) at 12.68m very small fragments of rinded flint up to 20mm at 12.78m very small fragments of rinded flint up to 15mm.	19[i] 19[i] 19[i] 18[i] 20[i]		-	
		•	•							at 12.78m rinded brown sponges at 13.16m very small rinded flint 30mm thick x 80mm length between 13.20m and 13.25m possible minor movement along a polished and slickensided discontinuity (55°) between 13.30m and 15.00m non intact recovered as angular fine	21[i]		-	

5	[	Orilling Pro	gress and	Water C	bservation	S			Gor	oral I	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliaiks		
2													
,													
١							A	II dimens	sions in metre	es	Scale:	1:11	
01100110	Method Used:	Inspe Rota	ction pit + rry Cored	Pla Use		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

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### STRUCTURAL SOILS

#### **BOREHOLE LOG**

Contract:							Client			Boreho	nle·	
	nehenge P	hasa 6	Groun	d Inve	etina	tion	Ciletit	•	Highways England	Borenc	л <del>с</del> .	R619
Contract Ref		iiase u					nd Leve	el:	National Grid Co-ordinate:	Sheet:		11010
	33442			30.0				.63	E:412785.8 N:141969.2		8	of <b>49</b>
•	Flush	Mo								   0		Material
Depth	Returns & Details	TCR S	chanica SCR RQ (%) (%	D If (mm)	No	Type	Backfill Instru- mentatio	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Graphic Legend
13.50-15.00 (0:15)	80% return Air+Mist (White)	33		NI 100 140					to coarse gravel size chalk and flint.  Very weak to weak white medium to high density CHALK with occasional rinded flints. Fracture set 1:  Fractures are 45-55° widely spaced planar to undulating rough and striated open with occasional black specks and rare brown staining.  Fracture Set 2: Fractures are 80-85° planar rough partly open with black specks. Single fracture at 13.02m 25° undulating rough open infilled with fine gravel of chalk.  (Grade B3)  (stratum copied from 12.20m from previous sheet)  between 13.50m and 13.65m small fragments of rinded nodular flint (possible band of flint).	-	(2.80)	
14.80-15.00					12	D				64.63	-	
15.00-16.00 (0:10)	80% return Air+Mist (White)	100	25 11	NI 100 180	13	D			Very weak medium density locally weak white locally brown stained CHALK. Fracture set 1: Fractures are 35-55° medium spaced undulating rough open with brown staining (230/300/430). Fracture set 2: Fractures are 70-75° planar rough partly open with black specks (150/200/465). Single fracture at 15.32m 20° planar rough partly open with black specks. (Grade B3)  between 15.10m and 15.27m occasional brown stained sponges.	-	15.00	

[	Drilling Pr	ogress and	Water Ob	oservation	S			Cor	aarali	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai	Remarks		
					·							
						Al	l dimen	sions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan		omacchio MC450		Drilled Bv:	Stuart Crawford	Logged Bv:	IFoster + BSaimen	Checked By:	AGS

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GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:58 | KJ2 |

#### STRUCTURAL SOILS

Contract:								Clien	t:				Boreho	le:	
A303 Sto	nehenge P								hways England				R619		
Contract Re	f:		S	tart:	20.0	4.18	Grou	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	30.0	4.18			.63		E:412785.8 N:1419	69.2		9	of <b>49</b>
Depth	Flush Returns & Details	TCR	echar SCR (%)	RQD			mples Type	Backfill & Instru- mentation	Water	ı	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphic Legenc
16.00-16.50 (0:08) 16.10-16.40	80% return Air+Mist (White)  80% return Air+Mist (White)	100	25	111	NI 100 180	14	D			weak weak weak weak weak weak weak weak	copied from 15.00m from sheet) etween 15.50m and 15.90m and brown stained sponges.	27[i] 28[i] 29[i]	63.13	- (1.50) - -	
16.50-17.00 (0:08)	80% return Air+Mist (White)	0	- O	0						Weak I containing angular	gravel and cobbles of chalk		62.63	-	AZCI
17.25-17.40	80% return Air+Mist (White)	100	0	0	NI 	15	D			and flint.	17.15m very small fragments		62.13	(0.50)	

5	Г	Orilling Pro	gress and	Water O	bservation	S			Cor	orol	Remarks		
2	Date	Time	Borehole		Borehole Diameter	Water			Gei	lerar	Remarks		
<u> </u>	Date		Depth	Depth	(mm)	Depth							
2													
ڕ													
2													
g													
_													
Š													
2											_		
5							Α	II dimen	sions in metre	S	Scale:	1:11	
סוומרותונ	Method Used:	d Inspection pit + Plant Used: Comacchio N						Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:								Client	t:	Borehole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Inves	stiga	tion			Highways England	R619
Contract Re	f:		S	tart:	20.0	4.18	Grour	nd Leve	el:	National Grid Co-ordinate: Sheet:	
7	733442		E	nd:	30.0				.63	E:412785.8 N:141969.2	of <b>49</b>
	Flush	М	echar	nical I	Log	Sa	mples	⊗ ¹ ïo	_	e p p Depth	Material
Depth	Returns & Details	TCR	SCR	RQD	If (mm)	No	Type	Backfill & Instru- mentation	Water	Description of Strata   ਲੂੰ ੧ ਜ਼ੈ ਡੇ   (Thick	Graphic Legend
Depth  17.50-18.50 (0:12)  17.60-17.80	80% return Air+Mist (White)	100	233	16	(mm)	16	D D	Ba	<b>A</b>	Weak high density white CHALK with rare flint nodules and bands. Fracture set 1: Fractures are 5-25° closely spaced planar to undulating rough partly open to open with black specks (80/200/1110). Fracture set 2: Fractures are 35-50° medium spaced planar rough partly open with black specks and brown staining (60/350/955). Fracture set 3: Fractures are 60-80° medium to widely spaced planar to undulating rough partly open to open with black specks and rare brown staining (170/300/740). (Grade B4)  at 17.90m occasional brown stained sponges at 18.00m very small fragments of rinded nodular flint.	Legend
18.50-19.50 (0:12)	*	*	*	*	NI 100 230					between 18.50m and 18.87m non intact recovered as angular fine to coarse gravel size fragments of chalk and flint.	
- - 19.00-19.10 -	80% return Air+Mist (White)	80	8	0		18	D			at 18.75m small fragments of rinded nodular flint.  between 18.90m and 19.07m possible slickensided discontinuity dipping at 60° at 18.98m occasional brown stained sponges.  (2.75)	
-			•							between 19.37m and 19.50m recovered non intact as gravel size fragments.	

	Drilling Pro	ogress and	Water Ob		3			Cor	orall	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lerari	Remarks		
						Α	II dimens	ions in metre	es	Scale:	1:11	
Method Used:	Inspe Rota	Plan Use		omacchio MC450	)	Drilled By:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS	

#### **BOREHOLE LOG**

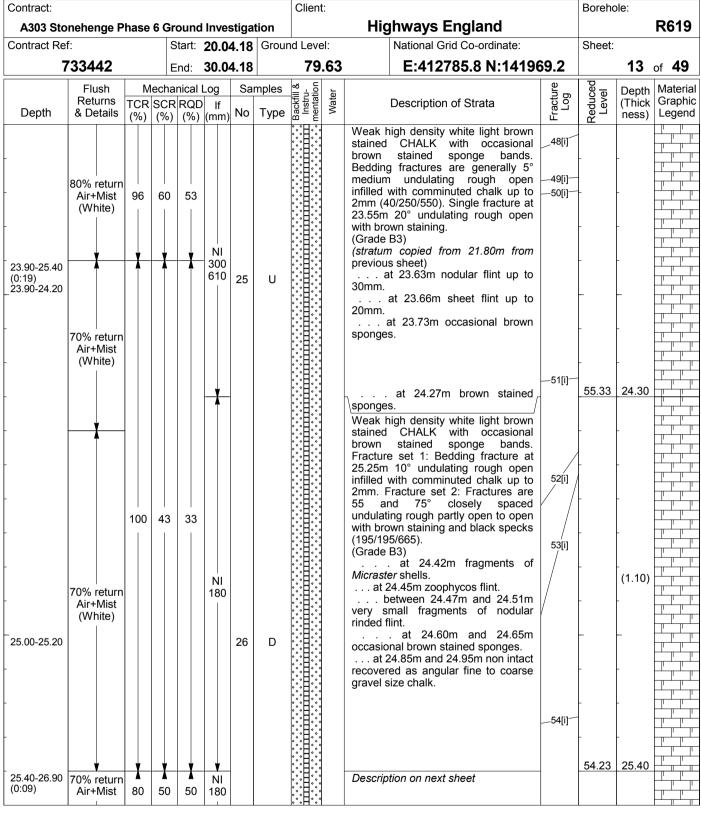
Contract:								Client	:			Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Inves	stigat	ion			<b>Highways England</b>				R619
Contract Re	f:		S	tart:	20.04	1.18	Grour	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.04	1.18		79.	.63	E:412785.8 N:14196	9.2		11	of <b>49</b>
	Flush	М	echar	nical L	_og	Sar	nples	tion ≡ ⊗	ē		ure	ced	Depth	Material
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Туре	Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	(Thick ness)	Graphic Legend
19.50-20.25 (0:15) 19.50-19.70	80% return Air+Mist (White)	100	43	15	NI 100 230	19 20	D			Weak high density white CHALK with rare flint nodules and bands. Fracture set 1: Fractures are 5-25° closely spaced planar to undulating rough partly open to open with black specks (80/200/1110). Fracture set 2: Fractures are 35-50° medium spaced planar rough partly open with black specks and brown staining (60/350/955). Fracture set 3: Fractures are 60-80° medium to widely spaced planar to undulating rough partly open to open with black specks and rare brown staining (170/300/740). (Grade B4) (stratum copied from 17.50m from previous sheet)  at 19.90m occasional brown stained sponges.	43[i] 44[i] —46[i] —45[i]		-	
20.25-20.70 - (0:10)	80% return Air+Mist (White)	67	11	0	ZI					No chalk recovered. Recovery consists of very strong black FLINT containing brown mottling recovered as angular gravel and cobbles. Possible flint band.		59.38	- (0.55)	<u> </u>
20.70-20.80 (0:10) 20.80-21.40 (0:12)	80% return Air+Mist (White)	80	0	0	*					Weak high density white CHALK. Recovered as angular gravel and cobbles of chalk.		58.83	20.80	
- 21.20-21.40	80% return Air+Mist (White)	33	0	0	NI 	21	D			at 21.00m very small fragments of rinded spikey flint.		-	_ (0.60)	
21.40-22.15 (0:08)	80% return Air+Mist	93	56	43	V NI					Description on next sheet		58.23	21.40	

2	[	Orilling Pro	gress and	Water 0	Observation	s			Cor	orali	Remarks		
פ	Date	Time	Borehole	_	Diameter	Water			Gei	lerari	Remarks		
5	24.0		Depth	Depth	(mm)	Depth							
אווא בוע, ווכמע כווונג - ביונא													
ŏ =							A	II dimen	sions in metre	es	Scale:	1:11	
Suncinio	Method Used:		ction pit + rry Cored	Pla Us		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:								Clien	t:			Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England				R619
Contract Re	f:		S	tart:	20.0	4.18	Grou	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	30.0				.63	E:412785.8 N:14196	9.2		12	of <b>49</b>
Depth	Flush Returns & Details		lecha SCR (%)	RQD		Sa No	mples Type	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
21.90-22.15 - - - 22.15-23.05 - (0:08)	(White)  80% return Air+Mist (White)		56	43	NI I	22	U			Weak high density white light brown stained CHALK with occasional brown stained sponge bands. Recovered as irregular cobbles of chalk.  (Grade B3)  (stratum copied from 21.40m from previous sheet)  at 21.70m fine to coarse fragments of prismatic Micraster shells.  between 21.75m and 21.88m occasional brown stained sponges.  Weak high density white light brown stained CHALK with occasional brown stained sponge bands. Bedding fractures are generally 5° medium undulating rough open infilled with comminuted chalk up to 2mm (40/250/550). Single fracture at 23.55m 20° undulating rough open		-	21.80	
22.75-23.05	80% return Air+Mist (White)	100	100	100	NI 300 610	23	U			23.55m 20° undulating rough open with brown staining. (Grade B3) between 22.25m and 22.43m bed of brown stained sponges.  between 22.80m and 22.90m occasional brown stained sponges.			-	
23.05-23.90 - (0:10) 23.15-23.35	80% return Air+Mist (White)	96	60	53	_	24	D				47[i]		(2.50)	

[	Drilling Pro	ogress and	Water O		S			Cor	oral l	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ici ai i	Nemaiks		
		,			•							
											4-44	
						A	II dimen	sions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plar Use		omacchio MC450	)	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS



	С	rilling Pro	ogress and	Water Ol	oservations	3			Cor	oral I	Remarks		
D	ate	Time	Borehole	•	Borehole Diameter	Water			Gei	iciai i	Remains		
			Depth	Depth	(mm)	Depth							
i													
							Al	l dimen	sions in metre	es	Scale:	1:11	
Me	thod		ction pit + ary Cored	Plan		macchio MC450		Drilled Bv:	Stuart Crawford	Logged	IFoster + BSaimen	Checked By:	VG6

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Litd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:59 | KJ2 |

### STRUCTURAL SOILS

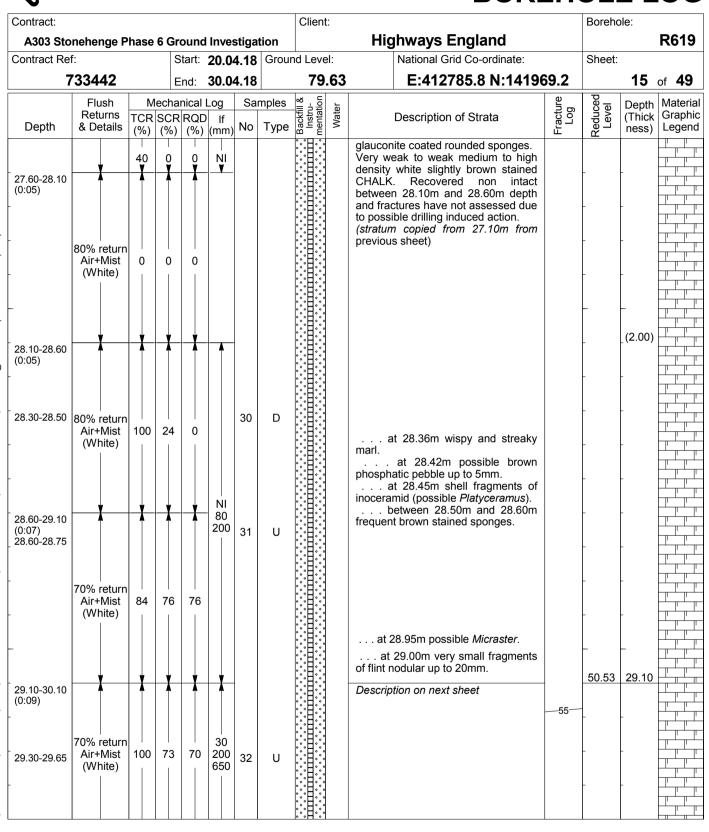
#### BOREHOLE LOG

am											BOR	EH	OLI		.OG
Contract:								Clien	t:				Boreho	ole:	
A303 Std	nehenge F	hase 6	Gro	und	Inves	stiga	tion			Hig	hways England				R619
Contract Re	f:		Sta	art:	20.04	4.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	733442		En	d: 🗧	30.04	4.18		79	.63		E:412785.8 N:1419	969.2		14	of <b>49</b>
Depth	Flush Returns & Details	TCR S	chani CR F	SUD	If	Sa No	mples Type	Backfill & Instru- nentation	Water		Description of Strata	Fracture	Reduced	Depth (Thick ness)	Material Graphic Legend
25.80-26.20	70% return Air+Mist (White)			50	NI 180 250	27	D	M E		occasio inoceral Recove have no drilling flints. (Grade (stratum previous at 2 (possibl groups of the stratum)	copied from 25.40m fron	7		(1.50)	
26.70-26.90						28	D			to coar 55mm.	26.55m and 26.61m small fine se fragments of flint up to		-	-	
26.90-27.10 (0:04)	80% return Air+Mist (White)	0	0	0	<b>_</b>					bet	ed zone of core loss. ween 26.90m and 27.10m no y. Driller notes clearing flints		52.73	_(0.20)	AZCL
27.10-27.60 (0:06) 27.30-27.50	80% return Air+Mist (White)	40	0	0		29	D			density CHALK betweer and frac to possi	eak to weak medium to high white slightly brown stained. Recovered non intact a 28.10m and 28.60m depth stures have not assessed due ble drilling induced action.	t t t	52.53	27.10	
											27.40m occasional rounded	i			

) [		Orilling Pro	gress and	Water O	bservations	6			Cor	oral [	Remarks		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	ierai i	Remains		
<u> </u>	_ 5.10		Depth	Depth	(mm)	Depth							
2													
,													
2													
3													
į													
3							Α	ll dimen	sions in metre	es	Scale:	1:11	
Or action.	Method Used:		ction pit + rry Cored	Plar Use		omacchio MC450		Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

brown stained sponges and

#### **BOREHOLE LOG**



,													
	Γ	Drilling Pro	ogress and	Water 0	Observation	S			Cor	acroll	Domorko		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	ierai	Remarks		
	Date	Tillie	Depth	Depth		Depth							
							A	II dimens	sions in metre	es	Scale:	1:11	
	Method		ction pit +	Pla			•	Drilled	0	Logged	IFoster +	Checked	
;	Used:	Rota	ary Cored	Us	ed: C	omacchio MC45	U	By:	Stuart Crawford	By:	BSaimen	By:	AGS

#### **BOREHOLE LOG**

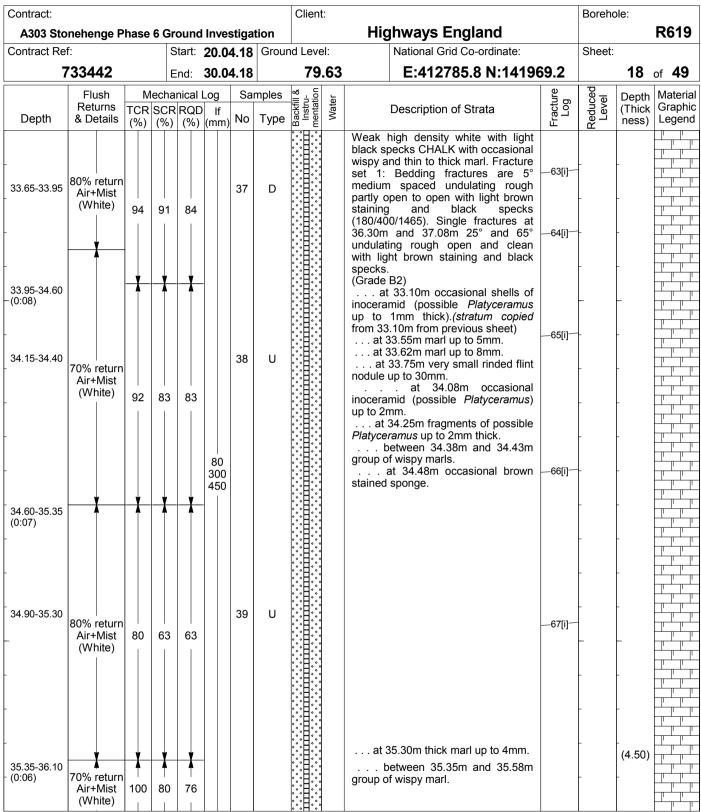
Contract:				0.0			- 41	4	Client:		Highwaya England	Boreh	ole:	D640
A303 Sto		nge P	nase						d Loval		Highways England  National Grid Co-ordinate:	Sheet:	,	R619
		40							nd Level			Sileet.		. 40
	7334					30.0			79.	ხა	E:412785.8 N:141969.2	1 70	1	of <b>49</b>
Depth	Ret	ush urns etails		echa SCR (%)	RQE		Sa No	mples Type	Backfill & Instru- mentatior	Water	Description of Strata  Facture Log	Reduced Level	Depth (Thick ness)	Materia Graphi Legend
29.80-30.10		return Mist nite)	100	73	70		33	D			Weak locally very weak high density white CHALK with occasional wispy marls. Fracture set 1: Bedding fractures are generally 5° closely and widely spaced undulating rough open with black specks (105/700/965). Fracture set 2: Fractures are 20-35° closely spaced undulating rough open with light brown staining (140/140/2000). Fracture set 3: Fractures are 50-60° medium spaced undulating rough partly open to open with black specks with light brown staining (530/720/1700). (Grade B3) (stratum copied from 29.10m from	-	-	
30.10-31.60 (0:06)			*	X	*						previous sheet) at 29.82m group of thin wispy marl at 29.93m locally chalk increases in strength - possible hard ground at 30.06m streaky marl at 30.17m very small rinded flint		_	
30.40-30.70						30 200 650	34	U			up to 30.7711 Very small finded limit up to 30mm at 30.20m group of thin wispy marl at 30.48m streaky marl.	-	(3.00)	
	Air+	return Mist nite)	100	75	62						at 30.85m wispy marl at 30.95m wispy marl at 31.00m very small nodular rinded flints.	- - -	-	
31.40-31.60							35	D			at 31.10m finger shaped flint at 31.30m streaky marl.	-	_	

	Drilling Pr	ogress and	Water O	bservations	3		Car	acroll	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water		Gei	ierari	Remarks		
Duto	1	Depth	Depth	(mm)	Depth						
						All dime	nsions in metre	es	Scale:	1:11	
Method		ection pit +	Plar		macchio MC450	Drilled	Stuart Crawford	Logged	IFoster + BSaimen	Checked	AGS

Contract:							_	Client:							Boreho	ole:	<b>D</b> ^
	nehenge l	Phase								Hig	hways E				01 1		R6
Contract Re			St				Grour	id Level			National Gr				Sheet:		
	733442		Eı	nd:	30.04	4.18		79.	63		E:4127	785.8 N	I:14196			17	of 4
Depth	Flush Returns & Details		lechar SCR (%)	RQD			nples Type	Backfill & Instru- mentation	Water		Description			Fracture Log	Reduced Level	Depth (Thick ness)	Mate Gra Leg
31.60-32.10 (0:05) 31.60-31.95	80% return	100	75 75 80	62	30 200 650	36	U			white C marls. fractures widely s with bl Fracture closely open (140/14)	cally very well that with Fracture so are general paced undulated specks set 2: Frac spaced unvith light 0/2000). For are 50-60	occasion set 1: ally 5° clo lating rou s (105/7 ctures are ndulating brown racture	al wispy Bedding sely and gh open 00/965). 20-35° rough staining set 3:	62[i]	-	-	
32.10-33.10 (0:08)	(White)		*	<b>X</b>	<b>X</b>					undulati with bla staining (Grade l (stratum previous a marl ar incornm	ng rough pa ck specks (530/720/17 33) copied fro	ortly open with ligh 700). om 29.10 creaky an al fragm ly platyce	to open to brown of brown from the distribution of the total to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open to open t		47.53	32.10	
	80% return Air+Mist (White)	10	0	0	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					consists containing as and	of very str of very str ng brown m ular grave flint band.	ong black ottling re	k FLINŤ covered			(1.00)	
33.10-33.95 (0:07)	80% return Air+Mist (White)	94	91	84	80 300 450					Descript	ion on next	sheet			46.53	33.10	
Dri	lling Progre		1		eserva						etween 33.4 nal streaky r	narl.	33.50m	rks	-	_	
Date	Time	epth	Casi Dep	- 1	Diame (mm	eter	Water Depth										
				Plant					A		ons in metre		Scale:		1:11		
Method	Inspection									Drilled		Logged	IFoste		Check	~~!	

	Drilling Pro	ogress and	Water Ob		3			Cor	orall	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lerari	Remarks		
						Α	II dimens	ions in metre	es	Scale:	1:11	
Method Used:		ction pit + ary Cored	Plan Use		omacchio MC450	)	Drilled By:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**



[	Drilling Pr	ogress and	Water Ob	oservations	s		Car	norali	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Gei	nerai	Remarks		
			•								
						All di	mensions in metro	es	Scale:	1:11	
Method		ection pit +	Plan		omacchio MC450	Dri	lled Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	۸G

06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk, | 08/08/18 - 12:59 | KJZ | GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:59 | KJ2 |

### STRUCTURAL SOILS

Contract:								Client	t:			Boreho	ole:	
A303 Sto	nehenge F	hase	6 Gr	ound	Inve	stiga	tion			Highways England				R619
Contract Ref	f:		s	tart:	20.0	4.18	Grou	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.0	4.18		79	.63	E:412785.8 N:14196	9.2		19	of <b>49</b>
Depth	Flush Returns & Details	TCR	echai	RQD	) If		mples Type	Backfill & Instru- mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Material Graphic Legend
35.50-35.80 - - - - - - - - - - - - - - - - - - -	70% return Air+Mist (White)	100	80   81	76	80 300 450	43	U	Reserve   Proceeding the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control o		Weak high density white with light black specks CHALK with occasional wispy and thin to thick marl. Fracture set 1: Bedding fractures are 5° medium spaced undulating rough partly open to open with light brown staining and black specks (180/400/1465). Single fractures at 36.30m and 37.08m 25° and 65° undulating rough open and clean with light brown staining and black specks. (Grade B2) at 33.10m occasional shells of inoceramid (possible <i>Platyceramus</i> up to 1mm thick).(stratum copied from 33.10m from previous sheet) at 35.50m full diameter inoceramid (possible <i>Platyceramus</i> ) at 35.67m fragments of inoceramid up to 4mm at 35.90m very small fragments of flint at 36.33m group of wispy marl at 36.50m wispy marl.	亡 —68[i]— 70	Re Re L	ness)	Legend
37.30-37.60						44	D			at 37.20m occasional brown stained sponge.	/ 71[i]	-	-	
-												_	-	

5	Г	Drilling Pro	ogress and	Water C	bservation	s			Cor	orol	Domarka		
פ	Date	Time	Borehole		Borehole Diameter	Water			Gei	lerai	Remarks		
<u> </u>			Depth	Depth	(mm)	Depth							
2													
ڕ													
₹													
2													
Ď													
Š													
2													
5						_ A	II dimen	sions in metre	es e	Scale:	1:11		
Oliucture	Method Used:	Inspe Rota	ction pit + ary Cored	Pla Use		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS

## ST

### STRUCTURAL SOILS

#### **BOREHOLE LOG**

Contract:								Client	t:				Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Hig	hways England				R619
Contract Ref	:		S	tart:	20.0	4.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.0	4.18		79	.63		E:412785.8 N:14196	<b>69.2</b>		20	of <b>49</b>
	Flush Returns		lecha SCR	nical	Log	Sai	mples Type	kfill & stru- itation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Materia Graphic
Depth	& Details	(%)	(%)	(%)	(mm)	No	Туре	Bac	>			Fra	Rec	ness)	Legeno
	<b>Y</b>	100	81 <b>Y</b>	81 <b>Y</b>	L V						37.50m occasional fragments ble <i>Platyceramus</i> up to 1mm		42.03	37.60	
37.60-39.10 (0:07) 37.60-37.90	Î			1	1	41	D			high de	ocally very weak medium to nsity CHALK. Fractures are sessed. Drilling marks are		_	_	
										visible jammed	on the core, possible flint in catcher. Possible drilling				
										orientate	fractures are randomly ed very closely spaced ng rough.		-	-	
										at	37.96m small fragments of rounded flint.		-	_	
										at 3	8.00m very small rinded. 38.00m and 38.50m thinning		-	-	
										a	t 38.03m small fragment of flint up to 50mm. 38.13m small fragments of	_72[i]	<u> </u>  -	-	
	80% return									rinded fl	int up to 50mm.		_	_	
38.40-38.70	Air+Mist (White)	93	70	63		42	D			at 3	8.33m wispy marl.		-	-	
													_	_	
					NI 								_	_	
													_	_	
													_	_	
										i	at 38.90m possible bivalve		_	(2.70)	
										spaced Latus).	ribs) (possible Spardylus		_		
39.10-40.60 (0:08)	<del>-  </del>		<b>X</b>	<b>X</b>	1	45	Б						_	_	
39.10-39.40						45	D				etween 39.16m and 39.28m wispy marl.		_	_	
	80% return Air+Mist (White)	100	13	0							etween 39.28m and 39.38m all brown sponges.		-	-	
										at 3	89.40m very small rinded flint		-	_	

{ [	Ε	Orilling Pro	gress and	Water C	bservation	s			Cor	orall	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lei ai i	Remarks		
d, 11644 Cilico			2 opu.	2000	()	2 opu.							
1 2 2		thed Diopt					Д	ll dimen	sions in metre	es	Scale:	1:11	
	Method Used:	Inspe Rota	ction pit + ry Cored	Pla Use		omacchio MC45	0	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 12:59 | KJ2 |

Contract:							Client:					Boreho	ole:	
A303 Sto	nehenge F	Phase 6	Groun	d Inves	stiga	tion		Hig	hways Englar	nd				R619
Contract Re	f:		Start	20.04	4.18	Grour	nd Level:		National Grid Co-or	dinate:		Sheet:		
7	733442		End:	30.04	4.18		79.63		E:412785.8 I	N:141969	.2		21	of <b>49</b>
Depth	Flush Returns & Details	TCR S	chanica CR RQ %) (%	D If		mples Type	Backfill & Instru- mentation Water		Description of Strat	a	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
40.50-40.60 40.60-42.10 (0:06)	80% return Air+Mist (White)	100	0 0		46	D		high de not as visible jammeo orientat undulati (Grade (stratun previou at up to 20	a copied from 37.6 s sheet) 39.53m very small rishm.  at 40.00m very small film up to 20mm and 39.80m non into at 40.10m very small film up to 30mm.  etween 40.12m and marl up to 3mm.  high density white occasional wispy le hard ground).	edium to tures are arks are sible flint le drilling randomly spaced som from anded flint led linded between act. all rinded la 40.20m		39.33	40.30	

	Drilling Pro	ogress and	Water Ob		3			Gor	narali	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ici ai i	- INCITIATINS		
			•									
							Il dimon	sions in metre	) c	Scale:	1:11	
Method	Inspe	ection pit +	Plan	t			Drilled	SIONS III MENE	Logged	Foster +	Checked	
Used:		ary Cored	Use		macchio MC450	)	Ву:	Stuart Crawford	By:	BSaimen	Ву:	AGS

### **BOREHOLE LOG**

Contract:							Client	:	Bo	orehole:	
A303 Sto	nehenge P	hase 6	Ground	d Inves	tigatio	n			Highways England		R619
Contract Re	f:		Start:	20.04	.18	Groun	d Leve	el:	National Grid Co-ordinate: Sh	neet:	
7	733442		End:	30.04				.63			2 of 49
Depth	Flush Returns & Details	TODIS	chanical CR RQE %) (%)	) it	Samp No T	ype	Backfill & Instru- mentation	Water	Description of Strata	Dep (Thi nes	ck   Graphic
42.10-42.85 (0:08)	60% return Air+Mist (White)  70% return Air+Mist (White)	0	0 0	NI					Assumed zone of core loss. (stratum copied from 40.60m from previous sheet)	- (2.2	AZCL
42.85-43.60 - (0:05) - 43.00-43.20	70% return Air+Mist (White)	100 1	00 100		47	D			Very weak locally weak white with black specks CHALK with rare inclusions of medium strong chalk gravel. Fractures are possibly drilling induced 5-55°. (LEWES NODULAR CHALK FORMATION Grade B3) at 43.00m inoceramid (possible Platyceramus).	5.78 42.8 - -	35

I	Drilling Pro	ogress and	Water Ol	servations	6			Car	a oral l	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai i	Remarks		
		Берит	Берш	(11111)	Верит							
						А	II dimen	sions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan		macchio MC450	)	Drilled Bv:	Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:	AGS

Contract:							Clien	t:			Boreho	le:	
A303 Sto	nehenge F	Phase 6	Groun	d Inve	stiga	tion			Highways England				R619
Contract Re	f:		Start:	20.0	4.18	Grour	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	733442		End:	30.0	4.18		79	.63	E:412785.8 N:141969.	2		23	of <b>49</b>
	Flush Returns	Med TCR S	chanical		Sa	mples	Backfill & Instru- mentation	Water	Description of Strata	Log	Reduced Level	Depth (Thick	Material Graphic
Depth	& Details			) (mm)	No	Туре	Bac men	>			Red	ness)	Legend
43.60-44.35 (0:06)	*	100 1	00 100						at 43.45m fragments of possible Platyceramus.  Very weak locally weak white with black specks CHALK with rare inclusions of medium strong chalk gravel. Fractures are possibly drilling induced 5-55°.		-	- (1.85)	
43.80-44.00	70% returr Air+Mist (White)		00 1000	NI	48	D			(LEWES NODULAR CHALK FORMATION Grade B3) (stratum copied from 42.85m from previous sheet) between 43.60m and 43.73m possible hard ground (medium strong chalk) at 43.80m occasional very small fragments of flint up to 20mm at 43.98m possible fragments of Platyceramus at 44.10m thin band of possible hardrock between 44.20m and 44.35m occasional shell fragments of		-	- - -	
44.35-44.70 (0:03) 44.60-44.70	60% return Air+Mist (White)		34 0		49	D			inoceramid (possible <i>Platyceramus</i> ) at 44.30m thin marl up to 1mm at 44.35m and 44.40m possible hard ground with slickensides between 44.45m and 44.55m non intact with very small fragments of flint at 44.50m very small fragments of flint (possible sheet flint up to 30mm thick).		- 34.93	44.70	
44.70-45.10 (0:05) - 44.90-45.10	60% return Air+Mist (White)		30 0	NI	50	D	0 0			3[i]— 4[i]—	-	-	
45.10-45.85 (0:05)	60% return Air+Mist (White)		25 17	NI 180					10mm between 44.86m and 44.90m very small fragments of nodular rinded flint at 44.95m thick marl up to 5mm at 45.00m group of thin marls up to 2mm between 45.10m and 45.44m non intact recovered as angular fine o coarse gravel size chalk and rinded nodular flint (possible flint band).		-	- (1.15) -	

	Orilling Pr	ogress and	Water Ob	servations	3	Cov	orali	Remarks	
Date	Time	Borehole		Borehole Diameter	Water	Gei	iciai i	Remaiks	
		Depth	Depth	(mm)	Depth				
						All dimensions in metre	es	Scale:	1:11
Method	Inspe	ection pit + ary Cored	Plan		macchio MC450	Drilled By: Stuart Crawford	Logged By:	IFoster + BSaimen	Checked By:

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### STRUCTURAL SOILS

#### **BOREHOLE LOG**

Contract:								Clie	ent:					Boreho	ole:	
A303 Sto	nehenge P	has	e 6 Gı	round	d Inve	stiga	tion				Hig	hways England				R619
Contract Re	f:			Start:	20.0	4.18	Groui	nd Le	vel	:		National Grid Co-ordinate:		Sheet:		
7	733442		E	End:	30.0	4.18		7	9.0	63		E:412785.8 N:1419	69.2		24	of <b>49</b>
	Flush		Mecha			Sa	mples	<b>≅</b> 2:	ation	ter			ture	iced /el	Depth	Materia
Depth	Returns & Details	TCF (%)	SCF (%)	(%)	If (mm)	No	Туре	Backfill & Instru-	ment	Water		Description of Strata	Fracture Log	Reduced Level	(Thick ness)	Graphic Legence
45.50-45.70	60% return				NI	51	D	• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·				75[i]	-	-	
	Air+Mist (White)	89	25	17	NI 180				• • • • • • • • • • • • • • • • • • • •			45.72m nodular lenticular flint Imm embedded in grey brown	—76[i] [—]	-	-	
45.85-46.60 (0:04)	X	<del>                                     </del>	<del>                                     </del>	<b>  X</b>	<b>  X</b>				••••••		white chembedo	at 45.77m nodular/lenticular nalk fragments upo to 10mm led in light grey and chalk. igh density white CHALK with		33.78	45.85	
								• • • • • • • • • • • • • • • • • • • •	`		occasio nodular fracture spaced	nal wispy and thick marl and flint. Fracture set 1: Bedding s are 5° closely to widely undulating rough partly open n clean or infilled with fine		-	-	
	60% return Air+Mist (White)	100	87	87							Fracture closely infilled (140/14 (LEWES FORMA	S NODULAR CHALK TION Grade B2)		_	-	
											group o with noo	etween 46.07m [°] and 46.28m f wispy thick marl up to 3mm Jular chalk. at 46.48m fragments of mid (possible <i>Platyceramus</i> ).		_	-	
46.60-48.10 (0:06) 46.65-47.05	T T	<del>                                     </del>			NI 300 450	52	U							-	-	
									• • • • • • • • • • • • • • • • • • • •					-	-	
	60% return	100	75	65							<b>.</b>	abuses 47.04m and 47.14mm		_	(2.25)	
	Air+Mist (White)	100	75	65							small fr 70mm.	etween 47.04m and 47.14m agments of rinded flint up to	_77[i]		-	
											at 4	7.20m marl up to 4mm.				
											at 4	.7.27m marl up to 3mm. .7.32m marl up to 5mm. etween 47.32m and 47.37m ed non intact as angular fine	78[i] [_] 79[i] [_]	† - -	- -	
												e fragments of chalk.				

	Drilling Pr	ogress and	Water Ol	oservations	6			Cor	oral I	Remarks		
Date	Time	Borehole		Borehole Diameter	Water			Gei	ierai i	Remarks		
		Depth	Depth	(mm)	Depth							
.												
						ΛII	dimone	iono in motro		Caalar	1.11	
						All	aimens	ions in metre	s	Scale:	1:11	
Method		ection pit + arv Cored	Plan		macchio MC450		Orilled	Stuart Crawford	Logged	lFoster + BSaimen	Checked	AGS

#### **BOREHOLE LOG**

													I		
Contract:								Clien	t:				Boreho	ile:	<b>D</b> 040
	nehenge P	hase 6								Hig	hways England				R619
Contract Re	f:		St	tart:	20.0	4.18	Grour	nd Lev	el:		National Grid Co-ordinate:		Sheet:		
7	733442		Er	nd:	30.0				.63		E:412785.8 N:1419	69.2		25	of <b>49</b>
Depth	Flush Returns & Details	Me TCR S (%)	echar SCR (%)	RQD	If	Sai No	mples Type	Backfill & Instru- mentation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth 47.60-47.80		(%)	75	65	NI 3000 450	53	Type D	9EQ (	M	Weak hoccasion nodular fracture spaced to oper chalk Fracture closely infilled (140/14 (LEWES FORMA (stratum previous a rinded floor in the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of	igh density white CHALK with nal wispy and thick marl and flint. Fracture set 1: Bedding s are 5° closely to widely undulating rough partly open n clean or infilled with fine fragments (100/280/1500). The set 2: Fractures are 15-25° spaced undulating open with fine fragments of chalk 0/1300). The set 2: Fractures are 15-25° spaced undulating open with fine fragments of chalk 0/1300). The set 2: Fractures are 15-25° spaced undulating open with fine fragments of chalk 0/1300). The set 2: Fracture are 15-25° spaced undulating open with fine fragments of chalk 0/1300). The set 2: Fracture are 15-25° spaced undulating copied from 45.85m from sheet) the set 27.74m and 47.82m and 47.82m and 47.82m and 47.95m thick marl up to 6mm.	-80[i]	-		

	Drilling Pro	ogress and	Water Ob		S			Gor	orall	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliains		
		Ворит	Ворит	(11111)	Верин							
						Δ	II dimen	sions in metre	es	Scale:	1:11	
Method Used:	Inspe Rota	t d: ^{Co}	omacchio MC45	)	Drilled By:	Stuart Crawford	Logged By:	lFoster + BSaimen	Checked By:	AGS		

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 5: R620 Borehole Log

#### BORFHOLF LOG

0-										BOILL			
Contract:								Client	t:		Boreh	ole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Inves	stiga	tion			Highways England			R620
Contract Re	ntract Ref: Start: 25.04.18								el:	National Grid Co-ordinate:	Sheet		
•	733442 End: 30.04.18							79	.62	E:412752.2 N:141959.2		1	of <b>47</b>
	Flush Mechanical Log Samp					Sa	mples	⊩ ⊩ tion	Ē	e,	ced	Depth	Material
Depth	Flush Mechanica Returns TCR SCR RC					No	Туре	Backfill & Instrumentation	Water	Description of Strata	Reduc	(Thick ness)	Graphic Legend
	Depth & Details (%) (%) (%) (mm) NO 1												
											-	-	

1	Depth	& Deta		SCR (%)	RQD (%)	If (mm)	No	Туре	Backf	menta	Description	of Strata	a 	Fract	Redu	(Thick ness)	Gi Le
Sand is fine to coarse. Grayed is subangular to subrounded fine to coarse of chalk and flint.   79.932   0.30															-	-	
1									· · · · · · · · · · · · · · · · · · ·		Sand is fine to c subangular to sub	oarse. G rounded	Gravel is		-	(0.30)	
1									***		fine to coarse Sangular to subrounce flint and challed	AND. G led fine to lk. PC	ravel is o coarse			(0.20)	.0
1.20-2.70	_										Cream to pale brow silty fine to coarse cobble content. Gra subrounded fine to chalk. Cobbles an subrounded flin	rn slightly SAND avel is ar coarse e suban t. PC	with low ngular to flint and gular to		79.12	-	×
Date   Time   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth		retur Wate	n er 60	0	0						subrounded GRA\ angular to subrounce white chalk and flin coarse. POSSIBL\	/EL. Gi led fine to t. Sand i	ravel is o coarse is fine to	-	78.42	1.20	
Date   Time   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth   Depth		rilling Prod	gress and	d Wate	er Ob	servat	tions		П	•			_				
26/04/18	Date	Time	Borehole Depth	Cas	sing pth	Boreh Diame (mm	ole eter 1)	Water Depth	<u> </u>		ation CAT scanned pric	or to exca	vation.				
All dimensions in metres Scale: 1:11	26/04/18 26/04/18 27/04/18 27/04/18 30/04/18	08:20 17:30 09:00 16:30 08:30	6.40 21.15 21.15 42.30 42.30	1.7 12. 12. 12. 12.	70 .10 .10 .10 .10	146 146 146 146 146		5.20 9.72 5.90 21.40 5.10	3 4 5	3. Han 4. No g 5. Bore flush	d dug inspection pit to roundwater strikes not hole drilled using a 14 medium.	1.20m de ted by the 6mm ged	epth on 27 e driller. obore S co	/03/201 ore barre	el and ai	r mist a	s the
Method   Inspection pit +   Plant   Drilled   Logged   IFoster +   Checked	30/04/18 Method				.10 Plant			5.20			All dimensions in metre	es Logged	Scale:	or +	1	ed	

	Orilling Pro	gress and	Water Ob	servations	6
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/04/18	17:00	6.40	1.70	146	5.20
26/04/18	08:20	6.40	1.70	146	5.20
26/04/18	17:30	21.15	12.10	146	9.72
27/04/18	09:00	21.15	12.10	146	5.90
27/04/18	16:30	42.30	12.10	146	21.40
30/04/18	08:30	42.30	12.10	146	5.10
30/04/18	16:00	48.30	12.10	146	5.20

#### **General Remarks**

- Location CAT scanned prior to excavation.
   Inspection pit excavated by Archaeologists to 0.90m.
   Hand dug inspection pit to 1.20m depth on 27/03/2018.
- 4. No groundwater strikes noted by the driller.
  5. Borehole drilled using a 146mm geobore S core barrel and air mist as the flush medium.

  6. 50mm PVC groundwater monitoring pipe installed as shown.



GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Litd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

Contract:		_		_				Clier	nt:	Highwaya Fugued	Boreho		DCOO
	nehenge P	nase						nd 1 5:	ıol:	Highways England  National Grid Co-ordinate:	Chast		R620
Contract Ref							Groui				Sheet:	•	. 47
/	33442				30.04				9.62	E:412752.2 N:141959.2	 		of <b>47</b>
Depth	Flush Returns & Details	TCR	echan SCR F	RQD	_og If (mm)	Sai No	mples Type	Sackfill & Instru-	Water	Description of Strata	Reduced Level	(Thick	Material Graphic Legend
	100% return Water (White)	60	0	0	(mm)		Турс			Brown sandy silty angular to subrounded GRAVEL. Gravel is angular to subrounded fine to coarse white chalk and flint. Sand is fine to coarse. POSSIBLY PHOSPHATIC CHALK. (stratum copied from 1.20m from previous sheet)		(1.50)	
2.70-4.20 (0:01)	100% return Water (White)	100	0							at 2.60m small cobble sized flint up to 60mm.  Structureless CHALK composed of slightly sandy silty subangular to rounded GRAVEL of white medium density chalk. Gravel is subangular to rounded fine to coarse medium to high density chalk. (Grade Dc)	76.92	2.70	
3.40-3.60						5	D					-	

	Drilling Pr	ogress and	Water O	oservations	3		Co	norali	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water		Ge	nerari	Remarks		
Date	1	Depth	Depth	(mm)	Depth						
						All dime	nsions in metr	es	Scale:	1:11	
Method		ection pit +	Plar		nacchio MC450-P1	Drille	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	VG6

### **BOREHOLE LOG**

Contract:						Clier	nt:		Boreh		
A303 Sto	nehenge P	hase 6						Highways England			R620
Contract Re	f:		Start:	25.04.18	Grou			National Grid Co-ordinate:	Sheet		
7	733442		End:	30.04.18			9.62	E:412752.2 N:141959.2		3	of <b>47</b>
Depth	Flush Returns & Details	TCRS	chanical SCR RQI (%) (%)	Log Sa	mples Type	Backfill & Instru-	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
-	100% return Water (White)	100	0 0					Structureless CHALK composed of slightly sandy silty subangular to rounded GRAVEL of white medium density chalk. Gravel is subangular to rounded fine to coarse medium to high density chalk. (Grade Dc) (stratum copied from 2.70m from previous sheet)	-		
4.20-4.90 (0:01)	100% return Water (White)	86	0 0					at 4.70m very small nodular rinded flint up to 20mm.	-	(3.70)	
4.90-6.40 (0:01)	100% return Air+Mist (White)	100	0 0						-	-	

[	Drilling Pro	ogress and	Water C	bservation	S			Car	oral l	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks		
Date	Tillic	Depth	Depth	(mm)	Depth							
						А	II dimens	ions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Pla		nacchio MC450-	P1	Drilled Bv:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

Contract:								Clier	nt:				Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Invest	gation	1			Hiç	hways England				R620
Contract Re	f:		S	tart:	25.04.	<b>18</b> G	roun	nd Lev	el:		National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	30.04.				9.62		E:412752.2 N:1419	59.2		4	of <b>47</b>
Depth	Flush Returns & Details	TCR	echar SCR (%)	RQD	) If	Sampl	es ⁄pe	Backfill & Instru-	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Graphi
	100%									slightly rounded density to round high de (Grade (stratum previou	reless CHALK composed of sandy silty subangular to d GRAVEL of white medium chalk. Gravel is subangular ded fine to coarse medium to nsity chalk.  Dc)  n copied from 2.70m from s sheet) elow 5.60m chalk fragments k high density.		-	-	
6.00-6.20	return Air+Mist (White)	100	0	0		6 I	O						-	_	
6.40-7.15 (0:01)	*	*	*	<b>X</b>	_					CHALK orientat spaced to mo			73.22	6.40	
	70% return Air+Mist (White)	100	0	0						(Olado			-	-	
7.15-7.90 (0:01)	65% return	*	X	<b>X</b>						at ī	7.10m very small rinded flint.		-	(1.50)	
	Air+Mist (White)	87	0	0									_	-	

[	Drilling Pro	ogress and	Water Ol		3			Gor	oral I	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliains		
		,			•							
											4-44	
						A	II dimens	ions in metre	es	Scale:	1:11	
Method Used:	Inspection pit + Plant Used: Comacchio					P1	Drilled By:	Lee Harris	Logged By:	lFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Fuil Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE PHASE_6 GROUND_INVESTIGATION. GPJ - v8_06. Structural Soils Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk, | 08/08/18 - 13:25 | KJ2 |

Contract:	• • • • • • • • • • • • • • • • •	-								Clien	t:	Highwaya England	Boreho	ole:	R620
Contract Re	onehenge	P	nase				investi 25.04.	_		nd I ev	ما٠	Highways England  National Grid Co-ordinate:	Sheet:		K02U
	 733442						25.04. 30.04.				62	E:412752.2 N:141959.2	Oncot.		of <b>47</b>
	Flush	_											   0		1
Depth	Returns & Detail	s	TCR	lech SCI (%	RR	QD	If	lo	Type	Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Graphic
7.50-7.70	65% retu Air+Mis (White)	t	87	0	(	0		7	D			Very weak medium density white CHALK. Fractures are randomly orientated extremely to very closely spaced undulating rough partly open to moderately wide infilled with comminuted chalk up to 3.5mm with brown staining. (Grade C5) (stratum copied from 6.40m from previous sheet)	71.72	7.90	
7.90-9.40 (0:01)				***************************************								Structureless CHALK composed of slightly sandy silty angular to subangular fine to coarse GRAVEL. Gravel is medium density white chalk and rare flint. (Grade Dc)		-	
	50% retu Air+Mis (Brown	st )	60	0								at 8.90m very small fragment of flint.		- -(2.25)	
9.40-10.15 (0:01)	50% retu Air+Mis	ırn t	<b>4</b> 0	0		0					•	at 9.40m small rinded flint up to 55mm.			



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

#### **DRAFT**

Contract:						Client	:				Boreho		
A303 Sto	nehenge P	hase 6							ys England				R620
Contract Ref	f:		Start:	25.04.18	Groui	nd Leve	l:	Nation	nal Grid Co-ordinate:		Sheet:		
7	33442		End:	30.04.18		79.		E:4	412752.2 N:1419	59.2		6	of <b>47</b>
Depth	Flush Returns & Details	TCRS	chanical SCR RQI (%) (%)	) If	mples Type	Backfill & Instru- mentation	Water	Descri	iption of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	(White) 50% return Air+Mist (White)		0 0					slightly sand subangular fin Gravel is medi and rare flint. (Grade Dc) (stratum copic previous sheet	CHALK composed of ly silty angular to le to coarse GRAVEL. ium density white chalk led from 7.90m from t)  Covery. Recovery		69.47	10.15	
	50% return Air+Mist (Brown)	67	0 0					comprises s composed of sandy SILT. medium de subangular to evidence discontinuities. (Grade Dm)	structureless CHALK cream slightly gravelly Gravel is very weak ensity white with o subrounded. No of bedding or		-	- - - - - -(1.31)	
10.90-11.65 (0:01)	*	<b>X</b>	<del>                                     </del>						al very small fragments up to 40mm (possible		_	-	
11.20-11.40	50% return Air+Mist (White)	40	0 0	NI 40 130 8	D						-	-	
								Description on	next sheet	1[i]	68.16	11.46	

ſ	Drilling Pro	ogress and	Water Ob	servations	3		Cor	aorol [	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Gei	lerai i	Telliains		
						All dimensions	s in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan Used		nacchio MC450-P1	Drilled By: Le	ee Harris	Logged By:	lFoster + BSaimen	Checked Bv:	AGS

### S S

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

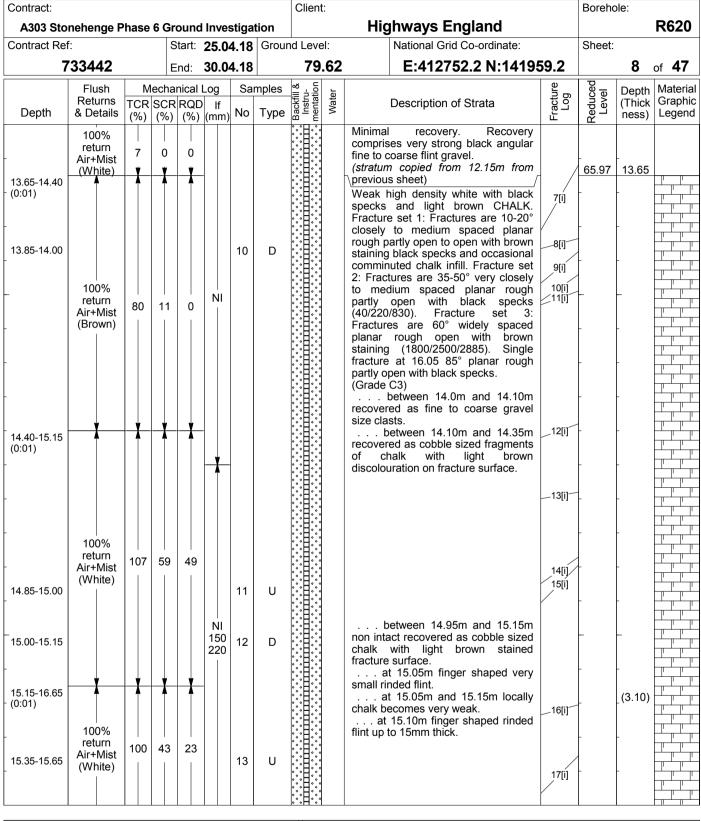
#### STRUCTURAL SOILS

Contract:								Client	t:		Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inves	tiga	tion			Highways England			R620
Contract Re	f:		S	tart:	25.04	.18	Grour	nd Leve	el:	National Grid Co-ordinate:	Sheet:		
7	733442		E	nd:	30.04	.18		79	.62	E:412752.2 N:141959.2		7	of <b>47</b>
Depth	Flush Returns & Details		SCR (%)	RQD	lf		mples Type	Backfill & Instru- mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth  11.65-12.15 - (0:01) 11.65-11.85 - (0:01) - (0:01)		TCR (%) 40 40 80	SCR (%) 0 1 24	RQD (%) 0	NI 40 130	9	Type D	**************************************	Wat	Partial recovery. Recovery comprises very weak medium density white black specks CHALK. Fracture set 1: Bedding fractures are 5° closely spaced planar and undulating rough open with brown discolouration and frequent comminuted chalk infill (40/60/350). Fracture set 2: Fractures are 25-45° closely spaced undulating rough partly open with black specks and are comminuted chalk infill. (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/215). (120/140/21	67.47		
	100% return Air+Mist (White)	7	0	0	NI -						-	_ (1.50)	

Ι	Drilling Pro	gress and	Water Ob		S			Gar	naral l	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliaiks		
		Ворит	Ворит	(11111)	Ворит							
						A	II dimensi	ons in metre	es .	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan Use		nacchio MC450-l	21	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION GPJ - v8_06.
Structural Soils Ltd, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk, | 08/08/18 - 13:25 | KJ2 |
Structural Soils Ltd, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk, | 08/08/18 - 13:25 | KJ2 |

#### STRUCTURAL SOILS



I	Drilling Pr	ogress and	Water Ol	oservations	S			Car	aarali	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai	Remarks		
		Ворин	Ворит	(11111)	Ворит							
						A	All dimens	ions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan		nacchio MC450-l	P1	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

### STRUCTURAL SOILS

Contract:								Client	t:				Boreho	ole:	
A303 Sto	nehenge P	hase 6	Gro	und	Inves	stiga	tion			Hig	hways England				R620
Contract Ref	f:		St	art:	25.04	1.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		Er	nd: 🤅	30.04				.62		E:412752.2 N:1419	59.2		9	of <b>47</b>
Depth	Flush Returns & Details	TCR S	echan SCR (%)	ROD	If	Sar	mples Type	Backfill & Instru-mentation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphic Legenc
16.45-16.65	100% return Air+Mist (White)		43	23	NI 150 220	14	D			specks Fracture closely rough p staining commin 2: Fract to med partly (40/220 Fracture planar staining fracture partly o (Grade (stratun previous b non in coarse and cha b medium 60mm (	es are 60° widely spaced rough open with brown (1800/2500/2885). Single at 16.05 85° planar rough pen with black specks.	18[i] 19[i] 20[i] 21[i] 22[i]	-	-	
16.65-18.15 (0:01) 16.65-16.85	<b>X</b>	X	*	<b>X</b>	*	15	D			density brown	eak to weak medium to high CHALK with occasional stained sponges and rare		62.87	16.75	
	100% return Air+Mist (Brown)	100	65	55	NI 225 440					are 5-2 undulatiopen woccasio fragmer set 2: widely striated occasio (200/40 16.93m light b specks. (Grade	0/1530). Single fracture at 40° planar rough open with rown staining and black	24[i] 25[i] 26[i]		-	

I	Drilling Pro	gress and	Water Ob		3			Gor	oral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	iciai i	Nemaiks		
		Depth	Depth	(mm)	Depth							
						Α .	II dimensi	ons in metre	es	Scale:	1:11	
Method Used:		ction pit + rry Cored	Plan Use		nacchio MC450-	.P1	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

# STR

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

#### STRUCTURAL SOILS

Contract:								Clien	t:			Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England				R620
Contract Re	f:		S	tart:	25.0	4.18	Groui	nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	733442		E	nd:	30.0	4.18		79	.62	E:412752.2 N:1419	59.2		10	of <b>47</b>
Depth	Flush Returns & Details	TCD	echa	DOL	14		mples Type	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Materia Graphic Legend
18.05-18.15 18.15-19.65 (0:01) 18.15-18.25	100% return Air+Mist (Brown)	100	65	555	-	16	D D			between 17.25m and 17.40m occasional brown stained sponges. Very weak to weak medium to high density CHALK with occasional brown stained sponges and rare echinoids. Fracture set 1: Fractures are 5-20° medium to widely spaced undulating rough open to moderately open with rare brown staining and occasionally infilled with chalk fragments (140/550/1480). Fracture set 2: Fractures are medium to widely spaced undulating rough to striated open with black specks and occasional slickensides (200/400/1530). Single fracture at 16.93m 40° planar rough open with light brown staining and black specks. (Grade C2) (stratum copied from 16.75m from previous sheet) between 17.50m and 17.62m	—27[i]—	-	-	
19.00-19.20	100% return Air+Mist (Brown)	87	50	50	NI 225 440	18	D			brown stained sponges at 17.60m fragments of echinoids (possible <i>Micraster</i> ) between 17.70m and 17.82m brown stained sponges at 18.00m fragments of inflated echinoids, possible <i>Micraster</i> .  between 18.65m and 18.85m recovered as angular fine to coarse gravel sized chalk and flint between 18.80m and 18.85m possible minor fault with polished and slickensided surface.	_29[i] 30[i]		(4.40)	
										between 19.22m and 19.35m possible minor fault with polished and slickensided surface.	31[i] 32[i]	-	-	

[	Drilling Pro	ogress and	Water Ol		3			Gor	oral I	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	iciai i	Ciliains		
		,			•							
											4-44	
						A	II dimens	ions in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plan Use		nacchio MC450-l	P1	Drilled By:	Lee Harris	Logged By:	lFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

Contract:								Clien	t:				Boreho		
A303 Sto	nehenge P	hase	6 Gro	ound	Inves	stiga	tion			Hig	hways England				R620
Contract Ref	:		S	tart:	25.0	4.18	Groui	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.0	4.18		79	.62		E:412752.2 N:1419	59.2		11	of <b>47</b>
Donth	Flush Returns	TCR	echar SCR	P∩D	lf.		mples	Backfill & Instru-mentation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Graphic
Depth  19.65-20.55 (0:01) 19.65-20.00	* Details  100% return Air+Mist (Brown)	87	50	50	(mm)	19	Type U			density brown echinoid are 5-20 undulati	eak to weak medium to high CHALK with occasional stained sponges and rare ls. Fracture set 1: Fractures 0° medium to widely spaced ng rough open to moderately ith rare brown staining and	Ľ.	- - - -	ness)	Legend
-	100% return									occasio fragmer set 2: widely striated occasio (200/40 16.93m light b specks.	nally infilled with chalk tts (140/550/1480). Fracture Fractures are medium to spaced undulating rough to open with black specks and slickensides 0/1530). Single fracture at 40° planar rough open with rown staining and black		-	-	
20.20-20.40	Air+Mist (White)	100	99	99	NI 225 440	20	D			previous at up to 1n	copied from 16.75m from s sheet) 19.68m group of wispy marl		-	-	
20.55-21.15 (0:01) 20.60-20.80	100% return Air+Mist	100	70	60		21	D			a sponges	at 20.67m occasional brown	_33[i]	-	-	
-	(White)		,							at of rinde	20.90m very small fragments I nodular flint.		58.47	- 21 15	
21.15-22.65 (0:01)	100% return	Å	Å	- A	NI					Descrip	ion on next sheet		-	-	
21.35-21.50	Air+Mist (White)	100	84	80	750	22	D						-	-	

5	Г	Orilling Pro	ogress and	Water O	bservations	S			Cor	oral	Remarks		
2	Date	Time	Borehole		Borehole Diameter	Water			Gei	lerari	Remarks		
<u> </u>	Duto	11110	Depth	Depth	(mm)	Depth							
2 □													
ί													
5													
מ													
-													
2													
5							Α	II dimens	ions in metre	s	Scale:	1:11	
Oliucture	Method Used:	Inspe Rota	ction pit + ary Cored	Plar Use		nacchio MC450	-P1	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

Contract:				Client:		Borehole:	
A303 Stonehenge Phase	6 Ground I	nvestigatio	on		Highways England		R620
Contract Ref:	Start: 2	5.04.18	Groun	d Level:	National Grid Co-ordinate:	Sheet:	
733442	End: 3	0.04.18		79.62	E:412752.2 N:141959.2	12	of <b>47</b>
Flush M	echanical Lo	og Samp	ples	er tion	e n	Dept	h Material
Depth Returns TCR (%)	echanical Lo SCR RQD (%) (%) (ı	lf mm) No T	Туре	Backfill & Instru- mentatio Water	Description of Strata	Dept Code (Thick ness	k Graphic
22.15-22.40	81 78	NI 240 750 24	U		Weak high density white black specks CHALK with rare brown stained sponges and rare wispy marls. Fracture set 1: Bedding fractures are 5-25° medium to widely spaced planar rough and undulating rough partly open to open with black specks and brown staining (230/800/1990). Fracture set 2: Fractures are 40-50° closely to widely spaced undulating rough and planar rough partly open to open with brown staining and black specks (50/400/2725). Fracture set 3: Fractures are 60-70° widely spaced open with black specks and brown staining (900/1200/4935) (Grade C2) (stratum copied from 21.15m from previous sheet)  at 22.50m very small nodular flint.  38[i]		

# ST

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

### STRUCTURAL SOILS

											DOM				
Contract:								Client	t:				Boreho		
A303 Sto	nehenge P	hase								Hiç	hways England				R620
Contract Ref	f:		S	tart:	25.0	4.18	Grour	nd Leve	el:		National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.0	4.18		79	.62		E:412752.2 N:1419	59.2		13	of <b>47</b>
Depth	Flush Returns & Details	M TCR (%)	echai SCR (%)	nical RQD (%)	Log If (mm)	Sa No	mples Type	Backfill & Instru- nentation	Water		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
23.75-23.90	100% return Air+Mist (White)	100	81	78		25	D	U		specks stained marls. fracture spaced rough p specks (230/80 Fracture widely s planar r brown (50/400 Fracture open w	high density white black CHALK with rare brown sponges and rare wispy Fracture set 1: Bedding s are 5-25° medium to widely planar rough and undulating artly open to open with black and brown staining 0/1990). Fracture set 2: es are 40-50° closely to spaced undulating rough and ough partly open to open with staining and black specks /2725). Fracture set 3: es are 60-70° widely spaced ith black specks and brown (900/1200/4935)	40[i]	-	-	
24.15-25.65 (0:01) 24.25-24.55	*	*	*	<b>X</b>	-	26	U			(Grade (stratun previou at 2			-	-	
-					NI 240 750						at 24.48m fragments of ds (possible micraster).	—41[i]—	-	-	
-	100% return Air+Mist (White)	100	100	63						a nodular	at 24.85m very small rinded flint.		-	-	
-										at 2	25.02m brown sponges.	—42[i]—	-	-	
25.35-25.55						27	D						_	-	

		Drilling Pro	ogress and	Water	Observation	S	General Remarks						
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks		
L	Date	Tillic	Depth	Depth		Depth							
							Α	II dimens	ons in metre	es	Scale:	1:11	
	Method Used:					nacchio MC450-	P1	Drilled Bv:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

#### **BOREHOLE LOG**

e Phase		ound	Invos						
	1 -		111403	stigat	ion			Highways England	R62
Contract Ref: Start: 25.04.18 Ground Find: 30.04.18							el:	National Grid Co-ordinate: Sheet:	
2	Eı	nd:	30.04	4.18		79.62		E:412752.2 N:141959.2	of <b>4</b>
М	Mechanical		Log	Sar	nples	er tion		pe Dep	h Mate
TCR (%)	SCR (%)	RQD (%)	If (mm)	No	Туре	Backfi Instru mental	Water	Description of Strata   향이 등 등 이 기 기 기 기 기 기 기 기 기 기 기 기 기 기 기 기	k ∣ Grap
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				29	U			47[i]	
1 100	73	60		30	D			at 27.15m thin marl up to 2mm and wispy marl.	
	ils (%) of 100 st 100 st 2) A of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100 of 100	100 100 st	100 100 63 100 100 63 100 100 63 100 100 63 100 100 63	100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 63 100 100 100 63 100 100 100 100 100 100 100 100 100 100	28	1 100 100 63	28 D  87 47 45  NI 240 750  29 U	(%) (%) (%) (%) (Mm) (8 19)	100   100   63

	Drilling Pr	rogress and	Water Ol	oservation	s			Cor	noral !	Remarks		
Date	Time	Borehole		Borehole Diameter	Water			Gei	lerai r	Remains		
		Depth	Depth	(mm)	Depth							
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				!		All	dimens	ions in metre	es	Scale:	1:11	
Method		pection pit +	Plan		macchio MC450-F		Orilled	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

eturns TCR So (%) (4		25.0d 30.0d Log ) If (mm)	4.18 4.18 Sai	Groun	d Level:  79.62  Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- 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Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Instin- Insti	Weak specks stained marls. fractures spaced rough paspecks (230/800 Fracture widely splanar rough with the staining (Grade (stratum previous sponges	E:4127s  Description of thigh density CHALK will sponges and Fracture sets are 5-25° m planar rough artly open to and brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown 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Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fracture   Fr	Sheet:		Mate
Dush Eturns Details (%) (%)  00% Eturn + Mist	End: chanical GCR RQE (%) (%)	Log Log If (mm)	<b>4.18</b> Sai	mples Type	79.62  10.0000000000000000000000000000000000	Weak specks stained marls. fractures spaced rough paspecks (230/800 Fracture widely splanar rough fracture open wistaining (Grade (stratum previous sponges	E:4127s  Description of thigh density CHALK will sponges and Fracture sets are 5-25° m planar rough artly open to and brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown brown br	of Strata  y white black th rare brown nd rare wispy et 1: Bedding nedium to widely and undulating open with black own staining acture set 2: 50° closely to ating rough and open to open with black specks cture set 3: y widely spaced cks and brown 035)  m 21.15m from	Fracture Log		Depth (Thick	Mate
Dush Eturns Details (%) (%)  00% Eturn + Mist	chanical GCR RQE (%) (%)	Log If (mm)	Sa No	mples Type	Backfill & Institution   Water	Weak specks stained marls. fractures spaced rough paspecks (230/800 Fracture widely splanar rough fracture open wistaining (Grade (stratum previous sponges	high density CHALK with sponges an Fracture sees are 5-25° m planar rough artly open to and br 0/1990). Fracts are 40-5 spaced undula br 2725). Fracts are 60-70° ith black spec (900/1200/49 C2) c copied from a sheet) at 27.50m oc.	of Strata  y white black th rare brown nd rare wispy et 1: Bedding nedium to widely and undulating open with black own staining acture set 2: 50° closely to ating rough and ben to open with black specks cture set 3: widely spaced ccks and brown 135)  m 21.15m from	Fracture Log	Reduced	Depth (Thick	Mate
oow eturn +Mist	SCR RQE (%) (%)	If (mm)	No			Weak specks stained marls. fractures spaced rough properties (230/800 Fracture widely splanar robrown (50/400/ Fracture open wistaining (Grade (stratum previous sponges	high density CHALK wii sponges at Fracture sets are 5-25° m planar rough artly open to and bro/1990). Fraces are 40-5 spaced undula pattaining and 12725). Fraces are 60-70° ith black spec (900/1200/49C2) ocopied from 5 s sheet) at 27.50m ocos.	y white black th rare brown nd rare wispy et 1: Bedding nedium to widely and undulating open with black own staining acture set 2: 50° closely to ating rough and pen to open with black specks cture set 3: 2° widely spaced ecks and brown 1335) m 21.15m from	—49[i]—	Reduced	(Thick	Grap
00% eturn ++Mist 100 7						specks stained marls. fractures spaced rough pi specks (230/800 Fracture widely s planar r brown (50/400/ Fracture open wi staining (Grade ( stratum previous sponges	CHALK wii sponges at Fracture sets are 5-25° m planar rough and bro/1990). Fraces are 40-5 spaced undulational partly open staining and 12725). Fraces are 60-70° ith black spec (900/1200/49C2) ocopied from sets sheet) at 27.50m ocos.	th rare brown nd rare wispy et 1: Bedding ledium to widely and undulating open with black own staining acture set 2: 50° closely to ating rough and ben to open with black specks cture set 3: widely spaced ecks and brown 135) m 21.15m from		-	-	
					l.°.∏°.1	flint.		I rinded nodular		-	_	
00%	* *	NI 240 750	32	D		inccerar concent possible	nids with thir ric ribs and Platyceramu it 28.50m ve	n slightly rinded I growth lines,		-	-	
++Mist /hite)	89 87		33	U					51[i]	-	-	
Progress and W	Vater Oh	serva	tions									
Borehole (		Boreh	nole	Water			Gen	erai Rema	arks			
etu (+) (h	ogress and V	ogress and Water Ot  Borehole Casing	ogress and Water Observa  Borehole Casing Borel	ogress and Water Observations  Borehole Casing Borehole Diameter	ogress and Water Observations  Borehole Casing Borehole Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Diameter Diameter	ogress and Water Observations  Borehole Casing Borehole Diameter Water Diameter Water	ogress and Water Observations  Borehole Casing Borehole Diameter Water Diameter Water

	Drilling Pro	ogress and	Water Ob		3	General Remarks						
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lerari	Remarks		
						A	ll dimensi	ons in metre	es	Scale:	1:11	
Method Used:	Inspection pit + Plant Used: Comacchio MC450				P1	Drilled By:	Lee Harris	Logged By:	lFoster + BSaimen	Checked By:	AGS	

# ST

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

## STRUCTURAL SOILS

Contract:			Client				Boreho		
A303 Stonehenge P	hase 6 Grour	nd Investigat	on	Hiç	hways England			F	R620
Contract Ref:	Start	t: <b>25.04.18</b>	Ground Leve	l:	National Grid Co-ordinate:		Sheet:		
733442	End:	: <b>30.04.18</b>	79	.62	E:412752.2 N:1419	59.2		<b>16</b> o	of <b>47</b>
Flush Returns Depth & Details	Mechanica TCR SCR RC (%) (%) (%	OD If	Backfill & Backfill & mentation	Water	Description of Strata	Fracture Log	Reduced Level	(Thick	Material Graphic Legend
100% return Air+Mist (White)  30.15-31.65 (0:01)  100% return Air+Mist (Brown)	100 90 8	NI 240 750 87   V	<u>■                                    </u>	Weak specks stained marls. fracture spaced rough paper specks (230/80 Fracture open widely planar ribrown (50/400 Fracture open with staining (Grade (strature open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open with staining open w	10/1990). Fracture set 2: es are 40-50° closely to spaced undulating rough and rough partly open to open with staining and black specks (2725). Fracture set 3: es are 60-70° widely spaced with black specks and brown (1900/1200/4935) C2) In copied from 21.15m from sheet) 29.60m fragments of possible ramus.  high density white with sheat black specks CHALK. In the set 1: Bedding fractures are medium to widely spaced ing rough partly open with specks (490/750/1900). In the widely spaced undulating open with black specs and brown staining and rare sides.	52[i] 53[i] -54[i]- -56[i]-	49.62		Legend

Ī		Orilling Pro	gress and	Water Ol	oservations	6			Cor	oral I	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ierai i	Remarks		
							Д	II dimens	ons in metre	s	Scale:	1:11	
	/lethod /sed:						P1	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

## STRUCTURAL SOILS

Contract:								Client	t:				Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gro	ound	Inves	stiga	ation			Highw	ays England				R620
Contract Ref	<del> </del>		S	tart:	25.0	4.18	Groui	nd Leve	el:	Nat	ional Grid Co-ordinate:		Sheet:		
7	33442				30.0				.62	E	:412752.2 N:14 ²	959.2		17	of <b>47</b>
	Flush	М	echai	nical	Log	Sa	mples	≈ -l ioi	<u></u>	'		are 1	p eq	Depth	Material
Depth	Returns & Details	TCR (%)	SCR (%)	RQD (%)	lf (mm)	No	Type	Backfi Instru mentar	Water	Des	cription of Strata	Fracture Log	Reduced Level	(Thick ness)	Graphic
31.50-31.65 - 31.65-33.15 - (0:01)	100% return Air+Mist (Brown)	100	90	83	_	35	D			occasional Fracture set 5-10° med undulating	n density white w black specks CHAL : 1: Bedding fractures a ium to widely spac- rough partly open w ecks (490/750/1900	K. re ed th	-	-	
31.90-32.05						36	D			Fracture set medium to vrough open light brow slickensides (Grade B2) (stratum co previous she at 31.7 of possibl subparallel r	t 2: Fractures are 40-6 widely spaced undulation with black specs and radio- staining and radio- staining and radio- staining and radio- staining and radio- staining and radio- staining and radio- staining and radio- staining and radio- staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining are 40-6 staining	5° ang and are 58[i] 58[i] 58[i]	-	-	
32.40-32.65	100% return Air+Mist (Brown)	83	55	47	NI 300 580	37	D			to 5cm of br	own phosphatic chalk. at 31.95m possik is. 2.0m medium gravel	le	-	-	
-		<b>V</b>	V							at 33 marl up to 1	.00m and 33.05m wis mm.	59[i]−	-	(6.15)	
33.15-34.65 - (0:01)	100% return Air+Mist	100	83	83						at 33.1 ( <i>Platyceram</i>	5m possible inccerami us).	ds	-	- -	
33.35-33.75	(Brown)					38	U			at 33 10mm.	3.40m marl seam up	to	-		

	Drilling Pr	ogress and	Water Ol	oservations	3		Cor	acrol I	Domarka		
Date	Time	Borehole	Casing	Borehole Diameter	Water		Gei	ierai i	Remarks		
		Depth	Depth	(mm)	Depth						
						All dimens	ions in metre	es	Scale:	1:11	
Method		ection pit +	Plan		nacchio MC450-P	Drilled	Lee Harris	Logged	IFoster + BSaimen	Checked By:	AGS

# S Office

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

## STRUCTURAL SOILS

Contract:			С	Client:			Boreho	
A303 Stonehenge P					Highways England			R620
Contract Ref:	Start	t: <b>25.04.18</b>	Ground	Level:	National Grid Co-ordinate:		Sheet:	
733442	End:	30.04.18		79.62	E:412752.2 N:14195	9.2		<b>18</b> of <b>47</b>
Flush Returns Depth & Details	Mechanica TCR SCR RC (%) (%) (%	אר אר	mples Sack	Instru- mentation Water	Description of Strata	Fracture Log	Reduced Level	Depth Material (Thick Graphic ness) Legend
34.00-34.35 100% return Air+Mist (Brown)  34.65-36.15 (0:01) 34.75-35.00  100% return Air+Mist (Brown)	91 53 4	39 3 300 580 40	D		Weak high density white with occasional black specks CHALK. Fracture set 1: Bedding fractures are 5-10° medium to widely spaced undulating rough partly open with black specks (490/750/1900). Fracture set 2: Fractures are 40-65° medium to widely spaced undulating rough open with black specs and light brown staining and rare slickensides. (Grade B2) (stratum copied from 30.00m from previous sheet) at 33.50m occasional fragments of incceramids (possible Platyceramus) at 33.80m group of marl seam up to 50mm and wispy marl at 33.97m very small nodular rinded flint.  at 34.75m possible incceramid fragments.  at 34.75m possible incceramid fragments.	60[i] 61[i]		

5	Г	Drilling Pro	ogress and	Water O	bservations	5			Cor	oral	Domorko		
פ	Date	Time	Borehole		Borehole Diameter	Water			Gei	ierari	Remarks		
5			Depth	Depth	(mm)	Depth							
2													
ζ													
5													
ממ													
Í													
2													
5							A	II dimens	ions in metre	s	Scale:	1:11	
סוומרומי	Method Used:	Inspe Rota	ction pit + ary Cored	Plar Use		nacchio MC450	-P1	Drilled By:	Lee Harris	Logged By:	lFoster + BSaimen	Checked By:	AGS

A303 Sto	nehenge F	hase	6 Gr	ound	Inve	stiga	tion			Highways England				R620
Contract Ref								nd Leve	el:	National Grid Co-ordinate:		Sheet:		
7	33442		E	nd:	30.0	4.18		79.	.62	E:412752.2 N:141959	2		19	of <b>47</b>
Depth	Flush Returns & Details	M TCR (%)	echai	RQD			mples Type	Backfill & Instru- mentation	Water		Log	Reduced	Depth (Thick ness)	Materia
35.90-36.15	100% return Air+Mist (Brown)	91	53	47	NI 300 580	41	D			Weak high density white with occasional black specks CHALK. Fracture set 1: Bedding fractures are 5-10° medium to widely spaced undulating rough partly open with black specks (490/750/1900). Fracture set 2: Fractures are 40-65° medium to widely spaced undulating rough open with black specs and	- 33[i] 44[i]	-	-	
36.15-36.55 (0:01) 36.25-36.30	100% return Air+Mist (Brown)	100	0	0	NI	42	D			Weak to medium strong very high density white CHALK with occasional inoceramids shell fragments. Recovered as gravel and cobbles.		43.47	(0.40)	
36.55-37.80 (0:01) 36.75-37.25	100% return Air+Mist (White)	100	100	92	NI 400 480	43	U			Weak high density white CHALK with rare wispy marls and hard gravels. Fracture set 1: Bedding fractures are 5-15° widely spaced undulating rough open with brown discolouration and rare comminuted chalk infill (1170/1330/2042). Fracture set 2: Fractures are 40-65° widely spaced with brown staining (130/1000/2870). (Grade C2) at 36.55m very small nodular fragments of flint between 36.55m and 36.65m group of wispy marl.	<u>/</u> 6[i]	43.07	36.55	
										between 37.20m and 37.27m possible hard ground.		-	-	

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# STRUCTURAL SOILS

000						BOKI		ULI		.UG
Contract:				Client:				Boreho	ole:	
A303 Stonehenge P	Phase 6 Grour	nd Investiga	ition		Hig	hways England				R620
Contract Ref:	Start	25.04.18	Grou	nd Level:		National Grid Co-ordinate:		Sheet:		
733442	End:	30.04.18	1	79.62	)	E:412752.2 N:1419	59.2		20	of <b>47</b>
Flush Returns Depth & Details	Mechanica		mples	Backfill & Instru- mentation		Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
100% return Air+Mist (White)  37.80-39.30 (0:01) 37.80-38.25  100% return Air+Mist (White)  39.30-40.80 (0:01) 39.35-39.65  39.10-39.30  100% return Air+Mist (White)	93 73 73	NI 444  NI 4400  3 480  45  46	U U	B	rare wi Fracture 5-15° rough of and ra (1170/1) Fracture with bro (Grade a fragmen b group of from 36 at inccera at nodular at nodular at nodular at fincera at nodular at nodular at nodular 	t 36.55m very small nodular nts of flint. etween 36.55m and 36.65m of wispy marl.(stratum copied .55m from previous sheet) 37.50m fragments of possible mids, possible <i>Platyceramus</i> . 37.66m very small rinded flint .37.76m very small rinded flint at 38.20m very small rinded flint.	67[i] —68[i]		-	

	Drilling Pr	ogress and	Water O	bservation	S			Cor	oral I	Domarka		
Date	Time	Borehole		Borehole Diameter	Water			Gei	ierai i	Remarks		
2010		Depth	Depth	(mm)	Depth							
						А	II dimens	ons in metre	es	Scale:	1:11	
Method Used:		ection pit + ary Cored	Plar		nacchio MC450-	P1	Drilled Bv:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

# ST

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

# STRUCTURAL SOILS

Contract:								Clion	<b>.</b> .							
Contract:		booo	c C		l lma.	-ti	41	Clien	<b>[</b> :	<b>∐ia</b> bwa	ys England		B	oreho		R620
A303 Stoneh Contract Ref:	enge P	ııase					Grour	nd Leve			nal Grid Co-ordina	ate:	.9	Sheet:		11020
733	442				30.0				.62		412752.2 N:				21	of <b>47</b>
	lush	M	echa								+12102.2 IV.			<u>p</u>		
Re	eturns Details	TCP	SCP	PΩΓ		No		Backfill Instrumentation	Water	Descr	iption of Strata	Fracture	. Log	Reduced Level	Depth (Thick ness)	Graphic Legend
re Air	00% eturn ++Mist Vhite)	100	89	7		47	D			rare wispy m. Fracture set 1 5-15° widely rough open wi and rare co (1170/1330/20 Fractures are with brown sta (Grade C2) at 36.5 fragments of fi between group of wisp from 36.55m fi at 39.50 brown sponge at 39.75 flint up to 55m at 39.90 fossil (possib) subparallel rib between	nsity white CHAL arls and hard gr : Bedding fracture of spaced under the brown discolor mminuted chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace of the chalk blace	avels. es are llating irration infill set 2: paced 2870). odular 6.65m copied et) unded odular ells of with 0.27m	-			
re Air	00% eturn +Mist Vhite)	93	•	74	NI 400 480	48	D			stained spong at 40.6 rinded flint fragments of Latus or Plagi at 40.70 up to 15mm at 40.85m recovered as sized fragmen betwee group of thick	Om very small nounce to 20mm for possible Sponstomata. In very small rinder and 40.95m non fine to coarse serious to 20mm for the serious small rinder to coarse serious for the serious small rinder to coarse serious for the serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious small rinder to coarse serious serious small rinder to coarse serious small rinder to coarse serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious serious	odular and rdylus ed flint intact gravel			(7.95)	

	Drilling Pr	rogress and	Water Ol	oservation	s			Cor	noral !	Remarks		
Date	Time	Borehole		Borehole Diameter	Water			Gei	lerai r	Remains		
		Depth	Depth	(mm)	Depth							
		]	İ	'	1							
		I I	İ	'	1							
		J	İ	'	1							
		]	İ	'	1							
		I I	İ	'	1							
		I I	İ	'	1							
			1	'		All	dimens	ions in metre	es	Scale:	1:11	
Method		pection pit +	Plan		macchio MC450-F		Orilled	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	VC S

#### DRAFT

#### **BOREHOLE LOG**

110										SUREH	OL		.UG
Contract:							Client	:			Boreho	ole:	
A303 Sto	nehenge P	hase 6							Highways Engla				R620
Contract Ref	f:		Start	25.0	4.18	Grour	nd Leve	el:	National Grid Co-o		Sheet:		
7	33442		End:	30.0	4.18		79.		E:412752.2	N:141959.2		22	of <b>47</b>
Depth	Flush Returns & Details	TCR S	chanica SCR RQ (%) (%		1	mples Type	Backfill & Instru- mentation	Water	Description of Stra	Fracture Log	Reduced	Depth (Thick ness)	Material Graphic Legend
41.60-41.90	100% return Air+Mist (White)	93	74		49	U			Weak high density white C rare wispy marls and har Fracture set 1: Bedding fra 5-15° widely spaced rough open with brown disc and rare comminuted (1170/1330/2042). Fractures are 40-65° wide with brown staining (130/10 (Grade C2) at 36.55m very smargments of flint between 36.55m ar group of wispy marl.(strat from 36.55m from previous at 41.80m and 41 seam up to 10mm with wispodular flint.	HALK with rd gravels. actures are undulating colouration chalk infill re set 2: ely spaced 000/2870). all nodular and 36.65m aum copied s sheet). 83m marl py marl.	-	-	
42.30-43.80 (0:01) 42.30-42.55	*	¥	<b>A A</b>	NI 400 480	50	D			between 42.55m ar very small rinded branching			-	
43.00-43.35	100% return Air+Mist (Brown)	100	73 73	3	51	U			at 42.75m and 42.90i minor fault with slickenside at 42.95m thick m 20mm.	72[i] 73[i]		-	

	Drilling Pr	ogress and	Water O	oservations	3		Co	norali	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water		Ge	nerari	Remarks		
Date	1	Depth	Depth	(mm)	Depth						
						All dime	nsions in metr	es	Scale:	1:11	
Method					nacchio MC450-P1	Drille	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	VG6

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

## STRUCTURAL SOILS

Contract:					Clien	nt:			Boreho		
A303 Stonehenge	Phase 6	Ground	l Invest	igation			<b>Highways England</b>				R620
Contract Ref:		Start:	25.04.	. <b>18</b> Gro	und Lev	el:	National Grid Co-ordinate:		Sheet:		
733442		End:	30.04			.62	E:412752.2 N:1419	59.2		23	of <b>47</b>
Flush Returns Depth & Detail	TCBS	chanical SCR RQE	) If	Sample No Typ	Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
100% return Air+Mis (Brown (0:01)	t 100	73 73	NI 400 480	52 D	B		Weak high density white CHALK with rare wispy marls and hard gravels. Fracture set 1: Bedding fractures are 5-15° widely spaced undulating rough open with brown discolouration and rare comminuted chalk infill (1170/1330/2042). Fracture set 2: Fractures are 40-65° widely spaced with brown staining (130/1000/2870). (Grade C2)  at 36.55m very small nodular fragments of flint.  between 36.55m and 36.65m group of wispy marl.(stratum copied from 36.55m from previous sheet)  at 43.63m occasional fragments of fossil possible Platyceramus with subparallel ribs.  at 43.71m and 43.725m thick marl up to 15mm.  at 44.05m rinded flint.	74[i]		ness)	Legend  I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I
100% return Air+Mis (Brown	[	66 52	NI 30 90				Weak high to very density white slightly nodular CHALK with occasional thick and wispy marl and occasional flints. Bedding fractures are 5-25° very close to closely spaced undulating rough open clean with rare fragmented chalk infill (50/70/130). (Grade C3) between 44.54m and 44.60m single flint nodule fills whole diameter of core. All edges have been cored. Possible solid flint layer.	76[i] 77[i] 78[i] 79[i]_	35.12	(0.70)	
45.10-45.30			,	53 D			small rinded tabular flint at 44.90m occasional fragments of fossils possible <i>Platyceramus</i> with parallel ribs.	80[i]	34.42	45.20	
45.30-46.80 (0:01) 100% return Air+Mis (Brown	[	77 65	200 600				Description on next sheet  at 45.30m group of wispy marl.  Description on next sheet			-	

I	Drilling Pr	ogress and	Water Ol	oservation	S			Cor	oral I	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai i	Remarks		
					·							
						Al	I dimens	ons in metre	es	Scale:	1:11	
Method Used:					nacchio MC450-F		Drilled Bv:	Lee Harris	Logged Bv:	IFoster + BSaimen	Checked By:	AGS

### **BOREHOLE LOG**

Contract:								Client:	Borehole:
	nehenge P	hase							Highways England R62
Contract Ref	f:		S	tart:	25.0	4.18	Grour	nd Level:	National Grid Co-ordinate: Sheet:
7	33442				30.0			79.62	
Depth	Flush Returns & Details	TCR	SCR	nical RQD	Log If	Sa No	mples Type	Sackfill & Instru-nentation	Description of Strata  Description of Strata  Description of Strata  Depth (Thick Graph Legel
45.80-46.00 -46.00-46.40	100% return Air+Mist (Brown)	100	777	65	200 600	54	D U	BM ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	at 45.45m thick marl up to 50mm.  Weak high to very high density white slightly nodular CHALK with occasional thick and wispy marl. Fracture set 1: Fractures are 15-25° closely to widely spaced undulating rough partly open clean with occasional comminuted chalk infill (180/300/1640). Fracture set 2: Fractures are 45-60° widely spaced undulating rough to striated partly open to open with brown stained surfaces with slickensides and rare black specks. (Grade C3) (stratum copied from 45.20m from previous sheet) at 45.72m very small nodular flint at 45.85m group of wispy marl at 45.85m thin marls up to 10mm and wispy marl between 46.00m and 46.30m occasional wispy marl up to 5mm between 46.10m and 46.35m wispy marl between 46.50m and 46.92m thick marl up to 50mm with nodular white chalk.
47.05-47.25	100% return Air+Mist (Brown)	97	73	65		56	D		at 47.20m very small flint up to 40mm.

	Drilling Pr	ogress and	Water Ol	servations	3			Cor	oral I	Remarks		
Date	Time	Borehole		Borehole Diameter	Water			Gei	lerai i	Remarks		
		Depth	Depth	(mm)	Depth							
											4.44	
						A	ll dimens	ions in metre	es	Scale:	1:11	
Method		ection pit + ary Cored	Plan		nacchio MC450-l	P1	Drilled	Lee Harris	Logged	IFoster + BSaimen	Checked	AG S

GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 13:25 | KJ2 |

### STRUCTURAL SOILS

Contract:								Clien	t:		Boreho	ole:	
A303 Sto	nehenge P	hase	6 Gr	ound	Inve	stiga	tion			Highways England			R620
Contract Ref	f:		S	tart:	25.0	4.18	Grour	nd Lev	el:	National Grid Co-ordinate:	Sheet:		
7	33442		E	nd:	30.0	4.18		79	.62	E:412752.2 N:141959.2		25	of <b>47</b>
Depth	Flush Returns & Details		lecha SCR (%)	RQD		Sa No	mples Type	Backfill & Instru- mentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	
48.00-48.30	100% return Air+Mist (Brown)	97	73	65	200 600	57	U			Weak high to very high density white slightly nodular CHALK with occasional thick and wispy marl. Fracture set 1: Fractures are 15-25° closely to widely spaced undulating rough partly open clean with occasional comminuted chalk infill (180/300/1640). Fracture set 2: Fractures are 45-60° widely spaced undulating rough to striated partly open to open with brown stained surfaces with slickensides and rare black specks. (Grade C3) (stratum copied from 45.20m from previous sheet)  between 47.82m and 48.00m thick marl up to 5mm.  at 47.90m and 48.00m nodular rinded flint up to 20mm.  Borehole terminated at 48.30m depth.	-	48.30	

2		Orilling Pro	gress and	Water O	bservation	S			Cor	oral I	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Gei	lerai i	Remarks		
1			Берш	Берит	(mm)	Берит							
ĺ													
							Д	II dimensi	ons in metre	s	Scale:	1:11	
) I	Method Inspection pit + Rotary Cored			Plar Use		nacchio MC450-	P1	Drilled By:	Lee Harris	Logged By:	IFoster + BSaimen	Checked By:	AGS

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 6: R71907 Borehole Log

#### **BOREHOLE LOG**

Contract:								ent:				Boreho	ole:	
A303 Std	onehe	enge Ph	nase 7 Ground	Inves	tigat	ion			I	Hig	hways England		R	71907
Contract Re	ef:		Start:	15.08	3.18	Grou	und L	evel (m			National Grid Co-ordinate:	Sheet:		
•	7334	142	End:	21.08	3.18		ç	98.35			E:412939.1 N:141968.9		1	of <b>64</b>
		Sample	s & Testing	M	lecha	anical	Log	Sis	& 7 E	2 5	a re	bed =	Depth	Material
Depth (m)	No	Туре	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Backfi Instru	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
-										_		-	-	
-											Very soft light brown slightly sandy slightly gravelly SILT. Sand is fine to medium. Gravel is angular to subangular fine to coarse flint. (TOPSOIL)	-	(0.30)	*o · × · · · · · · · · · · · · · · · · ·
-											Structureless CHALK composed of brownish cream slightly gravelly sandy SILT. Gravel is subrounded to rounded medium density white chalk with occasional angular to subangular fine flint. (SEAFORD CHALK Grade Dm)	98.05	0.30	x .
-									1000	'.l		-	(0.90)	
1.20-2.30 (0:01)				73	5	0	NI 100 190	•			Very weak low density white with light black specks CHALK. Fracture set 1: 10-20° closely spaced (80/100/350) planar smooth open with light brown staining on surfaces. Fracture set 2: 60-75° very closely to closely (50/100/150) spaced undulating planar open with light brown staining and black	97.15	1.20	

	Boring Pro	gress and	Wat	er Ob	servations	5
Date	Time	Borehole	Ca	sing	Borehole Diameter	Water
Date	Tille	Depth	De	pth	(mm)	Depth
15/08/18	08:30	3.80	3.	50	146	Dry
15/08/18	16:45	39.80	33	.40	146	32.40
16/08/18	08:30	39.80	32	.50	146	31.75
16/08/18	16:30	45.80	45	.40	146	32.40
20/08/18	08:30	45.80	45	.20	146	31.20
20/08/18	16:45	51.80	51	.20	146	30.80
21/08/18	13:30	51.80	51	.20	146	31.80
21/08/18	17:00	67.80	67	.20	146	31.50
Method Used:		tion pit + y Cored		Plan Used		cchio MC4

Comacchio MC450-P1

#### **General Remarks**

- 1. Location CAT scanned prior to excavation.
- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.20m depth on 14/08/2018.
- 4. No groundwater strikes noted by the driller.
- 5. Borehole drilled using a 146mm geobore S core barrel and air mist as the flush medium.
- 6. 50mm PVC groundwater monitoring pipe installed as shown.

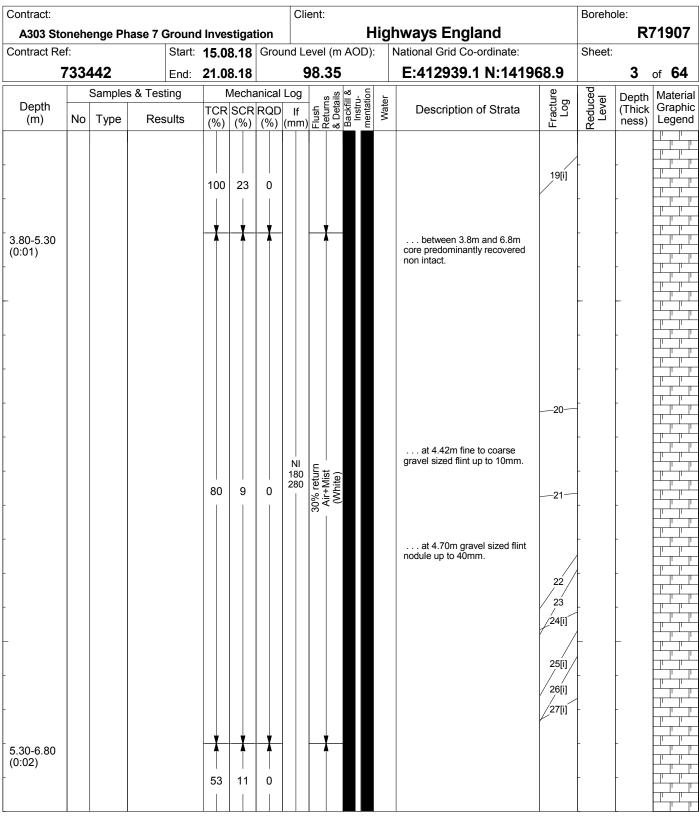
Α	ll dimer	nsions in metre	:S	Scale:	1:11	
	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	\GS

### **BOREHOLE LOG**

Contract:					CI	ient:					Boreho		-400=
	enge Phase 7				Щ.				hways England			- K	71907
Contract Ref:			15.08.1			evel (m		:	National Grid Co-ordinate:		Sheet:	_	
733			21.08.1			98.35			E:412939.1 N:14196			2	of <b>64</b>
Depth (m) No	Samples & Te	esting esults	TCR SC (%) (%	hanica R RQI	al Log	Flush Returns & Details	Sackfill & Instru- nentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
2.30-3.80 (0:01)			100 23	0	NI 100 190 NI 180 280	90% return Air+Mist (White) (White)			specks on fracture surfaces. (SEAFORD CHALK Grade B3) at 1.20m gravel sized flint up to 40mm.  between 2.20m to 2.30m recovered non intact.  at 2.40m gravel sized flint up to 20mm.  Very weak low density white with light black specks CHALK. Fracture set 1: 5-15° closely to very widely spaced(150/300/1500) planar smooth clean with light brown staining on surfaces. Fracture set 2: 20-45° (20/70/1340) extremely to widely spaced undulating closed clean with light black specks on surfaces. Fracture set 3: 55-70° closely to widely spaced (30/160/2000) undulating open clean with black specs on fracture surfaces. (SEAFORD CHALK Grade A3)	1 2 3 4 5 5 10 11 11 12 13 14 15 16 17 18	95.75		

	ŀ	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
	Date	Time	Borehole Depth	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
			Depth	Depth	(mm)	Depth							
.													
							А	II dimer	nsions in metre	es	Scale:	1:11	
	Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

#### **BOREHOLE LOG**



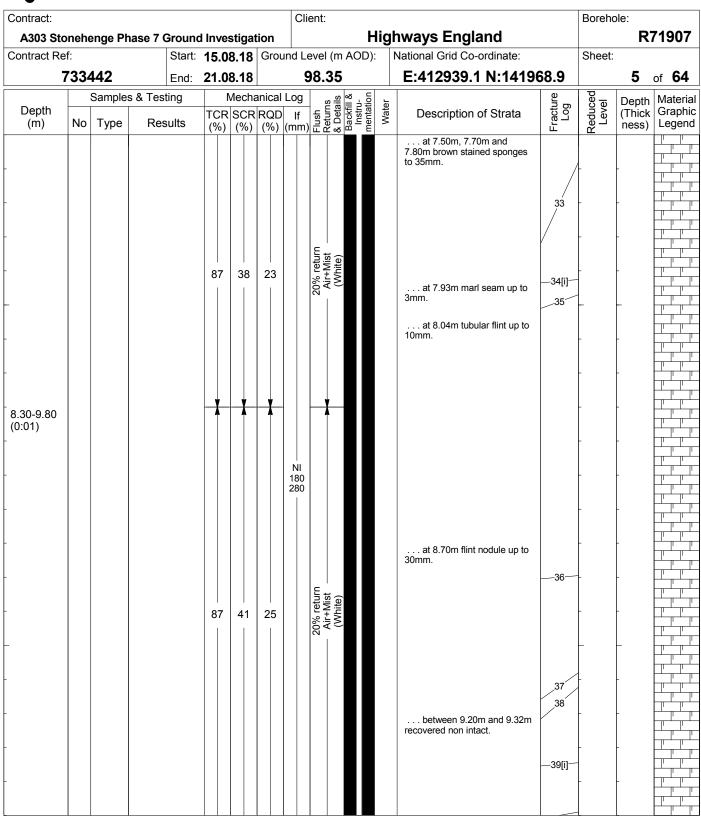
3	E	Boring Pro	gress and	Water O	bservations	5			Co	noral	Domorko		 
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
ا ز	Duto	111110	Depth	Depth	(mm)	Depth							
3													
3													
5													
3													
·													
2													 
<u> </u>							Α	II dimer	nsions in metre	es	Scale:	1:11	
וי	Method Used:		tion pit + y Cored	Pla Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

															\	
Contract:							C	Clie	nt:					Boreh		
A303 Sto	nehenge	Phase 7											hways England			1907
Contract Ref			Start:	15.0	8.18	Gro	und				OD):	1 :	National Grid Co-ordinate:	Sheet		
7	33442		End:	21.0		_			8.3				E:412939.1 N:141968.9			64
Depth		ples & Tes		TCR	SCR (%)	anica RQI	I Log	g f \	ush eturns	Details ackfill &	Instru- entation	Water	Description of Strata	Reduced Level	Depth (Thick	Materia Graphic
(m) 6.80-8.30 (0:01)	No Typ	pe Re	sults	53	111	0	N   18   28		Z0% return Flus Flus Air+Mist — Air+Mist — Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return Return R		ln mer	M	28 —29  at 6.70m full diameter micraster up to 20mm.	Rec	(7.30)	
				87	38	23			20% retum	(White)			32	<u>-</u>		

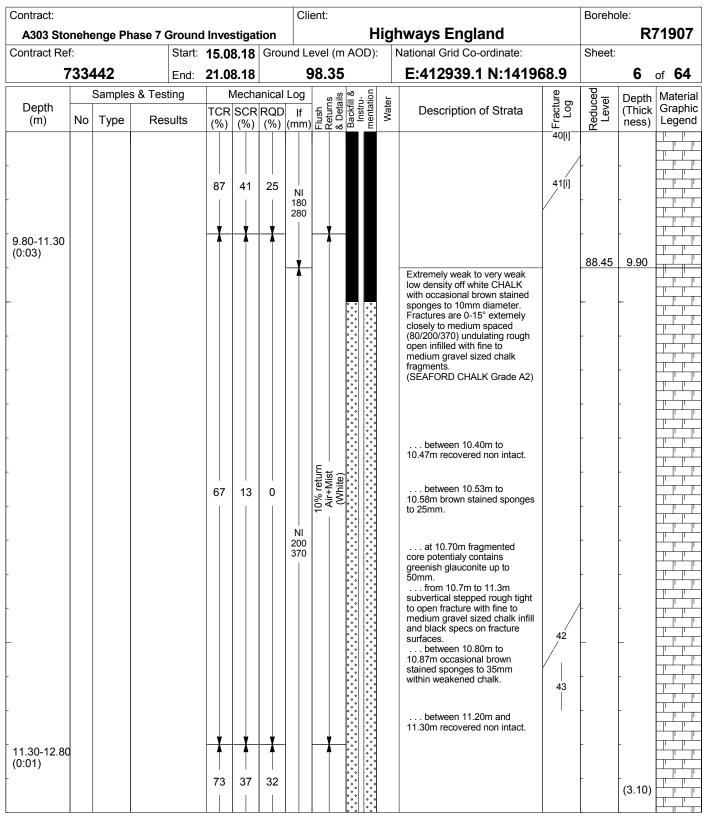
	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
24.0	1	Depth	Depth	(mm)	Depth							
						Α	ll dimer	nsions in metre	es	Scale:	1:11	
Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

#### **BOREHOLE LOG**



	F	Boring Pro	ogress and	Water Ob	servations	3			C •	noral	Domorko		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
			Верит	Берит	(11111)	Верит							
							Д	ll dimer	sions in metre	es	Scale:	1:11	
)	Method Used:		ction pit + ry Cored	Plani Used		cchio MC45	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

#### **BOREHOLE LOG**



	, <u>, , , , , , , , , , , , , , , , , , </u>	Boring Pro	ogress and	Water Ob	servations	3			<u> </u>	noral '	Domorko		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	nerai	Remarks		
+			Берит	Бери	(mm)	Берит							
	ļ I			i l									
	!			i l									
	ļ I			i l									
	!			i l									 
:	'			!			A	II dimen	nsions in metre	s	Scale:	1:11	
)	Method Used:		ction pit + ry Cored	Plant		cchio MC45	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:									Cli	ent:							Boreho	ylo:	
		naa Dha	7	C	l l.a., .a	ation o	4:		CIII	ent.			u:	ak	nways England		Borenc		71907
A303 Sto Contract Re		enge Pna	15e / 1	Start:					414	avol	/m	۸٥			National Grid Co-ordinate:		Sheet:	111	1301
	'. 7334	142						oun		98.			<i>ا</i> ل.	'	E:412939.1 N:1419	60 0	Sileet.	7	. 61
	_		0 T	End:				-11					-	_	E.412333.1 N.1413		   0		of <b>64</b>
Depth (m)	No	Samples Type		sults		Mech		al Lo	og If	lush	r Details	Sackfill & Instru-	nentation	Water	Description of Strata	Fracture Log	Reduced	Depth (Thick ness)	Material Graphic Legend
12.80-14.30				Suite	73	37	322	1 2 2	N 2000 270		(White)				at 12.1m two 20° fractures extend across the core roughly 70 degrees apart. Fractures are undulose stepped smooth and tight with black specs on fracture surfaces.	44 45 46 47		-	
-					87	40	300	1	NI 880 80	10% return	(White)				Very weak to extremely weak low density white with occasional black specs CHALK with occasional black specs CHALK with occasional thin grey marl up to 3mm and rare <i>Platyceramus</i> fossils. Fracture set 1: 5-20° medium spaced (210/250/420) undulose rough to planar smooth open infilled with up to 2mm of communited chalk. Fracture set 2: 40-45° medium spaced (200/350/520) undulose rough occasionally stepped tight and clean to open infilled with coarse sand to fine gravel size chalk	_48[i]	85.35	13.00	

3	E	Boring Pro	gress and	Water Ol	servations	3			Co	noral	Domorko		
	Date	Time	Borehole	J	Borehole Diameter	Water			Ge	nerai	Remarks		
2			Depth	Depth	(mm)	Depth							
ָ כ													
2													
o Liu													
5							Δ	ll dimer	nsions in metre	es	Scale:	1:11	
סוומכומי	Method Used:		tion pit + y Cored	Plar Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

														DOIL				
Contract:								CI	lient	:						Boreho		
A303 Std	nehe	enge Ph	nase 7 (											hways England			R	71907
Contract Re	f:			Start:	15.0	8.18	Gro					)D):	1	National Grid Co-ordinate:		Sheet:		
7	7334	142		End:	21.0				98.					E:412939.1 N:141968			8	of <b>64</b>
Depth (m)	No	Samples Type		ting sults		Mech SCR (%)	anica RQE (%)	Log If (mm	Hush	Returns & Details	Backfill &	mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
14.30-15.80		Туре	Res	Suits	87	40	30	NI 80 180	n 10% return	White)				fragments up to 1mm. (SEAFORD CHALK Grade B3) at 13.33m rare Platyceramus fossils at 13.50m grey marl up to 2mm at 13.60m and 13.72m rare brown stained sponges to 25mm at 13.70m marl up to 2mm at 13.85m marl up to 2mm at 13.88m marl up to 2mm at 14.00m rinded flint nodule up to 20mm.	550[i] 550[i] 550[i] 550[i]	A CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR	(2.80)	

	Boring Pro	ogress and	Water Ob	servations	3			Co	noral	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
Date	Time	Depth	Depth	(mm)	Depth							
						Α	ll dimer	nsions in metre	es	Scale:	1:11	
Methodused:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

Contract:							Cli	ent:					Boreho	vlo:	
	1	Di-	<b>7</b> O		. 4	4	CII	ent.	ш	انما	owove England		Boreno		71907
		enge Ph	ase 7 Ground								nways England		01	K	1907
Contract Ref						Grou			m AOD): -	ľ	National Grid Co-ordinate:		Sheet:	_	
7	334	142	End:	21.0				98.3			E:412939.1 N:14196			9	of <b>64</b>
Depth			& Testing  Results	TCR	Mecha SCR	anical RQD	Log	ush turns	& Details Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Material Graphic
(m)	No	Туре	Results	(%)	(%)	(%)	(mm)					<u>r</u>	- Re	ness)	Legend
- 15.80-17.30 (0:01)				100	32	19	NI 80 180	X			Extremely weak to very weak low density off white CHALK with rare wispy marl and brown stained sponges to 15mm diameter. Fractures are 20-65°	58[i]	82.55	15.80	
-											close to medium (120/180/210) spaced planar smooth tight with brown staining and up to 3mm of communited chalk on surfaces. (SEAFORD CHALK Grade B3)	_59	-	-	
-				100	40	20	NI 180 210	5% return Air-Mist	(White)			60 61 62	-	(1.50)	
17.30-18.80 (0:01)				43	23	23		<b>X</b>			Assessed Zone of Core Loss	63	- - 81.05	17.30	#

	Boring Pro	ogress and	Water Ob	servations	5			Co	noral	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
Date	11110	Depth	Depth	(mm)	Depth							
						A	ll dimer	sions in metre	es	Scale:	1:11	
Method Used:		ction pit + ry Cored	Plan Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:									Cli	ient	:						Boreho	ole:	
A303 Sto	nehe	enge Pha	ase 7	Ground	l Inv	estic	ati	on			•		Hio	ıh	nways England				71907
Contract Ref		9		Start:					und L	eve	l (m	AOI		_	National Grid Co-ordinate:		Sheet:		
		142		End:	21.0						.35		,		E:412939.1 N:1419	68.9		10	of <b>64</b>
Depth		Samples	& Tes	sting	TCF	Med	har	nical	Log If (mm)	پ	urns etails	Backfill & Instru-	entation		Description of Strata	Fracture Log	Reduced	Depth (Thick	Materia Graphic
(m)	No	Type	Re	sults	(%)	(%	) )	(%)	If (mm)	) Hish	Retu & De	Back	· * * * * * * * * * * * * * * * * * * *		Description of Strata	Frac	Red	(0.90)	Legend
					433	23	3	23	NI 100 130	0% retum	Air+Mist(No returns)				Extremely weak to very weak low density off white CHALK with rare wispy marl and brown stained sponges to 15mm diameter. Fractures are 20-25° closely spaced (90/100/130) stepped rough open infilled with up to 1mm of granular chalk, with brown staining on surfaces.  (SEAFORD CHALK Grade B3) at 18.50m nodular flint up to 30mm.		80.15	(0.60)	
18.80-20.30 (0:01)					100	) 49	9	46	NI 250 280	0% return	Air+Mist (No returns)				Extremely weak to very weak low density white CHALK with possible Volviceramus and Platyceramus fossils. Fracture set 1: 5-20° closely to very widely spaced (190/1100/2930) undulating rough open infilled with up to 2mm communited chalk or clean. Fracture set 2: 25-45° closely to very widely spaced (160/700/1730) undulating partly open infilled with up to 1mm white communited chalk with light black specks and brown staining on fracture surfaces. Fracture set 3: 50-85° closely to very widely (70/390/1500) spaced undulating planar tight to partially open with light black specks and brown staining on fracture surfaces. (SEAFORD CHALK Grade B3)	64 65[i]	79.55		

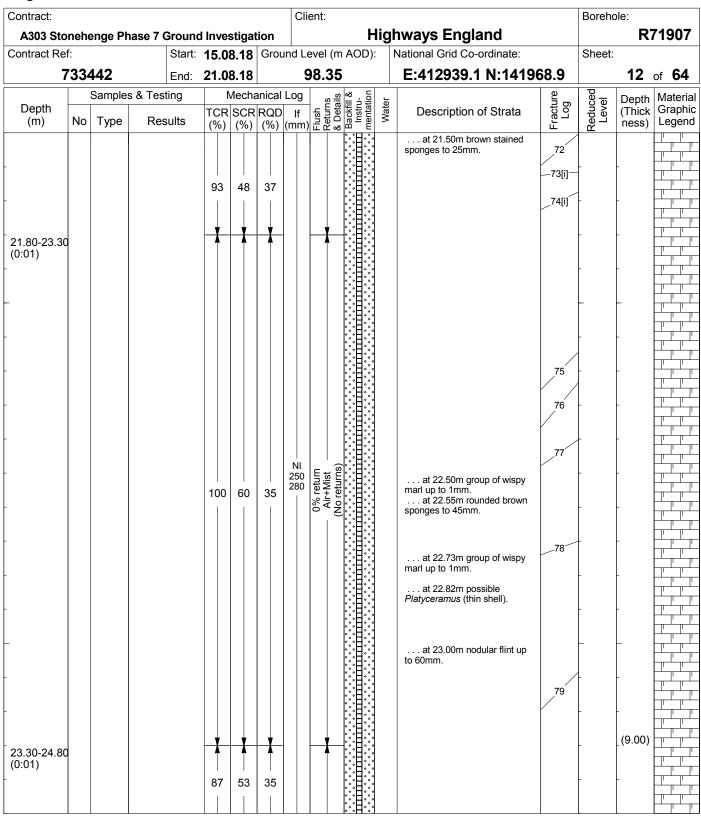
	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	Herai	Remarks		
5	10	Depth	Depth	(mm)	Depth							
<u> </u>												
2												
ł l												
						А	II dimen	sions in metre	es	Scale:	1:11	
Method Used:	Inspec Rota	tion pit + y Cored	Plan Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

•													BOILL	<b>-</b>	
Contract:								CI	ient:	-				Boreh	
A303 Std	onehe	enge Pha	ase 7 (	Ground	l Inve	stiga	tion				H	ligl	hways England		R71907
Contract Re	ef:			Start:	15.0	8.18	Gro	und L	eve	l (m	AOD)	:  1	National Grid Co-ordinate:	Sheet	
•	7334	142		End:	21.0	8.18		,	98.	35			E:412939.1 N:141968.9		<b>11</b> of <b>64</b>
Depth (m)	No	Samples Type		ting sults	TCR	Mech SCF	anica	l Log	lush .	eturns Details	Backfill & Instru-	Water	Description of Strata	Reduced	Depth (Thick ness) Material Graphic Legend
20.30-21.8(0:01)		Туре	ries -	bults	93	49	37	NI 2500 280	0% return	) Alf-Mist (No returns)			at 18.80m 100mm flint across whole core diameter at 19.20m possible Volviceramus (thick shells) at 19.60m possible Platyceramus (thin shell).  —66[iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	-	ness) Legeria

	Boring Pro	ogress and	Water Ob	servations	3			Co	noral	Domorko		
Date	Time	Time Borehole Casing Depth Depth Diameter (mm) D						Ge	nerai	Remarks		
Date	, Time	Depth	Depth		Depth							
							ll dimer	nsions in metre	es	Scale:	1:11	
Metho Used:		ction pit + ry Cored	t d: <b>Coma</b>	cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS	

#### **BOREHOLE LOG**



	[	Boring Pro	gress and	Water Ob	servations	5			Co	noral	Domorko		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
į	Date	111110	Depth	Depth	(mm)	Depth							
:													
5													
							А	ll dimer	nsions in metre	es	Scale:	1:11	
	Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:					CI	lien	t:					Boreho		
A303 Stonehenge Phase	7 Ground	l Invest	igati	ion				H		nways England			R7	1907
Contract Ref:	Start:	15.08.	.18	Gro	und L	eve	el (m	AOD):	: 1	National Grid Co-ordinate:		Sheet:		
733442	End:	21.08.	18			98	.35			E:412939.1 N:1419	68.9		<b>13</b> (	of <b>64</b>
Depth Samples & To		TCR S	echa SCR	nical RQD	Log	- ls	turns Jetails	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	(Thick	Material Graphic
(m) No Type R	esults	87	53	35   31	NI 250 280	0% return	Air+Wist (No returns)	instructions of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the c		at 23.90m micraster.  between 24.37m and 24.47m flint up to 60mm.	80/ 81/ 82[i]   83[i]   84 86/	Red	(Trick ness)	Glaphic Legend  I I I I I I I I I I I I I I I I I I I

2	E	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domarko		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
30110			Берит	Бериі	(111111)	Берит							
3													
אווס בוני,													
5							Α	II dimer	nsions in metre	es	Scale:	1:11	
Oliuctuic	Method Used:	Inspec Rota	Plan Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS	



### **BOREHOLE LOG**

Contract:								Cli	ient:					Boreho	ole:
A303 Sto	nehe	enge Pha	ase 7 G	round	l Inve	stiga	tion				H	ligl	hways England		R71907
Contract Re	:		;	Start:	15.0	8.18	Gro	und L	evel	(m /	AOD):	:  I	National Grid Co-ordinate:	Sheet:	
7	334	142		End:	21.0				98.3				E:412939.1 N:141968.9		<b>14</b> of <b>64</b>
Depth (m)	No	Samples	& Testii Resu			Mech SCR	anica		lush	Details	Instru- Ientation	Water	Description of Strata	Reduced Level	Depth Materia (Thick Graphic ness) Legend
-					93	40	31		0% return F	(S			88[i] 89 90[i] at 25.86m flint up to 30mm.		
26.30-27.80 (0:01)					<u> </u>	X	*	NI 250 280	<b>X</b>				at 26.30m fine to coarse gravel sized fragments of flint between 26.35m and 26.40m recovered non intact as fragments of high density chalk.	_	
					93	37	27		0% return Air+Mist	(No returns)			at 26.70m recovered non intact between 26.80m and 27.04m chalk crumbles when handled.	_	
-													at 26.97m fragments of flint embedded in comminuted chalk.  at 37.13m 25mm rounded brown stained sponge.		
										٠			Description on next sheet 93		

	E	Boring Pro	gress and	Water Ob		3			Co	noral	Remarks		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	ileiai	Remarks		
	2010		Depth	Depth	(mm)	Depth							
Ī													
							<u> </u>					4-44	
							A	ll dimer	nsions in metre	S	Scale:	1:11	
	Method Used:	Inspection pit + Plant Used:				cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:						Cli	ent:					Boreh	ole:	
A303 Stoneh	enge Pha	ase 7 Ground	l Investi	igatio	on				Н	lial	hways England		R7190	7
Contract Ref:			15.08.			nd Le	evel	(m A			National Grid Co-ordinate:	Sheet:		_
733	442		21.08.				98.3		,		E:412939.1 N:141968.9		15 of 64	4
		& Testing			ical I				- E			<u> </u>		
Depth (m) No		Results	TCRS	CR R	QD (%) (	If (mm)	Flush Returns	& Detail	Instru- mentatio	Water	Description of Strata	Reduced	Depth Mate (Thick Grap ness) Lege	hic
-					27	NI 250 280		000000000000000000000000000000000000000			at 27.45m two 45° fractures roughly 90° apart bisect core at 27.50m grey marl up to 20mm.		- "	
27.80-29.30 (0:01)			97 4	447	335	NI 180 380	0% return Air-Mist	(No returns)			Very weak low density white CHALK with rare brown stained sponges to 20mm diameter. Fracture set 1: 5° medium to widely spaced (330/600/1000) undulating to planar partially open to open infilled with up to 1.5mm comminuted and granular chalk or clean. Fracture set 2: 20–45° medium spaced (350/1000.2430) undulating smooth to rough partially open to open with granular chalk infill and black specks on fracture surfaces. Fracture set 3: are 50-85° extremely closely to widely spaced (50/220/2430) planar smooth tight and clean. (SEAFORD CHALK Grade B3) at 27.80m 45° fracture with striations and balck specs on fracture surface at 28.03m 5mm phosphatic nodule at 28.10m occasional brown stained specks between 28.52m and 28.58m flint up to 60mm.	70.55	27.80	
29.30-30.80 (0:01)			100 8	555	49		<b>X</b>				at 29.20m shell fragments of micraster.			

Ī	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	nerai	Remarks		
		Берш	Бериі	(mm)	Берш							
						Д	ll dimer	nsions in metre	es	Scale:	1:11	
Method Used:		tion pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

											DOIL	•			
Contract:						CI	ient	:					Boreho		
	enge Phase 7			_							nways England			R7	71907
Contract Ref:		Start:	15.0	8.18	Gro				AOD)	:	National Grid Co-ordinate:		Sheet:		
733	442	End: 2	21.08					.35			E:412939.1 N:141968	3.9		16	of <b>64</b>
Depth	Samples & Tes		TCR	Mech:	anica RQD	l Log	lsh	turns Jetails	.* Backfill & ☐ Instru- .• mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Materia Graphic
(m) No	Type Res	sults	TCR (%)	555	49	NI 180 380	0% retum		Back The Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of t	Wa	Description of Strata	Frac Lo	Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Redu   Re	(1 nick ness)	Graphic Legend
30.80-32.30 (0:01)			100	65	61		0% return	Air+Mist — (No returns)			at 31.35m wispy marl.	98		-	

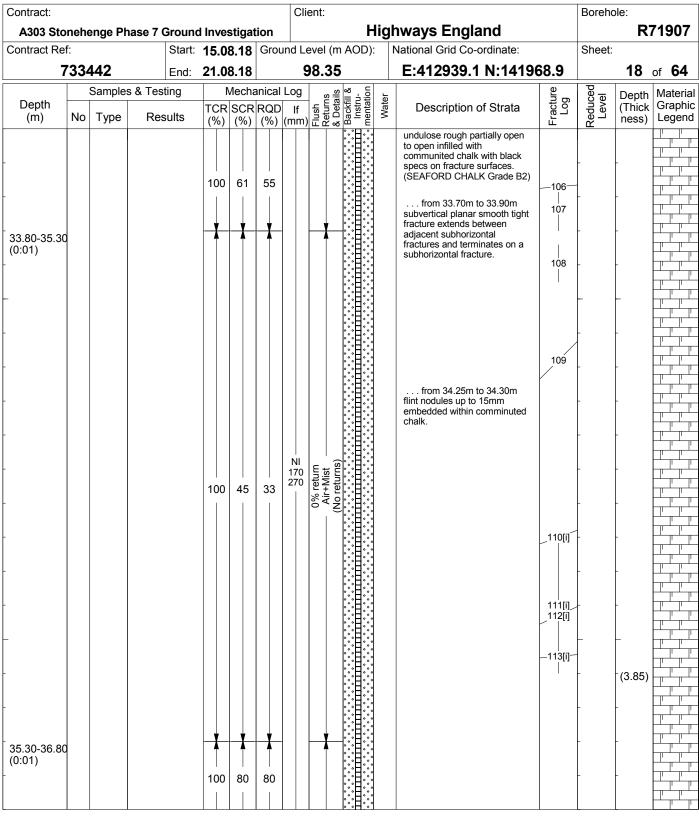
	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
Bato	11110	Depth	Depth	(mm)	Depth							
`												
										I		
						A	II dimer	nsions in metre	es	Scale:	1:11	 _
Method	Insper	ction pit +	Plan	t			Drilled		Logged	PRadcliffe +	Checke	
Used:	Rota	Inspection pit + Plant Rotary Cored Used: Comacchio					By:	Dean Walker	By:	BSaimen	Ву:	. IGS

### **BOREHOLE LOG**

Contract:							Cli	ent:			Borehole:	
A303 Sto	nehe	nge Pha	se 7 Ground	Inve	stiga	tion			H	lig	hways England R	71907
Contract Re	f:		Start:	15.0	8.18	Gro	und L	evel	(m AOD)	:	National Grid Co-ordinate: Sheet:	
7	334	142	End:	21.0	8.18		Ç	98.3	35			of <b>64</b>
Depth (m)	No	Samples &	Results	TCR	Mecha SCR	RQE	_	lush	& Details Backfill & Instru- mentation	Water	Description of Strata  Level Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company C	Material Graphic Legend
		Type	results	100	65	61	NI 180 380	0% return FI	(S)		at 31.61m nodules of rinded flint up to 30mm embedded in comminuted chalk at 31.70m possible echnoids/micraster shells.	
32.30-33.80 (0:01)					*	<b>X</b>		_			—102[i]— between 32.46m and 32.60m frequent brown stained sponges to 55mm.  65.70 32.65	
-				100	61	55	NI 100 150	0% return Air+Mist			CHALK with occasional brown stained sponges to 20mm diameter. Fractures are 5-15° closely spaced (70/100/150 undulating clean partially open to wide open infilled with up to 1.5mm white communited chalk and fine gravel size chalk fragments.  (SEAFORD CHALK Grade B2) between 32.75m and 32.83m brown sponges to 45mm 40mm fragmented sheet flint within 45 degree fracture	
							NI 170 270				Very weak medium density white CHALK. Fracture set 1: 5° very widely spaced (1380/1380) undulating rough open infilled with up to 2mm communited chalk or clean, with black specks on fracture surfaces. Fracture set 2: 20-85° close to medium spaced (170/420/860)	

	E	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	lierai	Remarks		
3													
,													
							А	ll dimer	sions in metre	es	Scale:	1:11	
	ethod sed:		tion pit + y Cored	Plan Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

#### **BOREHOLE LOG**



	F	Boring Pro	ogress and	Water Ob	servations	3			Co	noral	Domorko		
Г	Date	Time	Borehole		Borehole Diameter	Water			Ge	nerai	Remarks		
. —			Depth	Depth	(mm)	Depth	.						
	ļ			i !	'		.						
	ļ			i l	1		.						
	ļ			i l	1		.						
	ļ			i l	1		.						
	ļ			i !	'		.						
	ļ			i !	'								
	ļ			i l	'		A	ll dimer	nsions in metre	es e	Scale:	1:11	
)   '	ethod sed:		ction pit + ry Cored	Plant		cchio MC45	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:							CI	ient				Borehol	
		nge Pha	se 7 Ground								hways England		R71907
Contract Ref									l (m AOD	):	National Grid Co-ordinate:	Sheet:	
7	<b>'334</b>	42	End:	21.0					.35		E:412939.1 N:141968.9		<b>19</b> of <b>64</b>
Depth (m)			& Testing  Results	TCR	Mech	anica RQ[	l Log	nsh	Returns & Details Backfill & Instru-	Water	Description of Strata	e g	Depth Material Graphic
(m) 36.80-38.30 (0:01)		Туре	Results	100		80	NI 170 270	0% retum	— Air+Mist — → ← — Air+Mist — Air+Mist — Returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns) (No returns)		Very weak locally extremely weak low density white CHALK. Fractures 5-70° close to medium spaced (80/170/270) undulating rough partly open with light black specks on fracture surfaces.	61.30	ness) Legend

} [	F	Boring Pro	ogress and	Water Ot	servations	3			Co	noral	Domorko		
Í	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
<u>.</u>	Date	Tillie	Depth	Depth	(mm)	Depth							
2				İ									
3				i I									
5				i I									
200				i I									
ِ آڏِ				i I									
2				1									
5				<u>i                                     </u>			A	II dimer	sions in metre	S	Scale:	1:11	
9 1	Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

Contract:								CI	ient	•		Borehole:	
A303 Sto	nehe	enge Ph	ase 7	Ground	l Inve	stiga	tion			ŀ	lig	hways England	R71907
Contract Re	f:			Start:	15.0	8.18	Gro	ound L	eve	I (m AOD)		National Grid Co-ordinate: Sheet:	
7	'33 ⁴	142		End:	21.0	8.18		!	98.	35		E:412939.1 N:141968.9 20	of <b>64</b>
Depth (m)	No	Samples Type		sting		Mech SCF (%)	anica RQI (%)	I Log If (mm	Flush	Returns & Details Backfill & Instru-	Water	Description of Strata  Log Log Log Log Log Log Log Log Log Lo	k Graphic
												at 37.60m brown stained sponges to 35mm.	5)
-					100	23	0	NI 50 100	0% return	Alr+Mist (No returns) (No returns)		between 37.80m and 38.00m brown stained sponges to 15mm between 37.93m and 38.02m recovered non intact.	
					•							122 60.05 38.3	
38.30-39.80 (0:01)					100	69	49	NI 200	0% return	Air+Mist No returns)  Live State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State State Sta		Very weak medium density white slightly brown stained CHALK with occasional marl and brown stained sponges to 30mm diameter. Fractures are 5-45° very closely to medium spaced (30/200/280) planar rough to smooth tight and clean with light brown specs on surfaces. (BELLE TOUT BEDS Grade C2)  from 38.7m to 39.05m 45-50° undulating smooth open fracture partialy infilled with fine gravel size chalk fragments.  at 38.85m occasional brown stained sponges to	
								200 280	%0	.ik		55mm.  at 39.10m nodular flint up to 20mm.  at 39.20m possible shell of echnoids.  at 39.30m occasional brown stained sponges to 45mm.  Description on next sheet	

	ı	Boring Pro	gress and	Water O	oservations	3			Co	noral	Domarko		
- Dilatol: 1116	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
ווא רומי, יוכמה כיי													
3							A	ll dimer	sions in metre	es	Scale:	1:11	
פוומסומיי	Method Used:		ction pit + ry Cored	Plar Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

Contract:							CI	ient:					Boreho	ole:	
A303 Sto	nehe	nge Ph	ase 7 Ground	Inves	stiga	tion			Н	igł	nways England			R	71907
Contract Ref	f:	-	Start:	15.0	8.18	Gro	und L	evel (m	n AOD):	١	National Grid Co-ordinate:		Sheet:		
7	334	142	End:	21.0				98.35			E:412939.1 N:1419	68.9		21	of <b>64</b>
Depth (m)			& Testing  Results	TCR	Mecha SCR	anical	Log	lush tetums Details	Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Graphic
39.80-41.30 (0:01)	No	Type	Results	100     93	SCR (%) 69 65 65	49 49	NI 2000 2880	0% return Air+Mist No returns Air-Mist Returns A Del		Wa	at 39.45m rounded brown sponges to 35mm.  at 40.18m sheet flint up to 10mm.  between 40.40m and 40.55m chalk crumbles into anguali fragemts when handled at 40.50m marl seam up to 3mm.	-125[i]- -126- -127[i]- 128 129	Redt Levi Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Cont	(3.00)	Graphic Legend  I I I I I I I I I I I I I I I I I I I
41.30-42.80 (0:01)				97	67	40	NI 210 420	¥			very weak locally extremely weak low to medium density white CHALK with occasional marl up to 5mm. Fracture set 1: 5-20° medium to widely spaced (320/880/2430) planar	130 131 132[i]	57.05	41.30	

3	F	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
2	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
<u>.</u>	Date	TITLE	Depth	Depth	(mm)	Depth							
2													
3													
5													
Ę Ď													
, E													
2												4 44	
5							A	ll dimer	nsions in metre	S	Scale:	1:11	
Olluvius	Method Used:		ction pit + ry Cored	Plan Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

0 1 1															
Contract:	_			_				C	lien	ıt:		1:1	ha. Francisco d	Boreh	
A303 Sto		enge Pha	ase 7 (										hways England	0	R71907
Contract Re				Start:								):	National Grid Co-ordinate:	Sheet	
7	′334				21.0					3.35		$\perp$	E:412939.1 N:141968.9		<b>22</b> of <b>64</b>
Depth (m)	No	Samples Type		ting sults	TCR	Mech SCF	anica	I Log If (mm	7) <del>[</del>	Returns Details	Backfill & Instru-	Water	Description of Strata	Reduced	Depth Material (Thick ness) Legend
(m) 		Туре	Res	Suits	97	67	40	NI 210 420	0% return	.) Air+Mist (No returns)			smooth to stepped smooth and tight. Fracture set 2: 20-65° close to widely spaced (80/440/720) smooth planar tight with light brown staining on fracture surfaces. (BELLE TOUT BEDS Grade A3)  at 42.20m cobbles of subangular flint  133  between 42.60m and 42.65m rinded flint up to 60mm.		ness) Legend

E	Boring Pr	ogress and	Water Ob	servations	8			Co	noral	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
							All dimen	sions in metre	es	Scale:	1:11	
Method		ction pit +	Plan		rchio MC4	50 D1	Drilled By:	Doan Walker	Logged	PRadcliffe +	Checke	\G

#### **BOREHOLE LOG**

													BURE	<b>П</b>	JLI		.UG
Contract:								CI	ient:						Boreho	ole:	
A303 Sto	nehe	nge Ph	ase 7 (	Ground	Inve	stiga	tion				I	Hig	hways England			R	71907
Contract Re	f:			Start:	15.0	8.18	Gro	und L	eve	l (m	AOD	):	National Grid Co-ordinate:		Sheet:		
7	<b>'334</b>	<b>42</b>		End:	21.0				98.				E:412939.1 N:141968	3.9		23	of <b>64</b>
Depth		Samples	& Test	ting	1	Mech	anical RQD (%)	Log		rns tails	fill & tru- ation	Water	Description of Charte	Fracture Log	Reduced Level	Depth (Thick	Material Graphic
(m)	No	Туре	Res	sults	(%)	(%)	(%)	If (mm	Flus d	& De	Back	×	Description of Strata	Frac	Red	ness)	Legend
44.30-45.80		Туре	Res	suits	83	80	60	NI 210 420		Alf-Milst Area (No returns) & C	98		between 43.80m and 43.90m rinded flint up to 60mm.	<u>ii</u>	9 <u>2</u>	ness)	Legend
					90	70	65		0% return	Alf+Mist ————————————————————————————————————				-139	-	-	

	Boring Pro	ogress and	Water Ob	servations	3		Co	noral	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Ge	nerai	Remarks		
Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	II dimer Drilled By:	nsions in metro	Logged	Scale: PRadcliffe + BSaimen	1:11 Checke By:	IGS

### **BOREHOLE LOG**

•																			
Contract:								CI	ient	:					Boreho	ole:			
A303 Stonehenge Phase 7 Ground Investigation										Highways England						R71907			
Contract Ref: Start: 15.08.18 Groun								und L	nd Level (m AOD): National Grid Co-ordinate:						Sheet:				
733442 End: 21.08.18							,	98.	.35			E:412939.1 N:14196	68.9	<b>24</b> of <b>64</b>					
Depth	Samples & Testin			ng Mechanical L			l Log	- Lie	urns etails	ckfill & stru- ntation	Water	Description of Strata	Fracture Log	Reduced	Depth (Thick	Material Graphic			
(m)	No	Туре	Res	sults	(%)	(%)	(%)	(mm	) <u> </u>	Ret □ Set	a – a	>	·	Fra	Re	ness)	Legend		
45.80-47.30 (0:01)					90	70	65			•			between 45.80m and 46.10m recovered non intact.		-	(8.95)			
					100	57	50	NI 210 420	0% return	Air+Mist ————————————————————————————————————				—140 [—] —141 [—]	-	-			
- - 47.30-48.80 (0:02)					100	67	63	_		•			from 47.15m to 47.50m 45° undulose smooth tight clean fracture.	142[i] 143 /	-	-			

	E	Boring Pro	gress and	Water Ob	servations	3		General Remarks								
	Date	Time	Borehole	Casing	Borehole Diameter	Water		General Remarks								
;	Dute			Depth	(mm)	Depth										
Î																
							A	II dimer	nsions in metre	es	Scale:	1:11				
	Method Inspection pit + Plant Used: Rotary Cored Used: 0					cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:		GS		

### **BOREHOLE LOG**

Contract:							CI	ient:					Boreh	ole.		
	nehenge	Phase 7	Ground	l Inve	stiga	tion		iciit.		F	liał	nways England	Boicii	R71907		
A303 Stonehenge Phase 7 Ground Investigation  Contract Ref: Start: 15.08.18 Ground									(m .			National Grid Co-ordinate:	Sheet:			
7	733442			21.0				98.		ŕ		E:412939.1 N:141968.9		<b>25</b> of <b>64</b>		
Depth		ples & Te		ı		anica				Backfill & Instru-	Water	Description of Strata	Reduced	Depth Materi (Thick Graph		
(m)	No Typ	pe Re	esults	(%)	(%)	(%)	(mm	Flus	Kelu & De		*M		Red	ness) Legen		
												at 47.76m possible  Platyceramus at 47.84m nodular flint up to 30mm.  147.98m mark up to		- " " " " " " " " " " " " " " " " " " "		
				100	67	63		0% return	(No returns)			at 47.98m marl up to 3mm.  143  at 48.12m wispy marl up to 1mm.		- ""		
							NI 210 420		c			at 48.34m nodular flint recovered fragmented.	-			
48.80-50.30 (0:01)				*	Y	X	_		4				-			
-				100	90	90		0% return	All+Mist (No returns)			14 at 49.04m nodular flint up to 30mm.	-			
								ŏ°	(NC			at 49.30m nodular flint up —14 to 20mm.				

2	F	Boring Pro	ogress and	Water Ob	servations	3	General Remarks								
2	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	nerai	Remarks				
	Date	Tillie	Depth	Depth	(mm)	Depth									
;	1			1											
3				İ '											
5															
2	1			1											
, S				İ '											
2				1				U -C			0 1	4.44			
ō				'			A	li dimen	nsions in metre	:S	Scale:	1:11			
2	Method		ction pit +	Plan			!	Drilled		Logged	PRadcliffe +	Checke			
2	Used: Rotary Cored Used: C				d: Coma	cchio MC45	50-P1	By:	Dean Walker	Ву:	BSaimen	By:		lgs	

### **BOREHOLE LOG**

Contract:							Cli	ent:				Boreho	ole:	
A303 Sto	nehe	enge Pha	ase 7 Ground	l Inve	stiga	tion		H	ligŀ	nways England			R7	1907
Contract Re	f:		Start:	15.0	8.18	Gro	und Le	evel (m AOD):	: 1	National Grid Co-ordinate:		Sheet:		
7	7334	142	End:	21.0				98.35		E:412939.1 N:14196	8.9		<b>26</b> o	of <b>64</b>
Depth		Samples	& Testing		Mech	anica	Log	rns rns tails fill & fru- ation	Water	Description of Charles	Fracture Log	Reduced Level		Material Graphic
(m)	No	Туре	Results	(%)	SCR (%)	RQD (%)	lf (mm)	Flush Returns & Details Backfill & Instru- mentation	Wa	Description of Strata	Frac	Redu	ness)	Legend
										at 49.50m occasional brown sponges to 45mm.		-	-	
				100	90	90	NI 210 420	0% return Air+Mist (No returns)		at 49.70m occasional brown sponges to 35mm.		-		
				•	, v					Weak high density white CHALK with rare	_149	- - 48.10	50.25	
50.30-51.80				93	70	67	NI 220 500	O% return  Air-Mist (No returns)		CHALK with rare Platyceramus, grey marl up to 2mm, occasional angular flint fragments and wispy marl seams. Fracture set 1: 5-10° close to widely spaced (100/540/1540) undulating rough open infilled with up to 5mm communited chalk. Fracture set 2: 25-65° medium to widely spaced (300/12400/2450) undulose smooth occasionally slightly polished with black specks on fracture surfaces. (BELLE TOUT BEDS Grade B2) between 50.50m and 50.65m chalk is locally very weak and contains occasional brown stained sponges to 35mm at 50.88m grey marl up to 3mm at 50.92m grey marl up to 5mm at 50.95m grey marl up to 3mm at 50.95m grey marl up to 3mm at 51.25m nodular flint up to 10mm.	150 —151—	-		

Σ	E	Boring Pro	gress and	Water Ol	oservations	3			Co	noral	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	lierai	Remarks		
nead Oilice - brian					(comp								
al solls rta, .				1			Д		nsions in metre	_	Scale:	1:11	
אוותרות	Method Used:	Inspec Rota	tion pit + y Cored	Plar Use		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

Contract:								CI	lient						Boreho	
A303 Sto	nob	nac DL	200 7	Ground	llove	atics.	tion		iiCi I(		ام الـ	h	ays England		boreiic	R71907
Contract Ref		enge Pri	iase / (	Start:		_		und I	AVA	el (m AOD			tional Grid Co-ordinate:		Sheet:	
		142			21.0					.35	,.		E:412939.1 N:14196	88.9	Once.	<b>27</b> of <b>64</b>
Depth (m)		Samples Type		ting	TCR	/lech	anica RQE	Log	hsh	Returns & Details Backfill & Instru-	Water		Description of Strata	Fracture Log	Reduced	Depth Materia (Thick Graphi ness) Legend
	140	Туре	TVC:	suits	93	70	67	(mm	1)	**************************************	000000000000000000000000000000000000000	5 .	at 51.52m possible foliceramus at 51.55m grey marl up to mm at 51.65m phosphatic odules up to 6mm.	ű	- -	ness) Legend
51.80-53.30 (0:01)							<del>                                     </del>	-			•		at 51.82m grey marl up to mm.		-	
													at 51.95m grey marl up to	—152 [—]	1	
-												١.	mm. at 52.00m nodular flint up o 10mm.			
•													at 52.10m possible Platyceramus.		-	
													at 52.20m nodular flint up o 10mm.		-	
					97	87	80	NI 220 500	return	Air+Mist (No returns)	•		at 52.40m grey marl up to mm.		_	- ""
									<del>%</del> 0	(No (No (No (No (No (No (No (No (No (No			at 52.70m possible Platyceramus.		-	
-													at 52.90m nodular flint up ວ 20mm.		_	- " "
53.30-54.80 (0:02)					<b>X</b>	<b>X</b>		-				to	at 53.15m nodular flint up o 10mm. at 53.25m nodular flint up o 10mm.	153[i]	-	
(0.02)					87	67	63				•		at 53.35m <i>Platyceramus</i> .	154		

I	Boring Pro	ogress and	Water Ob	servations	3			Co	noral	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
							All dime	nsions in metre	es	Scale:	1:11	
Method		ction pit +	Plan		cchio MC4!	50-P1	Drilled By:	Dean Walker	Logged By	PRadcliffe +	Checke By:	/G

### **BOREHOLE LOG**

Contract:									Cli	ent:						Boreho		
A303 Sto	nehe	enge Ph	ase 7 (											nways England			R7	1907
Contract Re	f:			Start:	15.0	8.18	Gr	oun	d L	evel	(m	AOD)	: 1	National Grid Co-ordinate:		Sheet:		
7	<mark>'33</mark> 4	142		End:	21.0	8.18	3		Ś	8.	35			E:412939.1 N:141968	8.9		28	of <b>64</b>
Depth (m)	No	Samples Type		iting sults		Mech		al L	og If	-lush	k Details	Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced	Depth (Thick ness)	Material Graphic Legend
-															155 156[i] -157[i] -158	-	-	
-										tum	ırısı urns)			at 53.85m rinded flint up to 30mm.		-	- (7.75)	
-					87	67	63	2	NI 220 500	0% return	All + Mist (No returns)			at 54.13m grey marl up to 10mm.	159 _160 161[i]	-	-	
54.80-56.30 (0:02)						<b>X</b>	<b>X</b>			7				at 54.75m grey marl with wispy marl up to 5mm at 54.85m rounded sponges to 35mm.		-	-	
-					100	70	67	7		0% return	——————————————————————————————————————			at 55.20m brown stained sponges (corrugated type) to 65mm.  Description on next sheet		-	-	

	E	Boring Pro	gress and	Water O	oservations	3			Co	noral	Remarks		
	Date	Time	Borehole		Borehole Diameter	Water			Ge	Herai	Remarks		
<u> </u>	2 4.10		Depth	Depth	(mm)	Depth							
2													
5													
2													
2													
ĵ													
2													 
3							Α	ll dimer	nsions in metre	es	Scale:	1:11	
١ د	1ethod	Inspec	tion pit +	Plar		1-1 - 1404	-0 D4	Drilled		Logged	PRadcliffe +	Checke	
<u> </u>	lsed:	Rotar	y Cored	Use	a: Coma	cchio MC4	50-P1	Ву:	Dean Walker	By:	BSaimen	By:	IGS

### **BOREHOLE LOG**

Contract:							CI	ient:				DONLIN	Boreho	ole:
	nehen	ge Phase	7 Ground	Inve	stiga	tion				H	ligl	hways England		R71907
Contract Ref			Start:				und L	evel	(m /			National Grid Co-ordinate:	Sheet:	
7	3344	12	End:	21.0	8.18		,	98.3	35			E:412939.1 N:141968.9		<b>29</b> of <b>64</b>
Depth (m)		amples & T	esting	TCR	Mech SCR	anica RQE (%)	l Log	lush	Details	lnstru- lentation	Water	Description of Strata	Reduced	Depth Materia (Thick Graphic ness) Legend
()		1	. Coount	(%)	(%)	(%)	(mm	) ፲	· · · · · · · · · · · · · · · · · · ·			at 55.45m grey marl up to 5mm with wispy marl between 55.55m and 55.62m rinded flint recovered as angular fine to coarse gravel of flint.	<u>~</u>	
_				100	70	67		0% return	(No returns)			162[i] -163[i] - at 55.96m wispy marl up to 1mm.	- -	
56.30-57.80 (0:02)				<b>X</b>	<b>X</b>	<b>X</b>	_	<b>-</b>	· · · · · · · · · · · · · · · · · · ·			at 56.20m occasional wispy marl.	-	- """
							NI 220 500		。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。。			at 56.50m rounded sponges to 45mm between 56.55m and 56.65m flint up to 90mm.	-	
_				94	67	57		0% return	(No returns)			at 56.95m nodular flint up to 20mm.	- ,	
									0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			between 57.30m and 57.40m occasional brown stained sponges to 35mm at 57.40m grey marl up to 5mm. Description on next sheet	-	

	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	nerai	Remarks		
		Берш	Бериі	(111111)	Бериі							
						Α	ll dimer	nsions in metre	es	Scale:	1:11	
Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

							_						
Contract:							Cli	ent:				Boreho	
A303 Sto	nehe	enge Pha	se 7 Ground	Inves	stiga	tion		Н	ligł	nways England			R71907
Contract Ref	:		Start:	15.0	3.18	Grou	ınd L	evel (m AOD):	1	National Grid Co-ordinate:		Sheet:	
7	334	142	End:					98.35		E:412939.1 N:1419			<b>30</b> of <b>64</b>
Depth (m)	No	Samples & Type	& Testing Results		SCR	RQD	Log If	Flush Returns & Details Backfill & Instru-	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness) Material Graphic Legend
- ()	-10	Type	rtodato	(%)	(%)	(%)	(mm)			at 57.45m group of wispy marl up to 1mm.	ш	<u>~</u>	
57.80-59.30 (0:01)				94	67	57	NI 220 500	V		at 57.63m nodular flint up to 20mm.		-	- ""
-							<b>X</b>	- -		Weak high density greyish white and white CHALK with occasional thick grey marl and <i>Platyceramus</i> fossils. Fracture set 1: 5-10° close to widely spaced (70/580/950) undulose rough tight to partially open	168	40.35	58.00
-				93	83	74		0% retum  Air+Mist (No returns)		and clean. Fracture set 2: 30-65° very closely to widely spaced (90/850/1550) tight to open clean to infilled with up to 2.5mm communited chalk. (BELLE TOUT BEDS Grade B2) at 58.00m fine to coarse fragmented flint (possible flint band up to 30mm) at 58.37m to 58.48m wispy marl up to 10mm.		-	
-							NI 300 610			at 58.70m possible Volviceramus at 58.80m nodular flint up to 20mm.		-	
59.30-60.80				<b>X</b>	<u> </u>	<b>X</b>		<b>V</b> • • • • • • • • • • • • • • • • • • •		at 59.25m rinded nodular flint up to 25mm.	169 _170[i]	-	- " " "
(0:03)				90	60	47				between 59.40m and 59.75m recovered non intact. Description on next sheet		-	- " "

של של	E	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
פֿ	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
<u>.</u>	Date	Tillic	Depth	Depth	(mm)	Depth							
2													
5													
5													
מ													
ĹĽ,													
2									<u> </u>			4.44	 
							<i>P</i>	ill dimei	nsions in metre	S	Scale:	1:11	
Structur	Method Used:		tion pit + y Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

_													
Contract:								C	lien				Borehole:
A303 Sto		nge Pha	ase 7 (									hways England	R71907
Contract Ref	:			Start:	15.0	8.18	Gro	ound l	_eve	el (m AOD)	:  I	National Grid Co-ordinate:	Sheet:
7	334	142		End:	21.0	8.18			98	.35		E:412939.1 N:141968.9	<b>31</b> of <b>64</b>
Depth (m)	No	Samples Type		ting	TCR	Mech SCF	anica	al Log D If (mm	nsh	Returns & Details Backfill & Instru- mentation	Water	Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Practure Pra	Depth Materia (Thick Graphic ness) Legend
- (111)	140	Турс	1100		(%)	(%)	(%)	mm	יו (ו			at 59.45m rinded flint up to 40mm.	riess) Legend
-												between 59.70m and 59.75m flint up to 80mm.	
					90	60	47		0% return	Air+Mist (No returns)		172[i] 173[i]	
-					90		47		1 %0	NO re		at 60.20m rinded flint up to 30mm.	- " " "
-								NI 300 610				at 60.38m occasional Volviceramus fossils.	- " " "
-													- " " " " " " " " " " " " " " " " " " "
60.80-62.30 (0:02)					<b>X</b>	<del>  X</del>	<b>  X</b>					at 60.80m occasional wispy marl and trace fossils.	(5.80)
_									E	Air+Mist (No returns)		at 60.96m rinded nodular flint up to 30mm.	
-					100	88	77		0% retui	Air+Mist (No returns)			
-												at 61.30m sheet flint up to 25mm at 61.32m grey marl up to 6mm at 61.43m sheet flint.	- 1
												Description on next sheet	

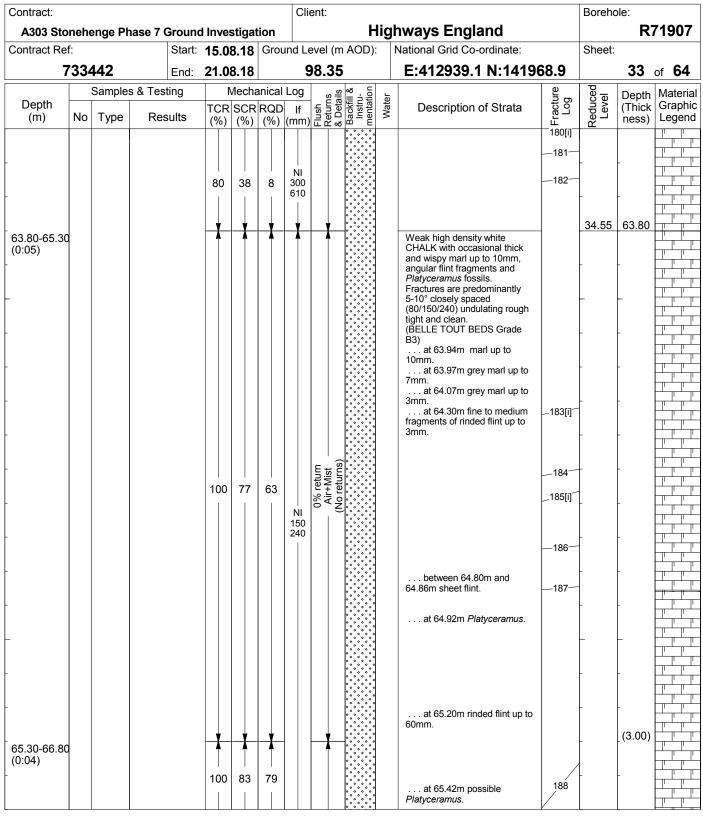
	Boring Pro	gress and	Water Ob		3				20	noral	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth				JC	lierai	Remains		
						P	ll dimer	sions in m	etre	:S	Scale:	1:11	
Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Wall	ker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**

•													BOILLI		L LOO
Contract:								CI	ient:					Boreho	
A303 Sto	nehe	nge Ph	ase 7										hways England		R71907
Contract Re	f:			Start:	15.0	8.18	Gro	und L	eve	l (m	AOD)	):	National Grid Co-ordinate:	Sheet:	
7	7334	42		End:	21.0		_		98.				E:412939.1 N:141968.9		<b>32</b> of <b>64</b>
Depth (m)	No	Samples Type		sting	TCR	Mech SCF	anica	I Log	hsh	eturns Details	Backfill & Instru-mentation	Water	Description of Strata	Reduced Level	Depth Material (Thick Graphic ness) Legend
		Турс	- 1100		(%)	(%)	(%)	(mm	) III (	₹ &		0	at 61.46m grey marl up to 5mm.	<u>~</u> -	Tiess) Logeria
-					100	88	77		0% return	——————————————————————————————————————			at 61.80m flint nodules up to 10mm and occasional wispy marl.	-	
62.30-63.80 (0:15)					*	<b>X</b>	X	NI 300	,			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	at 62.23m grey marl up to 20mm.	_	
_					80	38	8	610	0% return	(No returns)			at 62.85m nodular flint up to 10mm.  at 62.97m rinded nodular flint up to 20mm.	-	
												0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	between 63.15m and 63.25m grey marl up to 3mm with wispy marl.	-	

	ŀ	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Domorko		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
L			Depth	Depth	(mm)	Depth							
							Α .	ll dimer	nsions in metre	es	Scale:	1:11	
• 1	Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	IGS

### **BOREHOLE LOG**



	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	IICIAI	Remarks		
		1	<u> </u>	,,								
										I	4.44	
						A	ll dimer	isions in metre	es	Scale:	1:11	
Method Used:	inoposition pit				cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

### **BOREHOLE LOG**

Contract:			Cli	ent:					Boreho	le:	
A303 Stonehenge Phase 7 G	Fround Inve	stigation			Н	ligl	hways England			R7	71907
Contract Ref:	Start: <b>15.0</b>	<b>8.18</b> Gro	ound Le	evel (m			National Grid Co-ordinate:		Sheet:		
733442	End: <b>21.0</b>			98.35			E:412939.1 N:14196	8.9		34	of <b>64</b>
Depth Samples & Test	TCR	SCR RQI	al Log	sh turns Details	ckfill & nstru- ntation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick	Material Graphic
(m) No Type Res	ults (%)	83 79		0% return   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flus   Flu	Bac of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of	W _	at 65.70m nodular flints up to 15mm.  at 65.83m grey marl up to 5mm.  between 66.00m and 66.50m rinded flint up to 50mm.  at 66.17m nodular flint up to 25mm at 66.20m grey marl up to 5mm.  at 66.34m grey marl with wispy marl up to 5mm.  at 66.45m wispy marl up to 1mm.  between 66.64m and 66.80m occasional trace fossils.		December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 2015   December 201	ness)	Legend  I I I I I I I I I I I I I I I I I I I

	Boring Pro	gress and	Water Ob		3			Go	noral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	Herai	Remains		
		Depth	Depth	(mm)	Depth							
						Д	II dimer	nsions in metre	es	Scale:	1:11	
Method Used:		ction pit + ry Cored	Plan Used		cchio MC4	50-P1	Drilled By:	Dean Walker	Logged By:	PRadcliffe + BSaimen	Checke By:	GS

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 7: RX621 Borehole Log

GINT_LIBRARY V8 06.GLB LibVersion: v8 06_018 PriVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 16:08 | KJ2 |

#### STRUCTURAL SOILS

### **BOREHOLE LOG**

Contract:	onobonas F	bace 6 C	rous	l Invac	liast:	on	Client:	Highways England	Boreho		RX62 ²
Contract R	onehenge F			24.04			nd Level:	National Grid Co-ordinate:	Sheet:		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	733442			02.05		Jioui	79.99	E:412751.3 N:141919.2		_	of <b>9</b>
	ogress Log	Flush	_			5 .	1 3.33	L.712101.014.171313.2			Mater
Depth	Drill Time (hh:mm)	Returns & Details		Туре	Backfill & Instru-	Water		Description of Strata	Reduced Level	Depth (Thick ness)	l
						_					
							content. Sand	gravelly sandy SILT with low cobb is fine to coarse. Gravel is subangular ne to coarse of chalk and flint. Cobble	to <u>† 79.69</u>	0.30	× ·× × ·×
0.50			101	ES			are subrounded	d flint.	<b>∐</b> 79.29	0.70	1 1
							Cream and comprising slig	pale brown structureless CHAL phtly sandy gravelly SILT with low cobb		(0.50)	
							content. Sand	is fine to coarse. Gravel is subangular ne to coarse of chalk and rare flir	to 78 79	1.20	
	1 1	<b>↑</b>				:	Cobbles are su	ubangular to subrounded chalk and ra		-	
							flint. (Grade Dm)		ll <u>E</u>	-	
		100%				:		eam structureless CHALK comprisir	<u> </u>   -	-	
	1.20 - 3.00	return					slightly sandy s	silty angular to subrounded fine to coars alk and rare flint. Sand is fine to coarse	se F	-	
	(00:01)	Air+Mist (White)					(Grade Dc)	aik and rare limt. Sand is line to coarse	[		-
		Ì				:		nts (driller's description).	<b>-</b>	-	
					•••				Ē	-	
	<b>X</b>	<del>- X-</del>	-			×			-	-	
									F	-	
									E		
									-	-	
									F	-	
		100%							[		
	3.00 - 6.00	return							-	-	HĽ
	(00:01)	Air+Mist (White)							Ē		
									-	-	
						า			F	-	Ħ.
						<u></u>			E	_	
						١.			ļ.	-	
						<b>‡</b>			Ē	-	
	1	<b>^</b>				:	at 6.00m d	epth excess water (driller's description)	ŧ	-	
						::			F	-	
									E	E	HH.
						:			-	-	
	6.00 - 9.00	100% return				:]			E		
	(00:01)	Air+Mist							ŧ	-	
		(White)							F	-	
						:1			Ē	_	
									-	-	
						:			F	-	
					ŀ.•H.	۰٩				Γ	ΗЩ

	Orilling Pro	gress and	Water Ob	servations	3
Date	Time	Borehole	Casing	Borehole Diameter	Water
Date	Time	Depth	Depth	(mm)	Depth
24/04/18	13:00	6.00	1.60	146	6.00
24/04/18	14:20	48.00	4.00	146	5.50
30/04/18	16:30	48.00	4.00	146	5.40
01/05/18	08:30	6.70	4.00	146	5.20
01/05/18	09:00	6.70	2.60	200	-
01/05/18	17:00	48.00	42.00	146	19.40
02/05/18	08:30	48.00	42.00	146	5.30
02/05/18	15:50	46.00	None	146	5.40
Method	Inspe	ction pit +	Plan	t	

Used:

Comacchio MC450-P1

Inspection pit + Rotary open hole

Used:

#### **General Remarks**

- 1. Location CAT scanned prior to excavation.
- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.20m depth on 26/03/2018.
- Hand ddg inspection pit to 1.20m depth of 20/03/2018.
   Groundwater strike at 6.00m depth, rising to 5.50m depth after 20 minutes.
   Borehole drilled initially using 146mm open hole rotary bit and air mist as the flush medium, Geobore S casing installed due to collapse at 6.70m.
   50mm PVC groundwater monitoring pipe installed as shown.

By:

All dimensions in metres 1:50 Scale: Checked Drilled Logged **IFoster** 



Ву:



## **BOREHOLE LOG**

Contract:						Client:		Boreho		
		hase 6 C		d Investigat			ghways England	011		X621
Contract Re				24.04.18	Groun		National Grid Co-ordinate:	Sheet:	_	
	733442		End:	02.05.18	-	79.99	E:412751.3 N:141919.2	1.70	<b>2</b> o	
Drilling Pro Depth	Drill Time (hh:mm)	Flush Returns & Detail		Type Supplies	mentation		Description of Strata	Reduced	(Thick	Mater Graph Leger
	6.00 - 9.00 (00:01)				* * * * * * * * * * * * * * * * * * * *	(stratum copied fr	(driller's description). om 1.20m from previous sheet)	- - - -		
	1					description).	to 9.50m depth flint band (driller	5 -		
	9.00 - 12.00 (00:01)	100% return Air+Mis (Brown)						-		
	Y	<b>X</b>		* • • • • • • • • • • • • • • • • • • •				-		
	12.00 - 15.00 (00:01)	100% return Air+Mis (Brown)								
	¥	<u> </u>						-		
	15.00 - 18.00 (00:01)	100% return Air+Mis (Brown)	t							
								-  -  -  -  -  -	-	

Г	Drilling Pro	ogress and	Water Ob	servations	3	C	pporol	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	G	enerai	Remarks		
						All dimensions in me	tres	Scale:	1:50	
Method Used:		ection pit + y open hole	Plan		nacchio MC450-P1	Drilled By: Lee Harris	Logged By:	IFoster	Checked By:	AG



GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 16:08 | KJ2 |

#### **DRAFT**

Contract:					Client:		Boreh	ole:	
A303 Stoneheng	e Phase 6	Ground	d Investigat	ion		Highways England		F	X621
Contract Ref:		Start:	24.04.18	Groui	nd Level:	National Grid Co-ordinate:	Sheet:		
733442	2	End:	02.05.18		79.99	E:412751.3 N:141919.2	2	3	of <b>9</b>
Drilling Progress Lo		Sa	mples ≝ _⇒	e tion			pec el	Depth	Materia
Depth Drill Tin	ne Return: (1) & Detai	s Is No				Description of Strata	Reduced	(Thick ness)	Graphic Legend
18.00 21.00 (00:01	return	st			CHALK with fli	nts (driller's description). d from 1.20m from previous sheet)			
21.00 24.00 (00:01	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	st						(40.80)	
24.00 27.00 (00:01	Ai-LAAi-	st							

[	Drilling Pr	ogress and	Water Ob	oservation	s			Car	oral I	Domorko		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ger	ierai i	Remarks		
						All	dimensi	ons in metre	es	Scale:	1:50	
Method Used:					nacchio MC450-F		Orilled Bv:	Lee Harris	Logged Bv:	IFoster	Checked By:	AGS



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, 1 08/08/18 - 16:08 | KJ2 |

#### **DRAFT**

Contract:									Client:			Boreho	ole:	
A303 Sto	nehenge	e P	hase 6			_				ghways Engl			R	X621
Contract Re	ef:			S	tart:	24.04.1	8 6	rour	nd Level:	National Grid Co-	ordinate:	Sheet:		
7	733442	2		E		02.05.1			79.99	E:412751.3	8 N:141919.2		4	of <b>9</b>
Drilling Pro		_	Flush		Sa	mples 😤	fion fion	e				ced	Depth	Material
Depth	Drill Tim (hh:mm	ne า)	Returr & Deta		No	mples Type	Instr	Water		Description of Stra		Reduced Level	(Thick ness)	Graphic Legend
- -									CHALK with flint (stratum copied )	s (driller's description from 1.20m from pre	า). vious sheet)	E	-	
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	33.00 - 36.00	-	100% returi	n			非					<b>†</b>	-	
	(00:02)	)	Air+Mi	ist			郜		at 34 00n	to 34.70m depth	flint band (driller's	E		
	`   `		(Brow	11)			計		description).	. to oarrow deput	bana (annot s	<b> </b>	-	
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I	Drilling Pro	ogress and	Water Ob	servations	3			Cor	oral I	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	lei ai i	Remarks		
						All	dimensi	ons in metre	es	Scale:	1:50	
Method Used:		ection pit + y open hole	Plan		nacchio MC450-F		Drilled Bv:	Lee Harris	Logged By:	IFoster	Checked By:	AGS



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, 1 08/08/18 - 16:08 | KJ2 |

#### **DRAFT**

Contract:						Client:		_	Boreho		
	onehenge F						lighways Engla			F	RX621
Contract Re			Start:	24.04.18	Groun		National Grid Co-		Sheet:		
•	733442		End:	02.05.18		79.99	E:412751.3	N:141919.2		5	of <b>9</b>
Drilling Pro	Drill Time (hh:mm)	Flush Returns & Details		Type Rackfill Safety	mentation Water	CHALK with flir	Description of Stra ats (driller's description of from 1.20m from prev	1).	Reduced Level	Depth (Thick ness)	Materi Graph Legen
	36.00 - 39.00 (00:02)	100% return Air+Mist (Brown)									
	39.00 - 42.00 (00:01)	100% return Air+Mist (Brown)				at 39.10 description).	m to 39.60m depth	flint band (driller's			
	42.00 - 45.00 (00:01)	100% return Air+Mist (Brown)				CHALK with lar	ge flint bands (driller's	description).	37.99	42.00	

1	Drilling Pro	ogress and	Water 0	Observation	S			C 0.1	acrol I	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks	i	
Date	Tillie	Depth	Depth	(mm)	Depth							
						Δ	ll dimens	ons in metre	26	Scale:	1:50	
							ii diiiiciio	ono in mone	,0	Ocaic.	1.00	
Method		ection pit + y open hole	Pla		nacchio MC450-	D1	Drilled	Lee Harris	Logged	IFoster	Checked	400
Used:	Notai	y open noie	Us	ea: coi	Iaccino MC430-		By:	Lee Hallis	By:	ii Ostei	By:	AGS



## **BOREHOLE LOG**

Contract:						Client:			Boreho	ole:	
A303 Ston	nehenge F	hase 6 G	roun	d Investiga	tion		Highways Eng	land		F	X621
Contract Ref:			Start:	24.04.18	Groui	nd Level:	National Grid Co		Sheet:		
73	33442		End:	02.05.18		79.99	E:412751.	3 N:141919.2		6	of <b>9</b>
Drilling Progr		Flush	Sa	mples ≝ _	tion er				ced	Depth	Material
Depth	Drill Time (hh:mm)	Returns & Details	No	Type Section 1	menta				Redu	(Thick ness)	Graphic
I	Drill Time	Returns		<u> </u>	Mater Water	(stratum copie	Description of Strange flint bands (driller d from 42.00m from p	's description). revious sheet)	Seduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduced Reduce	(Thick ness)	Graphic
-									- - - -	- - - -	
									F	-	

Date	Time	ogress and Borehole		Borehole Diameter	Water		Gei	neral I	Remarks		
		Depth	Depth	(mm)	Depth						
						All dimens	ions in metre	es	Scale:	1:50	
Method		ection pit +	Plan		nacchio MC450-P1	Drilled	Lee Harris	Logged	IFoster	Checked By:	VG6

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 8: RX622 Borehole Log

### **BOREHOLE LOG**

Contract:								Client:		Boreho		
A303 Sto		nge F	Phase 6						ghways England	Ob4:	H	RX622
Contract Re							oun	d Level:	National Grid Co-ordinate:	Sheet:		•
	7334				02.05			80.56	E:412749.8 N:141870.1	   75	1	of <b>9</b>
Drilling Pro	Drill	Time	Flush Return & Deta	s	Type	ackfill & Instru- entatior	Water		Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Берит	(hh:r	nm)	u Deta	140	Турс	<u>α</u> ε				<u>.</u>	- - -	Legend
								coarse. Gravel i		80.26	0.30	× · × · × · × · × · × · × · × · × · × ·
0.50				101	ES			comprising slightl	ale brown structureless CHALK y sandy gravelly SILT with low cobble fine to coarse. Gravel is subangular to	79.86	0.70	
<del>.</del>		١	<b>A</b>					subrounded fine Cobbles are sub-	to coarse of chalk and rare flint. angular to subrounded chalk and rare	79.36	<b>⊢</b> ' '	
								flint. (Grade Dm) White and crea	m structureless CHALK comprising	- - -	- - -	
-	1.20 -		100% return Air+Mi	1				slightly sandy silt	y angular to subrounded fine to coarse and rare flint. Sand is fine to coarse.	- - - -	= - - -	
			(White	*)				Weak white CH description).	ALK with occasional flints (driller's	- - -	_ _ _	
-		,	<b>— X</b>							-	-	
										- - -	- - - -	
- - -										- - -	- - -	
	3.00 -			1						- - -	- - - -	
-	(00:	05)	Air+Mi: (White							-	-	
										- - -	- - -	
										-	-	
-			<u> </u>							- - -		
							<u>1</u>			- - - -	- - - -	
-	6.00 -	9.00	90% ret Air+Mi	urn			÷ 1			- - -	<u>-</u> -	
	(00:	05)	(White	e)			<u> </u>			- - -	_ - -	
										- - -	- - - -	
										-	-	

	Drilling Pro	ogress and	Water Ob	servation	s	
Date	Time	Borehole	Casing	Borehole Diameter	Water	
Date	Tille	Depth	Depth	(mm)	Depth	l
02/05/18	11:30	7.50	3.00	146	7.50	11.
02/05/18	16:45	48.00	3.00	146	7.20	Ш
						Ш.
						1
						Ш
						╟
						Ш
Method Used:		ction pit + open hole	Plan Used	-	omacchio MC4	50

GINT_LIBRARY V8 06.GLB LibVersion: v8 06_018 PriVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 16:08 | KJ2 |

#### **General Remarks**

- 1. Location CAT scanned prior to excavation.
- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.20m depth on 26/03/2018.
- 4. Groundwater strike at 7.50m depth, rising to 6.90m depth after 20 minutes.
  5. Borehole drilled using 146mm open hole rotary bit and air mist as the flush
- medium.
- 6. 50mm PVC groundwater monitoring pipe installed as shown.

_	iii uiiiieii	Sions in mene	:5	Scale.	1.50
	Drilled By:	Stuart Crawford	Logged By:	lFoster	Checked By:



1.50



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PrjVersion: v8 06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442 A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Lid, Head Office - Bristol: The Oid School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, 1 08/08/18 - 16:08 | KJ2 |

#### **DRAFT**

Contract:						Client:		Boreho	ole:	
A303 St	onehenge I	Phase 6	Groun	d Investiga	tion	Hig	ghways England		R	X622
Contract R				02.05.18			National Grid Co-ordinate:	Sheet:		
	733442		End:	02.05.18		80.56	E:412749.8 N:141870.1		2	of <b>9</b>
Drilling Pro	ogress Log	Flush	Sa	amples ≝ <u>.</u>	L O			ed ed	Depth	Materia
Depth	Drill Time (hh:mm)	Return: & Detai	s	<b>₩</b>	mentatio Water		Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
	6.00 - 9.00 (00:05)				• • • • • • • • • • • • • • • • • • • •	description).	ALK with occasional flints (driller's om 1.20m from previous sheet)	-	-	
	<b>A</b>	<b> </b>				(Stratum copied in	om 1.20m nom previous sneet)	-	-	
								-	-	
								[		
								-	<u> </u>	
	9.00 - 12.00	90% retu Air+Mis						E		
	(00:06)	(White		***				-		
				***	• • •			-	- - -	
								Ē		
								-	  -  -	
	<b>*</b>	1		***	• • •			-	-	
								[		
				***				-	-	
					• • •			-		
	12.00 - 15.00	90% retu Air+Mis	st					-	-	
	(00:05)	(White	)	***				Ė	-	
				***	• • •			E		
								-	-	
								E		
	1	<b>^</b>		***	• • •			<u>-</u>		
								-	(28.80)	
								-	<u>-</u>	
	15.00 - 18.00	80% retu Air+Mis	st					-	- -	
	(00:04)	(White	)					-	-  -  -	
								-		
								-	_	
					• • •			-	<u> </u>	

I	Drilling Pro	ogress and	Water Ob	servations	3		Cor	orol	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Gei	lerai	Remarks		
						All di	mensions in metre	es	Scale:	1:50	
Method Used:		ection pit + y open hole	Plan		macchio MC450		lled Stuart Crawford	Logged By:	IFoster	Checked By:	AGS



GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Bristol SI - 012 | Log XCUSTOM - 733442 LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION.GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, | 08/08/18 - 16:08 | KJ2 |

#### **DRAFT**

Contract:					Client:		Boreho	ole:	
A303 Stonehenge	Phase 6 G	round	l Investigat	tion	H	ighways England		R	X622
Contract Ref:		Start:	02.05.18	Groun	d Level:	National Grid Co-ordinate:	Sheet:		
733442		End:	02.05.18		80.56	E:412749.8 N:141870.		<b>3</b> c	of <b>9</b>
Drilling Progress Log	Flush	Sa	mples ≝ _⇒	er tion			pec el	Depth	Materi
Depth Drill Time (hh:mm)	Returns & Details		mples ⊗ Type Backtill &	mentatio Water		Description of Strata	Reduced	(Thick	Graph Leger
18.00 - 21.00 (00:06)	80% retur Air+Mist (White)				description).	HALK with occasional flints (drille	r's		
21.00 - 24.00 (00:05)	80% retur Air+Mist (White)								
24.00 - 27.00 (00:06)	80% retur Air+Mist (White)	n							

[	Drilling Pr	ogress and	Water Ob	oservation	s	Con	oral Damai	rko
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	Ger	neral Remai	iks
						All dimensions in metre	s Scale:	1:50
lethod sed:		ection pit +	Plan		omacchio MC450	Drilled Bv: Stuart Crawford	Logged Bv: IFoste	Checked By:

#### **BOREHOLE LOG**

Contract:							Client:		Boreho	ıle.	
	nobona	o Dha	50 F	Graus	d Investigation			ghways England	Dorenc		X622
Contract Re		e Pila	se o		<b>02.05.18</b> Gr			National Grid Co-ordinate:	Sheet:		XUZZ
	 733442	•		End:	02.05.18	· oui	80.56	E:412749.8 N:141870.1	Onoot.	4	of <b>9</b>
Drilling Pro							00.00	L.412745.0 N. 141070.1	<u> </u>		1
Depth Depth	Drill Tim (hh:mm	ne R	Flush eturn Detai	s	Type Backfill & nentation	Water		Description of Strata	Reduced Level	Depth (Thick ness)	Materia Graphic Legend
	*		<b>X</b>				description).	ALK with occasional flints (driller's om 1.20m from previous sheet)	- - - - - - -	- - - - - - -	
	27.00 - 30.00 (00:07)	A	% retuir+Mis	st					-	- - - - - - - - - - - -	
			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						50.56	30.00	
	30.00	-   ^	% retu	urn st			Weak very light occasional flints (c	brown/yellowish white CHALK with driller's description).	-		
	33.00 (00:05)	1 1 1	1: -	.1_4					-	- - - - - - - - - - - - - - - - - - -	
	33.00 - 36.00 (00:04)	- I A	% retuir+Misery licy	st l					-	- - - - - - - - - - - - - - - - - - -	
									- - - - -	- - - - -	

[	Orilling Pro	ogress and	Water (	Observation	S			Car	oral l	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ger	ierai i	Remarks		
Date	Tillie	Depth	Depth		Depth							
						А	II dimen	sions in metre	s	Scale:	1:50	
Method Used:		ection pit + y open hole	Pla		omacchio MC45	)	Drilled Bv:	Stuart Crawford	Logged Bv:	IFoster	Checked By:	AGS



## **BOREHOLE LOG**

Contract:								Client:		Boreho	ole:	
A303 Stor	nehenge	Phase 6	Gro	und	Investiga	tion		Hig	hways England		R	X622
Contract Ref:	•		Sta	art:	02.05.18	Gro	un	d Level:	National Grid Co-ordinate:	Sheet:		
7	33442		En	d:	02.05.18			80.56	E:412749.8 N:141870.1		5	of <b>9</b>
Drilling Prog	ress Log Drill Tim	Retur	ns –	Sai	mples Sackfill & Type	mentation	Water	n	escription of Strata	Reduced	Depth (Thick	Material Graphic
	(hh:mm	~ n n	ails 1	No	Type 🖁	mer	≥			Rec	ness)	Legend
-	<b>X</b>	<b>Y</b>				***		occasional flints (di	brown/yellowish white CHALK with riller's description).  m 30.00m from previous sheet)	- - - - - -	- - - - -	
	36.00 - 39.00 (00:05)	70% re Air+M (Very li own/yello	list	ite)							(13.00)	
-	39.00 - 42.00 (00:06)	70% re Air+M (Very li own/yello	list	iite)								
-	42.00 - 45.00 (00:05)	60% re Air+M (Very li own/yello	list	ite)				Moderately weak occasional flints (di	light yellowish white CHALK with riller's description).	37.56	43.00	

I	Drilling Pr	ogress and	Water Ol		3		Gor	oral	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Gei	ICIAI	INCIIIAINS		
						All	dimensions in metre	es	Scale:	1:50	
Method Used:		ection pit + y open hole	Plan Use		macchio MC450		Orilled By: Stuart Crawford	Logged By:	IFoster	Checked By:	AGS



## **BOREHOLE LOG**

0				Oli t-		D- 1	la.	
Contract:	_			Client:	uba. Escalarad	Boreho		VCCC
A303 Stonehenge Phase 6					ghways England		R	X622
Contract Ref:		02.05.18			National Grid Co-ordinate:	Sheet:		_
733442	End:	02.05.18		80.56	E:412749.8 N:141870.1		6	of <b>9</b>
Drilling Progress Log Flus Popth Prill Time (hh·mm) & Det	ns	Type Backet	entation		Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth (hh:mm) & Det	JII3 140	Type m	•	occasional flints (d	light yellowish white CHALK with Iriller's description).	-	-	
45.00 - 48.00 (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I) (Very I	list			(stratum copied from Moderately weak heavy concentration	light yellowish white CHALK with on of flints (driller's description).		48.00	

_		ogress and Borehole		Borehole	Water		Ger	neral I	Remarks		
Date	Time	Depth	Depth	Diameter (mm)	Depth						
						All dimen	sions in metre	25	Scale:	1:50	
Method	Insp Rotar	ection pit + ry open hole	Plan		omacchio MC450	Drilled	Stuart Crawford	Logged	IFoster	Checked By:	VG2

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 9: RX633 Borehole Log

### **BOREHOLE LOG**

Contract:		Client:		Borehole:
A303 Stonehenge Phase 6	Ground Investigat	tion Hig	hways England	RX63
Contract Ref:	Start: 25.07.18	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
733442	End: <b>26.07.18</b>	80.91	E:412739.9 N:142040.3	<b>1</b> of <b>7</b>
Drilling Progress Log		Samples & Testing	-	Depth Mater
Depth Drill Time (hh:mm)	Returns & Details No	Samples & Testing  Type Results	Description of Strata	Depth Mater (Thick Graph ness) Leger
0.50	85% return Air+Mist (White)	ES	-	80.61 0.30

I	Drilling Pro	ogress and	Water Ob	servations	3
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/07/18	16:30	55.00	18.00	146	-

Plant

Used:

Massenza M.I.12

Inspection pit + Rotary openhole drilling

#### **General Remarks**

- 1. Location CAT scanned prior to excavation.
- 2. First strata encountered excavated by Archaeologists.
- 3. Hand dug inspection pit to 1.20m depth on 20/07/2018.

All dimensions in metres

4. No groundwater strikes noted by the driller.5. Borehole drilled using 146mm open hole rotary bit and air mist as the flush medium.

Scale:

6. 50mm PVC groundwater monitoring pipe installed as shown.

Drilled By:	Adrian Hopwood	Logged By:	SPearce	Checked By:
•		•		

1:50

Method

Used:

### **BOREHOLE LOG**

Contract:							Client:				Boreho	le:	
A303 Sto	nehenge Pl	hase 6 Gro	ound	Inve	stiga	tion		Hig	hwa	ays England		F	X633
Contract Ref	f:	S	tart:	25.0	7.18	Grour	nd Level (m A0	DD):	Natio	onal Grid Co-ordinate:	Sheet:		
7	33442	E	nd:	26.0	7.18		80.91		E:	412739.9 N:142040.3		2	of <b>7</b>
Drilling	g Progress L	.og	Flu	ısh	,	Sample	s & Testing	≈ 7 i	<u>_</u>		pec el	Depth	Material
Depth	Drill T (hh:m		Reti & De	urns etails	No	Туре	Results	Backfill & Instru-	Water	Description of Strata	Reduced	(Thick ness)	Graphic
	0.00 - 5 (04:2	00.00	85% I Air+ (Wh	return Mist nite)						CHALK and FLINT driller's description. (stratum copied from 1.20m from previous sheet)			

5	I	Drilling Pro	ogress and	Water O	oservation	s			Gene	rol I	Don	aarka			
2	Date	Time	Borehole		Borehole Diameter	Water			Gene	iai i	Ren	liaiks			
5			Depth	Depth	(mm)	Depth		·				·		·	
5															
3															
5															
2															
į															
3							Δ	ll dimens	ions in metres		Scal	Φ.	1:50		
5	Method			ole Plan	<u></u>			Drilled	iono in metros	Logge			Checked		
2000	Used:		+ Rotary openh Irilling	use		Massenza M.I.12		By:	Adrian Hopwood	Logge By:	tu	SPearce	By:		AGS

### **BOREHOLE LOG**

Drill Time Returns 및 통형 Description of Strata 국 (Thick Graphic	Contract:						Client:					Boreho	le:		
Trilling Progress Log Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hh:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:mm)  Depth Drill Time (hi:m	A303 Sto	nehenge F	hase 6			_								R	X633
Drilling Progress Log Returns Returns (hh:mm)  Depth Drill Time (hh:mm)  Returns & Details No Type Results Results Return (Thick Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graphic Graph	Contract Ref	:		Start:	25.07	7.18	Groun	d Level (m AC	)D):	N	atio	nal Grid Co-ordinate:	Sheet:		
0.00 - 55.00 (04:20)  85% return Air-Mist (White)	7	33442		End:	26.07	7.18		80.91			E:4	412739.9 N:142040.3		3	of <b>7</b>
0.00 - 55.00 (04:20)  85% return Air-Mist (White)	Drilling			Flu	ısh		Samples	s & Testing	& -1: EL 2:	allo	ıter	Description of Charts	uced	Depth	Material
0.00 - 55.00 (04:20) 85% return Air-Mist (White)	Depth			& De	etails	No	Туре	Results	Back		Wa	•	Redu	ness)	Legend
		Drill (hh:	Time mm)	Flu Retri & De	return Mist						Water	CHALK and FLINT driller's description.	Reduced	(Thick	Graphic
										• • • • • • • • • • • • • • • • • • • •				-	

	Drilling Pr	ogress and	Water Ob		S			Conc	vral [	Don	narks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Gene	iai i	\CI	liains		
Date		Depth	Depth	(mm)	Depth								
						A	II dimens	ions in metres		Scal	e:	1:50	
Method Used:		+ Rotary openh Irilling	Plan Used		Massenza M.I.12		Drilled By:	Adrian Hopwood	Logge By:	ed	SPearce	Checked By:	GS

Contract:						Client:				Boreho	le:	
A303 Sto	nehenge Phase 6 (	Ground	Inves	stiga	tion		Hig	hwa	rys England		R	X633
Contract Ref	f:	Start:	25.0	7.18	Grour	d Level (m AC	D):	Natio	nal Grid Co-ordinate:	Sheet:		
7	33442	End:	26.0	7.18		80.91			412739.9 N:142040.3		4	of <b>7</b>
Drilling	g Progress Log	Flu	ısh		Sample	s & Testing	% -i.e.	ter		lced /el	Depth	Material
Depth	Drill Time (hh:mm)		urns etails	No	Туре	Results	Backfill & Instru-	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
	0.00 - 55.00 (04:20)		return Mist nite)						CHALK and FLINT driller's description. (stratum copied from 1.20m from previous sheet)	-	(53.80)	

<u>ನ</u>	I	Drilling Pro	gress and	Water O	bservation	s			Conc	ral	Dom	orko		
ב ב	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gene	erai	Rem	arks		
<del>.</del>	Date	'	Depth	Depth	(mm)	Depth								
Š														
3														
5														
Ď														
- ĵ														
ב מ														
5							Α	II dimens	ions in metres		Scale	:	1:50	
Hucture	Method Used:	Inspection pit	+ Rotary openh	ole Plai Use		Massenza M.I.12		Drilled By:	Adrian Hopwood	Logge By:	ed s	SPearce	Checked By:	IGS

## **BOREHOLE LOG**

Contract:				Client:				Boreho	le:			
A303 Stonehenge	Phase 6	Ground	Inve	stiga	tion		Hig	hwa	ys England		R	X633
Contract Ref:		Start:	25.0	7.18	Groun	d Level (m A	OD):	Natio	nal Grid Co-ordinate:	Sheet:		
733442	1	End:	26.0	7.18		80.91		E:	412739.9 N:142040.3		5	of <b>7</b>
Drilling Progres	s Log		ısh		Sample	s & Testing	∞ , 8			p _	Denth	Material
Dri	II Time h:mm)	Ret	urns etails	No	Туре	Results	Backfill & Instru-	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
	0 - 55.00 14:20)	Air+	return ·Mist nite)						CHALK and FLINT driller's description. (stratum copied from 1.20m from previous sheet)			

]	Drilling Pro	gress and	Water O	bservation	s			Conc	ral [	701	marka		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gene	erai r	Kei	marks		
			·	,									
						Δ	II dimens	ions in metres		Sca	le:	1:50	
ethod sed:		+ Rotary openh rilling	Plai Use		Massenza M.I.12		Drilled By:	Adrian Hopwood	Logge By:	ed	SPearce	Checke By:	IGS

Contract:					Client:				Boreho	le:		
A303 Stonehenge	Phase 6 G	round	Inve	stiga	tion		Hig	hwa	ys England		R	X633
Contract Ref:		Start:	25.0	7.18	Groun	d Level (m AO	D):	Natio	nal Grid Co-ordinate:	Sheet:		
733442		End:	26.0	7.18		80.91		E:	412739.9 N:142040.3		6	of <b>7</b>
Drilling Progress	Log	Flu	ush		Sample	s & Testing	∞ . 5			e ed	Denth	Material
	Time :mm)	Ret	urns etails	No	Туре	Results	Backfill & Instru-	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
0.00	- 55.00 1:20)	Air+	return •Mist hite)						CHALK and FLINT driller's description. (stratum copied from 1.20m from previous sheet)			

	Drilling Pro	ogress and	Water Ob	servation	s			Conc	vrol l	Dar	marka		
Date	Time	Borehole		Borehole Diameter	Water			Gene	erai i	Rei	narks		
		Depth	Depth	(mm)	Depth								
						Α	II dimens	ions in metres		Sca	le:	1:50	
Method Used:		+ Rotary openh Irilling	Plan Use		Massenza M.I.12		Drilled By:	Adrian Hopwood	Logge By:	ed	SPearce	Checked By:	IGS

## **BOREHOLE LOG**

Contract:					Client:					Boreho	le:			
A303 Sto	nehenge Ph	nase 6 G	round	Inves	stiga	tion		Hi	gh	ıwa	ys England		R	X633
Contract Re	f:		Start:	25.0	7.18	Groun	d Level (m AC	D):	Ī	Vatio	nal Grid Co-ordinate:	Sheet:		
7	33442		End:	26.0	7.18		80.91			E:4	412739.9 N:142040.3		7	of <b>7</b>
Drilling	g Progress L		Flu	ısh	,	Samples	s & Testing	∞ :	tion	er		ced	Depth	Material
Depth	Drill Ti (hh:m		Ret	urns etails	No	Туре	Results	Backfill &	menta	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
	0.00 - 5 (04:2	55.00		return Mist nite)							CHALK and FLINT driller's description. (stratum copied from 1.20m from previous sheet)  Borehole terminated at 55.00m depth.	25.91	55.00	

3 [	]	Drilling Pro	gress and	Water C	bservation	s			Conc	vrol l	Dar	marka		
Í	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gene	erai i	Rei	marks		
<u> </u>	Date	111110	Depth	Depth	(mm)	Depth								
2														
{														
3														
-														
Š														
2											_		4.50	
2							Α	ll dimens	ions in metres		Sca	le:	1:50	
3 1	Method		+ Rotary openh	_{iole} Pla				Drilled		Logge	ed	SPearce	Checked	
ا ود	Jsed:	d	rilling	Use	ed: '	/lassenza M.I.12		Ву:	Adrian Hopwood	Ву:			By:	١GS

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 10: W617 Borehole Log

## **BOREHOLE LOG**

Contract:						Cli	ient:						Boreho	le:	
A303 St	oneh	enge Pł	nase 6 Ground	Investigat	ion			ı	Hig	hw	/ay	s England		,	W617
Contract Re			Start:	20.4.18		und L	evel (m					al Grid Co-ordinate:	Sheet:		
	7334	142	End:	3.7.18		-	79.60			E	<u>:</u> 4	12751.0 N:141968.7		1	of <b>8</b>
		Sample	s & Testing	Mech		l Log	<u>" "</u>		∞ ,	Б	_		- G	Depth	Material
Depth (m)	No	Туре	Results	TCR SCR (%) (%)	RQE (%)	) If (mm)	Flush Returns & Details	Drill Time (hh:mm)	Backfill & Instru-	mentati	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
-							,			L			-	-	
<u>-</u>									390			Brown slightly gravelly sandy CLAY. Sand is fine to coarse.	79.30	0.30	<u> </u>
0.50	101	ES	T,J,V									Gravel is subangular to subrounded fine to coarse of chalk and flint.	/ <del>-</del>	(0.90)	* · · · · × · · · × · · · × · · · ×
- - <del>-</del> -												Cream to pale brown slightly gravelly silty fine to coarse SAND with low cobble content.	78.40	1.20	
- - -												Gravel is angular to subrounded fine to coarse flint and chalk. Cobbles are subangular to subrounded flint.	-	(0.60)	
- - - -												Firm brown chalky CLAY abundant with flints (driller's	77.80	1.80	
-												description).  Firm white CHALK with numerous flint (driller's	-	- - -	
- -												description).	-	-	
- - - -													-	-	
- - -													-	(3.70)	
- - - -													-	[ -	
- - -													-		
- - -													-	- - -	
 - -							<b>A</b>	<b>A</b>				Rotary drilling techniques used below 5.20m depth.	-	- - -	
-												Firm white CHALK with numerous flint becoming more	74.10	5.50	
- - -												structured (driller's description).	-	-	
- - -							E +-						-	- - -	
- - - -							85% return Air+Mist (White)	(05:00)					<u>-</u>	<u>-</u>	
- - -							86						[	[	
<u> </u>													[	-	
_ - -													-	_	<del>                                     </del>

		Boring Pr	ogress and	Water Ol	oservations	;	Chise	lling / Slow F	Progress	0	<b>-</b>	1	
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth	From	То	Duration (hh:mm)	General I	Remar	KS	
-	00/04/40		-1		(mm) 300	<del></del>			<u> </u>	1. See technique 2			
1	20/04/18		5.50	5.50		Dry				2. Location CAT scanned	prior to exc	cavation.	
:	20/04/18	12:10	1.20	1.20	500	Dry				3. First strata encountered	excavated	l by	
	20/04/18	12:30	5.00	5.00	400					Archaeologists.		•	
	20/04/18	12:40	5.50	5.50	350	Dry				4. Hand dug inspection pit	to 1.20m c	depth on	
	05/06/18	14:30	5.50	5.50	350	-				27/03/2018.		•	
1	05/06/18	16:30	18.00	5.50	350	-				5. No groundwater strike n	oted by the	e driller.	
	06/06/18	08:30	18.00	5.50	350	11.45							
.	06/06/18	06/18 17:00 29.50 5.50 350								All dimensions in metres	Scale:	1:50	_
) [	Method Used:	Cable F	ection pit + Percussion +	Plar Use		Dando 2500 + Massenza M.I.12			m Langford + . Hopwood	Logged By: IFoster	Checked By:		GS

O															DOILLI			
Contract:								Cli	ent:							Boreho	ole:	
A303 Sto	neh	enge Ph	nase 6 Gr	ound	Inves	tigati	ion					Н	igh	way	ys England		1	W617
Contract Ref	:		5	Start:	20.4	1.18	Grou	ınd Le	evel	(m /	40[	D):	N	ation	al Grid Co-ordinate:	Sheet:		
7	<b>7</b> 334	142	E	End:	3.7	7.18		7	79.0	60				E:4	112751.0 N:141968.7		2	of <b>8</b>
Depth (m)	No	Sample:	s & Testin Resu		TCR	/lecha	anical RQD (%)	Log	ush	Details	Drill Time	n:mm)	Instru-	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
									85% return Air+Mic+		G:00) — — — — — — — — — — — — — — — — — —						(12.50)	

5															
2		Boring Pro	ogress and	Water Ob	servations		Chisel	ling / Slow F	Progress	Compared Domeonics					
2	Date	Time	Borehole Depth	Diameter		Water Depth	From	То	Duration (hh:mm)						
2	07/06/18	08:30	29.50	5.50	350 22.70					6. Cable percussion boreh					
ָ י	07/06/18	14:50	35.40	5.50	350						04mm "16 inch" casing				
	08/06/18	08:30	35.40	5.50	350	10.30				grouted in to 5.50m dep 7. Rotary borehole drilled t					
ב ב	08/06/18	13:00	36.00	5.50	350	-				open hole drill bit with a					
<u> </u>	11/06/18	09:30	36.00	5.50	350	13.80				medium.					
į	11/06/18	09:30	36.00	5.50	350	-				8. Borehole collapsed sub	sequent to geologging.				
2	18/06/18	10:45	35.50	21.00	350	13.65									
į E	18/06/18	17:30	35.50	21.00	350	-				All dimensions in metres	Scale: <u>1:50</u>				
טון מכימיי	Method Inspection pit + Cable Percussion + Rotary open hole		Plar Use	-	Dando 2500 + Massenza M.I.12			ım Langford + Hopwood	Logged By: IFoster	Checke By: GS					

Contract:					Cli	Client:							Boreho			
A303 Std	Investiga	tion		Highways England									W617			
Contract Ref: Start: 20.4.18 Ground																
7	<b>733442</b> End: <b>3.7.18</b>					-	79.60				E:412751.0 N:141968.7				3	of <b>8</b>
Samples & Testing									g ed	Depth	Material					
Depth (m)	No	Туре	Results	TCR SCI	RQE (%)	lf (mm)	Flush	& Deta	Drill Time (hh:mm)	Backfill & Instru-	mentat	water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
-									(05:00)					-	-	
							85% return Airt-Mist	(White)					CHALK and FLINT (Driller's Description)	61.60	18.00	

2															
2		Boring Pr	ogress and	Water Ob	servations	;	Chise	lling / Slo	w Progress	Consul Domestic					
2	Date	Time	Borehole	Casing Borehole Wate		Water	From	То	Duration	General Remarks					
	Date	Time	Depth	Depth	(mm)	Depth	1 10111	10	(hh:mm)	Derebala radrillad to death using a 250mm "12					
2	19/06/18	08:30	36.00	21.00	350	13.75				Borehole redrilled to depth using a 350mm "13 3/4 inch" open hole drill bit with air mist used as					
ξ	19/06/18	16:30	36.50	21.00	350	-				the flush medium.	DIL WILLI AII	IIIISI USC	u as		
	20/06/18	08:30	36.50	21.00	350	13.50				9. 300mm PVC water monitoring pipe installed a					
3	20/06/18	13:05	36.50	21.00	350	-				shown.					
-	21/06/18	08:30	36.50	21.00	350	13.85									
3	21/06/18	08:30	36.50	21.00	350	-									
2	22/06/18	08:30	37.00	21.00	350	13.65									
5	22/06/18	08:30	37.00	21.00	350	-				All dimensions in metres	Scale:	<u>1:50</u>			
	Used: Cable Percus				Dando 2500 + Massenza M.I.12		Drilled Bv:	Adam Langford + A. Hopwood	Logged By: IFoster	Checked By:		\GS			

### **BOREHOLE LOG**

Contract:									Client:								Borehole:			
A303 Stonehenge Phase 6 Ground Investigation								Highways England								W617				
Contract Ref	Start:	20.	4.18	Grou	ınd Le	evel	(m /	(OD	):	Nat	tiona	al Grid Co-ordinate:	Sheet:							
733442			End:		7.18			79.6	60				Ξ:4	12751.0 N:141968.7		4	of <b>8</b>			
Donath		Sample	s & Tes	ting	ı	Mecha	anical	Log	ی	ails	m (c	o ⊠ ⊃	tion	ē		ced	Depth	Material		
Depth (m)	No	Туре	Res	sults	TCR	SCR	anical RQD (%)	If	lush	Det	Drill Time (hh:mm)	Backfill & Instru-	Jenta	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend		
. ,		71			(%)	(70)	(70)	(111111)	L &	. ≪	<u>ة</u> ق					<u> </u>				
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									retu-	ite)	00	1 8				E				
-									85% return Air+Mist	₹	(04:00)					-	(20.50)			
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2	Boring Progress and Water Observations							lling / Slo	w Progress	General Remarks				
פֿ	Date	Time	Borehole	Casing	Borehole Diameter		ter From		Duration	General	Reman	KS		
<u>.</u>	Date	TITLE	Depth	Depth	(mm)	Depth	1 10111	То	(hh:mm)					
2	25/06/18	08:30	37.00	21.00	350	11.65								
Ų	25/06/18	16:00	37.00	21.00	350	-								
ĺ	29/06/18	09:30	38.50	38.50	350	11.70								
g	29/06/18	17:30	44.50	38.50	350	-								
_	02/07/18	10:10	44.50	44.70	350	11.80								
3	02/07/18	17:30	46.80	44.70	350	-								
2	03/07/18	09:15	46.80	46.70	350	11.84								
5 ≅	03/07/18	17:30	48.80	46.70	350	-				All dimensions in metres	Scale:	<u>1:50</u>		
	Method Used:	Cable F	Inspection pit + able Percussion +				Dando 2500 + lassenza M.I.12		Adam Langford + A. Hopwood	Logged By: IFoster	Checked By:		GS	
ר	Rotary open		open noie							1 .	1 1			

GINT_LIBRARY_V8_06. GLB LibVersion: v8_06_018 PŋVersion: v8_06_0 Core+Full Bristol SI - 012 | Log XCUSTOM - 562689 - COMPOSITE LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, [11/4/19 - 13:39 | KJ2 |

Rotary open hole

# STRUCTURAL SOILS

# **BOREHOLE LOG**

Contract:								Cli	ent:					Boreho	le:	
A303 Sto	neh	enge Pr	nase 6 (	Ground	Inves	stigat	ion			ŀ	Higl	hwa	ys England		,	W617
Contract Ref	:			Start:	20.4	4.18	Grou	ınd Le	evel (m	AOD):	:	Natior	nal Grid Co-ordinate:	Sheet:		
7	'33 ⁴	142		End:	3.	7.18		7	79.60			E:4	412751.0 N:141968.7		5	of <b>8</b>
		Sample	s & Tes	ting		Mecha	anical	Log	s ils	Je (	∞ -	ioi 🧏		bed Fig	Depth	Material
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Drill Time (hh:mm)	Backfill & Instru-	mentatio Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
-									85% retu <b>8</b> 5% ret <b>®5</b> % return Air+MistAir+Mis <b>k</b> ir+Mist (White) (White)	(00:10)				-	-	
-									% re ir+N Whi	:00	∄			-	-	
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-											18			41.10	- - 38 50	
-											╽┋		Hard white CHALK with frequent	-	-	
											ΙΪ		bands of small cobble sized flint (driller's description).	[		
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	Boring Pr	ogress and	Water Ob	servations		Chisell	ing / Slow F	rogress	Comparel	Da.		
Date	Time	Borehole	Casing	Borehole Diameter	Water	From	То	Duration	General I	Remai	KS	
Date	TITIC	Depth	Depth	(mm)	Depth	1 10111	10	(hh:mm)				-
			i									
			Í	'								
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			i	'								
			Í						AH			
				'		<u> </u>			All dimensions in metres	Scale:	<u>1:50</u>	
Method Used:		ection pit + Percussion +	Plan		Dando 2500 + Wassenza M.I.12			am Langford + A. Hopwood	Logged Bv: IFoster	Checke Bv:		GS.

# STRUCTURAL SOILS

# **BOREHOLE LOG**

Contract:								Clie	ent:					Boreho	le:	
A303 Stor	nehe	enge Ph	ase 6 0	round	Inves	tigati	on			H	ligh	way	s England		1	W617
Contract Ref:				Start:		4.18		ind Le	evel (m				al Grid Co-ordinate:	Sheet:		
7;	334	42		End:	3.7	7.18		7	79.60			E:4	12751.0 N:141968.7		6	of <b>8</b>
	;	Samples	& Test	ing	ľ	Mecha	anical	Log	s s	Je (	& ¹ ië	<u></u>		9 - G	Depth	Material
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Drill Time (hh:mm)	Backfill & Instru-	Water	Description of Strata	Reduced Level	(Thick ness)	Graphic Legend
													Borehole terminated at 48.80m depth.	30.80	48.80	

	Boring Pi	ogress and	Water Ob	servations		Chisel	ling / Slov	v Progress	Conoral	Damar	d.o	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth	From	То	Duration (hh:mm)	General	Remar	KS	
		Берит	Верит	(mm)	Берит							
Method Used:		ection pit + Percussion +	Plan Use	-	Dando 2500 + <i>N</i> assenza M.I.12		Drilled A	Adam Langford + A. Hopwood	All dimensions in metres Logged By: Foster	Scale: Checked Bv:	1:50	ıgs





# **BOREHOLE LOG**

Contract:			Client:		Borehole	9:		
A303 Stonehenge Phase 6 0	Ground	Investigati	on Hiç	ghways England			W	617
Contract Ref:	Start:	20.4.18	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:			
733442	End:	3.7.18	79.60	E:412751.0 N:141968.7		7	of	8

W617 Pit 1

GINT_LIBRARY_V8_06. GLB LibVersion: v8_06_018 PŋVersion: v8_06_0 Core+Full Bristol SI - 012 | Log XCUSTOM - 562689 - COMPOSITE LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, [11/4/19 - 13:39 | KJ2 |

W617 Pit 2

Method	Inspection pit +
Used:	Cable Percussion -
Occu.	Deterr ener hele

**IFoster** 





# **BOREHOLE LOG**

Contract:			Clie	nt:			Borehole	<b>e</b> :		
A303 Stonehenge Phase 6 0	Ground	Investigati	on	H	igh	nways England			W	617
Contract Ref:	Start:	20.4.18	Ground Lev	vel (m AOD):	١	National Grid Co-ordinate:	Sheet:			
733442	End:	3.7.18	79	9.60		E:412751.0 N:141968.7		8	of	8

W617 Spoil

GINT_LIBRARY_V8_06. GLB LibVersion: v8_06_018 PŋVersion: v8_06_0 Core+Full Bristol SI - 012 | Log XCUSTOM - 562689 - COMPOSITE LOG - A4P | 733442_A3003_STONEHENGE_PHASE_6_GROUND_INVESTIGATION. GPJ - v8_06. Structural Solis Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.solis.co.uk, Email: ask@solis.co.uk, [11/4/19 - 13:39 | KJ2 |

Method Inspection pit + Cable Percussion + Rotary open hole Used:

Plant

Dando 2500 + Massenza M.I.12 Used:

Drilled Adam Langford + A. Hopwood

Logged By:

Checke **IFoster** By:

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 11: 210317-67 Groundwater Analysis Report



Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside

> Tel: (01244) 528700 Fax: (01244) 528701

CH5 3US

email: haward encustomers ervices@alsglobal.com

Website: www.alsenvironmental.co.uk

RPS Consultants Ltd 260 Park Avenue Aztec West Almondsbury Bristol BS32 4SY

Attention: Benjamin Briere

#### **CERTIFICATE OF ANALYSIS**

Date of report Generation:24 March 2021Customer:RPS Consultants Ltd

Sample Delivery Group (SDG): 210317-67
Your Reference: JFR1451

**Location:** A303 Stonehenge

**Report No:** 591965

We received 1 sample on Wednesday March 17, 2021 and 1 of these samples were scheduled for analysis which was completed on Wednesday March 24, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.



Sonia McWhan

**Operations Manager** 





SDG: 210317-67 Location: A303 Stonehenge

Client Reference: Order Number:

JFR1451

Report Number: Superseded Report: 591965

# **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23914784	W617			16/03/2021

Only received samples which have had analysis scheduled will be shown on the following pages.

16:31:23 24/03/2021

# **CERTIFICATE OF ANALYSIS**

ALS

() (SS) <u>=</u>									_
Results Legend									23
X Test	Lab Sample	No(s)							23914784
No Determination									84
Possible									
	Custom								
	Custom Sample Ref								W617
	Campio Roi	0101100							7
Sample Types -									
S - Soil/Solid UNS - Unspecified Solid									
GW - Ground Water	AGS Refer	ence							
SW - Surface Water LE - Land Leachate									
PL - Prepared Leachate PR - Process Water									
SA - Saline Water TE - Trade Effluent	Depth (	m)							
TS - Treated Sewage		·							
US - Untreated Sewage RE - Recreational Water			0.5	250	bo s	2 2		포	Na
DW - Drinking Water Non-regulatory UNL - Unspecified Liquid	Contain	er	glass (ALE2	ml Am PTFE,	30ml p tle (AL	50 M	H2SO4 (ALE244)	JO3 F (ALE2	OH (A
SL - Sludge G - Gas			3 bottle 227)	250ml Amber GI. PTFE/PE	330ml plastic bottle (ALE503)	DO KIT + DO 250 ml glass	144 144	HNO3 Filtered (ALE204)	NaOH (ALE245)
OTH - Other		·							_
	Sample T	ype 	GW	GW	GW	GW	GW	GW	GW
Alkalinity as CaCO3	All	NDPs: 0 Tests: 1							
		icolo. I			X				
Ammoniacal Nitrogen	All	NDPs: 0							
		Tests: 1					X		
Anions by Kone (w)	All	NDPs: 0							
		Tests: 1			Х				
Chromium III	All	NDPs: 0							
		Tests: 1						Х	
Conductivity (at 20 deg.C)	All	NDPs: 0						^	
Conductivity (at 20 dog.5)	7 41	Tests: 1							
0					Х				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1							
									Х
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1							
								Х	
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 1							
52.0011		16919. I	Х						
Dissolved Oxygen by Titration	All	NDPs: 0							
		Tests: 1				Х			
EPH CWG (Aliphatic) Aqueous GC	All	NDPs: 0							
(W)		Tests: 1		Х					
EPH CWG (Aromatic) Aqueous GC	All	NDPs: 0							
(W)		Tests: 1		Х					
Fluoride	All	NDPs: 0							
		Tests: 1			Х				
GRO by GC-FID (W)	All	NDPs: 0			^				
5 by 55 / 1D (W)	, vii	Tests: 1	3.5						
Hoverelent Characters ( )	All		Х						
Hexavalent Chromium (w)	All	NDPs: 0 Tests: 1							
					Х				
Mercury Dissolved	All	NDPs: 0 Tests: 1							
		,						Х	
	•								

# **CERTIFICATE OF ANALYSIS**

ALS

Location:	7,000 010	nenenge		Jiaci	Nun	ibci.			
Results Legend									239
X Test	Lab Sample	No(s)							23914784
No Determination Possible									
Sample Types -	Custom Sample Ref								W617
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate	AGS Refer	rence							
PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	Depth (	m)							
RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas	Contain	ier	0.5l glass bottle (ALE227)	250ml Amber GI. PTFE/PE	330ml plastic bottle (ALE503)	DO KIT + DO 250 ml glass	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
OTH - Other	Sample T	уре	GW	GW	GW	GW	GW	GW	GW
Nitrite by Kone (w)	All	NDPs: 0 Tests: 1							Х
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 1		Х					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 1		Х					
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 1	Х						
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 1	х						
pH Value	All	NDPs: 0 Tests: 1			X				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1					Х		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 1			X				
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 1	Х						
Total Dissolved Solids	All	NDPs: 0 Tests: 1			X				
TPH CWG (W)	All	NDPs: 0 Tests: 1	Х						
Turbidity in waters	All	NDPs: 0 Tests: 1			Х				
VOC MS (W)	All	NDPs: 0 Tests: 1	Х						
			^						

# **CERTIFICATE OF ANALYSIS**



	Results Legend		Customer Sample Ref.	W617				
# M	ISO17025 accredited.  mCERTS accredited.							
aq	Aqueous / settled sample.		Depth (m)					
	Dissolved / filtered sample. Total / unfiltered sample.		Sample Type	Ground Water (GW)				
•	Subcontracted - refer to subcontractor repe	ort for	Date Sampled	16/03/2021				
	accreditation status. % recovery of the surrogate standard to ch	eck the	Sampled Time	13:30:00				
	efficiency of the method. The results of ind	lividual	Date Received	17/03/2021				
	compounds within samples aren't correcte the recovery	d for	SDG Ref	210317-67 23914784				
	Trigger breach confirmed		Lab Sample No.(s) AGS Reference	20011101				
	Sample deviation (see appendix)	100011						
Compo		LOD/Unit		202				
Alkalinit	y, Total as CaCO3	<2	TM043	230				
		mg/l						
	y, Bicarbonate as	<2	TM043	230				
CaCO3		mg/l						
Alkalinity	y, Carbonate as CaCO3	<2	TM043	<2				
' '	,,	mg/l						
Control	Oi- (-li £lk)	-	TM000	-0				
Carbon,	Organic (diss.filt)	<3	TM090	<3				
		mg/l						
Ammoni	iacal Nitrogen as N	<0.2	TM099	<0.2				
		mg/l						
Fluoride		<0.5	TM104	<0.5				
1		mg/l						
Conduct	tivity @ 20 deg.C	<0.02	TM120	0.612				
Conduct	urny w 20 deg.0	mS/cm	1101120	0.012				
D: :	1 PL T111 : 1		711100	405	<del>                                     </del>	<del>                                     </del>		
Dissolve	ed solids, Total (meter)	<5	TM123	465				
		mg/l						
Chromiu	um, Trivalent	<0.03	TM152	<0.03				
1		mg/l						
Antimon	y (diss.filt)	<1	TM152	<1				
	,	μg/l		·				
Araania	(dina filt)		TM1EO	40 E				
Arsenic	(diss.fiit)	<0.5	TM152	<0.5				
		μg/l						
Berylliur	m (diss.filt)	<0.1	TM152	<0.1				
		μg/l						
Boron (d	diss.filt)	<10	TM152	16.8				
	•	μg/l						
Cadmiu	m (diss.filt)	<0.08	TM152	<0.08				
Caurillui	iii (uiss.iiit)		1101102	٧٥.٥٥				
01 1	( 11 (511)	μg/l	T14450					
Chromiu	um (diss.filt)	<1	TM152	<1				
		μg/l						
Copper	(diss.filt)	<0.3	TM152	2.74				
		μg/l						
Lead (di	iss.filt)	<0.2	TM152	0.545				
		μg/l						
Mangan	ese (diss.filt)	<3	TM152	<3				
Mangan	looo (dioo.iiit)	μg/l	1111102					
Mark 1 1	anum (dina EIII)		TMACO	-0	1	1		
iviolybde	enum (diss.filt)	<3	TM152	<3				
		μg/l						
Nickel (d	diss.filt)	<0.4	TM152	2.02				
L		μg/l						
Phospho	orus (diss.filt)	<10	TM152	16.6				
1	. ,	μg/l						
Salaniur	m (diss.filt)	<1	TM152	<1				
Colernal	ii (aloo.iiit)	μg/l	1101102	*1				
7: /:	EIIV		T1450	54.5	<del> </del>	<del> </del>		
Zinc (dis	ss.nit)	<1	TM152	54.5				
<u> </u>		μg/l						
Sodium	(Dis.Filt)	<0.076	TM152	31.9				
		mg/l						
Magnes	ium (Dis.Filt)	< 0.036	TM152	1.61				
1 1	•	mg/l						
Potassii	um (Dis.Filt)	<0.2	TM152	0.594				
. 5.30010	(=	mg/l		0.00				
Calai	/Dio Eilt\		TM450	100				
Calcium	(Dis.Filt)	<0.2	TM152	102				
		mg/l						
Iron (Dis	s.Filt)	<0.019	TM152	<0.019				
		mg/l						
Mercury	(diss.filt)	<0.01	TM183	<0.01				
l í		μg/l						
Nitrite as	s NO2	<0.05	TM184	<0.05				
Tanana as	·	mg/l	1,111,104	-0.00				
Dhoont	ate (Ortho as PO4)		TM184	<0.05				
Filospina	ate (Ottilo do FO4)	<0.05	1 IVI 104	<b>\U.U</b> 0				
0.1.1		mg/l	71117	22.2	<del>                                     </del>	<del>                                     </del>		
Sulphate	9	<2	TM184	20.6				
		mg/l						

# **CERTIFICATE OF ANALYSIS**



	Results Legend		Cuetomar Sarrala D. C	
# ISC	017025 accredited.		Customer Sample Ref.	W617
aq Aq	ERTS accredited. ueous / settled sample.		Double (m)	
tot.unfilt Tot	solved / filtered sample. al / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)
acc	bcontracted - refer to subcontractor representation status.		Date Sampled Sampled Time	16/03/2021 13:30:00
effi	ecovery of the surrogate standard to ch ciency of the method. The results of ind npounds within samples aren't correcte	ividual	Date Received SDG Ref	17/03/2021 210317-67
the	recovery gger breach confirmed	a for	Lab Sample No.(s)	23914784
1-4+§@ Sar	mple deviation (see appendix)	LOD/Uni	AGS Reference ts Method	
Compone Chloride	nt	<b>COD/Uni</b>	TM184	43.5
		mg/l		
Phosphate	(Ortho as P)	<0.02 mg/l	TM184	<0.02
Nitrate as N	NO3	<0.3	TM184	35.6
		mg/l		
Oxygen, di	ssolved	<0.3	TM187	9.69
Turbidity		mg/l <0.1	TM195	15.2
		ntu		
PCB conge	ener 28	<0.015 µg/l	TM197	<0.015
PCB conge	ener 52	μg/i <0.015	TM197	<0.015
		μg/l		
PCB conge	ener 101	<0.015	TM197	<0.015
DCP conce	aner 118	µg/l <0.015	TM197	<0.015
PCB conge	साटा 110	<0.015 µg/l	1101197	CIU.U>
PCB conge	ener 138	<0.015	TM197	<0.015
DOD	450	μg/l	T1110=	2.245
PCB conge	ener 153	<0.015 µg/l	TM197	<0.015
PCB conge	ener 180	<0.015	TM197	<0.015
		μg/l		
Sum of det	ected EC7 PCB's	<0.105	TM197	<0.105
Cyanide, T	otal	μg/l <0.05	TM227	<0.05
Jyaniut, I	our .	mg/l	I IVIZZ I	<b>\U.UU</b>
Cyanide, F	ree	<0.05	TM227	<0.05
Chromi	Hovovolost	mg/l	T84044	z0.02
onromium,	Hexavalent	<0.03 mg/l	TM241	<0.03
pН		<1	TM256	7.63
		pH Units	_	
Phenol		<0.002	TM259	<0.002
Cresols		mg/l <0.006	TM259	<0.006
0100010		~0.000 mg/l	IIVIZJJ	<b>~0.000</b>
Xylenols		<0.008	TM259	<0.008
Db. : =	-t-I D-t' '	mg/l	T14050	-0.040
Phenols, To monohydric	otal Detected	<0.016 mg/l	TM259	<0.016
Trifluralin	-	<0.01	TM343	<0.01
		μg/l		
alpha-HCH		<0.01	TM343	<0.01
namma₋⊔∩	CH (Lindane)	μg/l <0.01	TM343	<0.01
уанній-ПС	n i (Liliualie)	<0.01 μg/l	1101343	<b>\U.U1</b>
Heptachlor		<0.01	TM343	<0.01
		μg/l		
Aldrin		<0.01 µg/l	TM343	<0.01
beta-HCH		μg/i <0.01	TM343	<0.01
		μg/l		
Isodrin		<0.01	TM343	<0.01
delta-HCH		μg/l <0.01	TM343	<0.01
acita-i IOIT		νο.στ μg/l	IIVIOHU	\U.U I
Heptachlor	epoxide	<0.01	TM343	<0.01
- =1 DDF		μg/l	T84040	-0.04
o,p'-DDE		<0.01 µg/l	TM343	<0.01
Endosulpha	an I	<0.01	TM343	<0.01
l i		ua/l		

# **CERTIFICATE OF ANALYSIS**



	Results Legend		Customer Sample Ref.	W617	1		I
# M	ISO17025 accredited.  mCERTS accredited.		Customer Sample Rei.	W617			
aq	Aqueous / settled sample.		Depth (m)				
diss.filt tot.unfilt	Dissolved / filtered sample. Total / unfiltered sample.		Sample Type	Ground Water (GW)			
•	Subcontracted - refer to subcontractor rep accreditation status.	port for	Date Sampled Sampled Time	16/03/2021 13:30:00			
**	% recovery of the surrogate standard to cl efficiency of the method. The results of in-		Date Received	17/03/2021			
	compounds within samples aren't correct		SDG Ref	210317-67 23914784			
(F)	the recovery Trigger breach confirmed		Lab Sample No.(s) AGS Reference	23514704			
1-4+§@ Compo	Sample deviation (see appendix)	LOD/Units					
	hlordane	<0.01	TM343	<0.01			
		µg/l					
cis-Chlo	ordane	<0.01	TM343	<0.01			
		μg/l					
p,p'-DD	E	<0.01	TM343	<0.01			
		μg/l					
Dieldrin		<0.01	TM343	<0.01			
	D (TDE)	µg/l	T11010	0.04			
o,p´-DD	D (TDE)	<0.01	TM343	<0.01			
Endrin		μg/l <0.01	TM343	<0.02			
EHUHH		νο.στ μg/l	1101343	<b>\0.02</b>			
o,p'-DD	T	<0.01	TM343	<0.02			
J, DD	•	μg/l	1,11,040	·0.02			
p,p'-DD	D (TDE)	<0.01	TM343	<0.01			
r ar	,	μg/l					
Endosu	lphan II	<0.02	TM343	<0.02			
		μg/l					
p,p'-DD	Т	<0.01	TM343	<0.02			
		μg/l					
o,p'-Me	thoxychlor	<0.01	TM343	<0.02			
		μg/l					
p,p'-Me	thoxychlor	<0.01	TM343	<0.03			
		µg/l	T11010	2.24			
Endosu	lphan Sulphate	<0.02	TM343	<0.04			
D	Lata I	μg/l	TM242	40 O4			
Permet	nrin i	<0.01 µg/l	TM343	<0.01			
Permet	hrin II	40.01	TM343	<0.01			
1 Cillicu		μg/l	11010	40.01			
1,3,5-Tr	richlorobenzene	<0.01	TM344	<0.01			
, , , ,		μg/l					
Hexach	lorobutadiene	<0.01	TM344	<0.01			
		μg/l					
1,2,4-Tr	richlorobenzene	<0.01	TM344	<0.01			
		μg/l					
1,2,3-Tr	richlorobenzene	<0.01	TM344	<0.01			
		μg/l					
Dichlory	/OS	<0.01	TM344	<0.01			
Dichlob	onil	μg/l <0.01	TM344	<0.01			
DICTION	eilli	νο.στ μg/l	1101344	<0.01			
Mevinpl	hos	<0.01	TM344	<0.01			
		μg/l	1,111044	-0.01			
Tecnaz	ene	<0.01	TM344	<0.01			
	<u></u>	μg/l					
Hexach	lorobenzene	<0.01	TM344	<0.01			
		μg/l					
Demeto	n-S-methyl	<0.01	TM344	<0.01			
		μg/l					
Phorate	)	<0.01	TM344	<0.01			
D: :	_	µg/l	T14044	.0.04			
Diazino	п	<0.01	TM344	<0.01			
Triallate	`	μg/l <0.01	TM344	<0.01			
mailate	7	<0.01 µg/l	1 IVI 344	<b>~U.U1</b>			
Atrazine	2	μg/i <0.01	TM344	<0.01			
, waziilt	•	νο.στ μg/l	1101044	\U.U I			
Simazir	ne	<0.01	TM344	<0.01			
		μg/l					
Disulfot	on	<0.01	TM344	<0.01			
		μg/l				 	
Propeta	amphos	<0.01	TM344	<0.01			
		μg/l				1	I

# **CERTIFICATE OF ANALYSIS**



#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617			
М	mCERTS accredited.						
aq diss.filt	Aqueous / settled sample. Dissolved / filtered sample.		Depth (m)				
tot.unfilt	Total / unfiltered sample.		Sample Type	Ground Water (GW)			
	Subcontracted - refer to subcontractor repr accreditation status.	ort for	Date Sampled	16/03/2021			
	% recovery of the surrogate standard to ch	eck the	Sampled Time Date Received	13:30:00 17/03/2021			
	efficiency of the method. The results of ind compounds within samples aren't correcte		SDG Ref	210317-67			
	the recovery	u 101	Lab Sample No.(s)	23914784			
(F) 1-4+§@	Trigger breach confirmed		AGS Reference				
Compo	Sample deviation (see appendix)	LOD/Units	_				
	riphos-methyl	<0.01	TM344	<0.01			
Officipy	nphoo mouryi	μg/l	1111011	.0.01			
Discortion	-1-		TMO44	40.04			
Dimetho	oate	<0.01	TM344	<0.01			
		μg/l					
Pirimiph	os-methyl	<0.01	TM344	<0.01			
		μg/l					
Chlorpy	riphos	<0.01	TM344	<0.01			
		μg/l					
Methyl F	Parathion	<0.01	TM344	<0.01			
		μg/l		0.01			
Malathio	20		TM344	<0.01			
iviaiatnio	ווע	<0.01	1 IVI 344	<b>~</b> U.U1			
-		μg/l					
Fenthio	n	<0.01	TM344	<0.01			
		μg/l					
Fenitrot	hion	<0.01	TM344	<0.01			
1		μg/l					
Triadime	efon	<0.01	TM344	<0.01			
- Hadiille	0.0.1	νσ/l	TWOTT	,0.01			
Dan-II.	otholin	μg/i <0.01	TM344	<0.01			
Pendim	etnalin		1M344	<0.01			
		μg/l					
Parathio	on	<0.01	TM344	<0.01			
		μg/l					
Chlorfer	nvinphos	<0.01	TM344	<0.01			
1	'	μg/l					
trans_Cl	nlordane	<0.01	TM344	<0.01			
110113-01	liordane		TIVIOTT	V0.01			
		μg/l					
cis-Chlo	ordane	<0.01	TM344	<0.01			
		μg/l					
Ethion		<0.01	TM344	<0.01			
1		μg/l					
Carbool	nenothion	<0.01	TM344	<0.01			
ou.sop.		μg/l		0.0.			
Triononi	haa		TM344	<0.01			
Triazopl	nos	<0.01	1101344	<0.01			
		µg/l					
Phosalo	ne	<0.01	TM344	<0.01			
		μg/l					
Azinpho	s methyl	<0.02	TM344	<0.02			
1		μg/l					
Azinpho	os ethyl	<0.02	TM344	<0.02			
	• /	μg/l					
		r-3′'					
1							
			_				
1							
1							
1							
1							
1							
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			+				
1							
1							
			_				



JFR1451 Report Number: Superseded Report: 591965 SDG: 210317-67 Client Reference: Location: A303 Stonehenge Order Number:

AH S	Spec MS - Aqueou	s (W)		
#	ISO17025 accredited.		Customer Sample Ref.	W617
M aq diss.filt tot.unfilt *	mCERTS accredited. Aqueous / settled sample. Dissolved / filtered sample. Total / unfiltered sample. Subcontracted - refer to subcontractor rej accreditation status. % recovery of the surrogate standard to c efficiency of the method. The results of in	heck the	Depth (m) Sample Type Date Sampled Sampled Time Date Received	Ground Water (GW) 16/03/2021 13:30:00 17/03/2021
(F) 1-4+§@ Compo	compounds within samples aren't correct the recovery Trigger breach confirmed Sample deviation (see appendix)		SDG Ref Lab Sample No.(s) AGS Reference ts Method	210317-67 23914784
	nalene (aq)	<0.01 µg/l	TM178	<0.01
Acenap	ohthene (aq)	<0.005 μg/l	TM178	<0.005
Acenap	ohthylene (aq)	<0.005 µg/l	TM178	<0.005
Fluoran	nthene (aq)	<0.005 µg/l	TM178	<0.005
Anthrac	cene (aq)	<0.005 µg/l	TM178	<0.005
Phenar	nthrene (aq)	<0.005 µg/l	TM178	<0.005
Fluoren		<0.005 µg/l		<0.005
Chryse		<0.005 µg/l		<0.005
Pyrene		<0.005 µg/l		<0.005
	(a)anthracene (aq)	<0.005 µg/l		<0.005
	(b)fluoranthene (aq)	<0.005 µg/l		<0.005
	(k)fluoranthene (aq)	<0.005 µg/l		<0.005
Benzo(	a)pyrene (aq)	<0.002 µg/l		<0.002
	o(a,h)anthracene (aq)	<0.005 µg/l	TM178	<0.005
Benzo(	(g,h,i)perylene (aq)	<0.005 µg/l	TM178	<0.005
	(1,2,3-cd)pyrene (aq)	<0.005 µg/l	TM178	<0.005
PAH, T (aq)	otal Detected USEPA 16	<0.082 µg/l	TM178	<0.082



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SVOC MS (W) - Aqueous	S	0.401.0.6		1			
# ISO17025 accredited.		Customer Sample Ref.	W617				
M mCERTS accredited.							
aq Aqueous / settled sample. diss.filt Dissolved / filtered sample.		Depth (m)					
tot.unfilt Total / unfiltered sample.		Sample Type	Ground Water (GW)				
<ul> <li>Subcontracted - refer to subcontractor rep accreditation status.</li> </ul>	ort for	Date Sampled	16/03/2021				
** % recovery of the surrogate standard to ch	heck the	Sampled Time	13:30:00				
efficiency of the method. The results of inc	dividual	Date Received	17/03/2021				
compounds within samples aren't correcte the recovery	ed for	SDG Ref	210317-67 23914784				
(F) Trigger breach confirmed		Lab Sample No.(s) AGS Reference	23314704				
1-4+§@ Sample deviation (see appendix)		_					
Component	LOD/Units						
1,2,4-Trichlorobenzene (aq)	<1	TM176	<1				
	μg/l						
1,2-Dichlorobenzene (aq)	<1	TM176	<1				
1,2-Dictiloroberizerie (aq)	1	1101170	31				
	μg/l						
1,3-Dichlorobenzene (aq)	<1	TM176	<1				
	μg/l						
1,4-Dichlorobenzene (aq)	<1	TM176	<1				
1,4-Dictiloroberizerie (aq)	1	1101170	31				
	μg/l						
2,4,5-Trichlorophenol (aq)	<1	TM176	<1				
	μg/l						
2,4,6-Trichlorophenol (aq)	<1	TM176	<1				
Σ, 1,6 111611616161 (αφ)	μg/l		•				
0.4 B) 11 11 11 11		T111=2		<del>                                     </del>			
2,4-Dichlorophenol (aq)	<1	TM176	<1				
	μg/l						
2,4-Dimethylphenol (aq)	<1	TM176	<1				
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	μg/l	""	•				
0.4 Di il 11 ( )	1	T111=2					
2,4-Dinitrotoluene (aq)	<1	TM176	<1				
	μg/l						
2,6-Dinitrotoluene (aq)	<1	TM176	<1				
_,= (,	μg/l						
2.011 111 1 ( )		T14470					
2-Chloronaphthalene (aq)	<1	TM176	<1				
	μg/l						
2-Chlorophenol (aq)	<1	TM176	<1				
	μg/l						
011 (1 )		T14470					
2-Methylnaphthalene (aq)	<1	TM176	<1				
	μg/l						
2-Methylphenol (aq)	<1	TM176	<1				
2	μg/l						
0.00	<del> </del>	T14470					
2-Nitroaniline (aq)	<1	TM176	<1				
	μg/l						
2-Nitrophenol (aq)	<1	TM176	<1				
_ · · · · · · · · · · · · · · · · · · ·	μg/l						
0.1111	<del></del>	714470					
3-Nitroaniline (aq)	<1	TM176	<1				
	μg/l						
4-Bromophenylphenylether (aq)	<1	TM176	<1				
	μg/l						
4 Ohlana 2 mathedahanal (an)	<1	TM470	<1				
4-Chloro-3-methylphenol (aq)	1	TM176	<1				
	μg/l						
4-Chloroaniline (aq)	<1	TM176	<1				
` "	μg/l						
4-Chlorophenylphenylether (aq)	<1	TM176	<1	1			
- oniorophenyiphenyiether (aq)		11011/0	~1				
	μg/l	+ -		-			
4-Methylphenol (aq)	<1	TM176	<1				
	μg/l						
4-Nitroaniline (aq)	<1	TM176	<1				
		1,111,10	*1				l l
	μg/l			-			
4-Nitrophenol (aq)	<1	TM176	<1				l l
	μg/l			<u> </u>	<u></u>	<u> </u>	
Azobenzene (aq)	<1	TM176	<1				
(aq)		''	*1				
	μg/l			+			
Acenaphthylene (aq)	<1	TM176	<1				
	μg/l						
Acenaphthene (aq)	<1	TM176	<1				
(-4)	μg/l	'	•				
A (I)		<b></b>		<del>                                     </del>			
Anthracene (aq)	<1	TM176	<1				
	μg/l						
bis(2-Chloroethyl)ether (aq)	<1	TM176	<1				
(	μg/l	'	•				
his/O Ohless II V II		T14470	.4	+			
bis(2-Chloroethoxy)methane	<1	TM176	<1				
(aq)	μg/l						
bis(2-Ethylhexyl) phthalate (aq)	<2	TM176	2.27				
(24)	μg/l						l l
Putylhonzyl phtholoto (25)		TM176		<del>                                     </del>			
Butylbenzyl phthalate (aq)	<1	TM176	<1				
	μg/l						



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SDG: 210317-67 Client Reference: JFR1451 Report Number: 591965
Location: A303 Stonehenge Order Number: Superseded Report:

SVOC MS (W) - Aqueous								
Results Legend # ISO17025 accredited.		Customer Sample Ref.	W617					
M mCERTS accredited.  aq Aqueous / settled sample.								
diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)					
* Subcontracted - refer to subcontractor repo	rt for	Date Sampled	16/03/2021					
** % recovery of the surrogate standard to che		Sampled Time Date Received	13:30:00 17/03/2021					
efficiency of the method. The results of indi compounds within samples aren't corrected		SDG Ref	210317-67					
the recovery (F) Trigger breach confirmed		Lab Sample No.(s) AGS Reference	23914784					
1-4+§@ Sample deviation (see appendix)  Component	LOD/Units							
Benzo(a)anthracene (aq)	<1	TM176	<1					
	μg/l							
Benzo(b)fluoranthene (aq)	<1	TM176	<1					
D(1)4	µg/l	TN4470	-4					
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1					
Benzo(a)pyrene (aq)	<1	TM176	<1					
(-)	μg/l							
Benzo(g,h,i)perylene (aq)	<1	TM176	<1					
	μg/l							
Carbazole (aq)	<1 //	TM176	<1					
Chrysene (aq)	μg/l <1	TM176	<1					
5 300110 (uq)	μg/l	1141170	-1					
Dibenzofuran (aq)	<1	TM176	<1					
. "	μg/l							
n-Dibutyl phthalate (aq)	<1	TM176	<1					
5: 4 + 4 + 4 + 4 + 4	μg/l	71470						
Diethyl phthalate (aq)	<1 µg/l	TM176	<1					
Dibenzo(a,h)anthracene (aq)	μg/i <1	TM176	<1					
Discrizo(a,ri)ariariacone (aq)	μg/l	111170	*1					
Dimethyl phthalate (aq)	<1	TM176	<1					
	μg/l							
n-Dioctyl phthalate (aq)	<5	TM176	<5					
FI ( )	μg/l	T14470						
Fluoranthene (aq)	<1 µg/l	TM176	<1					
Fluorene (aq)	×1	TM176	<1					
()/	μg/l							
Hexachlorobenzene (aq)	<1	TM176	<1					
	μg/l							
Hexachlorobutadiene (aq)	<1	TM176	<1					
Pentachlorophenol (aq)	μg/l <1	TM176	<1					
i chachiorophenor (aq)	μg/l	111170	*1					
Phenol (aq)	<1	TM176	<1					
	μg/l							
n-Nitroso-n-dipropylamine (aq)	<1	TM176	<1					
Hexachloroethane (aq)	μg/l <1	TM176	<1					
riexaciiioloetiialie (aq)	μg/l	110170	~1					
Nitrobenzene (aq)	<1	TM176	<1					
	μg/l							
Naphthalene (aq)	<1	TM176	<1					
January (an)	µg/l	TM470	-4					
Isophorone (aq)	<1 µg/l	TM176	<1					
Hexachlorocyclopentadiene (aq)	μg/i <1	TM176	<1					
, , , , , , , , , , , , , , , , , , , ,	μg/l							
Phenanthrene (aq)	<1	TM176	<1					
	μg/l	=1.11=2						
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1					
Pyrene (aq)	μg/i <1	TM176	<1					
) =::= \== /	μg/l		•					
SVOC TIC (aq)		TM176	Not Detected					
Total SVOC TIC	<10	TM176	<10					
	μg/l							



JFR1451 Report Number: Superseded Report: 591965 SDG: 210317-67 Client Reference:

Location: A303 Stonehenge

Order Number:

(	CWG (W)			
#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617
M aq	mCERTS accredited. Aqueous / settled sample.		Depth (m)	
diss.filt tot.unfilt	Dissolved / filtered sample.  Total / unfiltered sample.  Subcontracted refer to subcontractor to	nort for	Sample Type	Ground Water (GW)
	Subcontracted - refer to subcontractor re accreditation status. % recovery of the surrogate standard to of		Date Sampled Sampled Time	16/03/2021 13:30:00
	% recovery of the surrogate standard to defficiency of the method. The results of incompounds within samples aren't correct	dividual	Date Received SDG Ref	17/03/2021 210317-67
(F)	compounds within samples aren't correct the recovery Trigger breach confirmed	101	Lab Sample No.(s)	23914784
1-4+§@ Compo	Sample deviation (see appendix)	LOD/Unit	AGS Reference	
	urrogate % recovery**	LOD/ONI	TM245	111
		%		2
GR0 >	C5-C12	<50 µg/l	TM245	<50
Methyl	tertiary butyl ether	μg/i <3	TM245	<3
(MTBE)		μg/l		2
Benzen	е	<7	TM245	<7
Toluene	9	μg/l <4	TM245	<4
		μg/l		2
Ethylbe	nzene	<5	TM245	<5
m,p-Xyl	ene	μg/l <8	TM245	<u>2</u>
,		μg/l	1 <u>2</u> 10	2
o-Xylen	е	<3	TM245	<3
Sum of	detected Xylenes	μg/l <11	TM245	<11
Ouill Of	detected Aylenes	μg/l	TIMETO	2
Sum of	detected BTEX	<28	TM245	<28
Alinhati	cs >C5-C6	μg/l <10	TM245	<10
7 iiipiiati	00 00 00	μg/l	TIME TO	2
Aliphati	cs >C6-C8	<10	TM245	<10
Δlinhati	cs >C8-C10	μg/l <10	TM245	<10
7 dipilati	03 - 00 0 10	µg/l	TWETO	2
Aliphati	cs >C10-C12	<10	TM245	<10
Δlinhati	cs >C12-C16 (aq)	μg/l <10	TM174	<10
Alipitati	cs > 012-010 (aq)	µg/l	11W174	10
Aliphati	cs >C16-C21 (aq)	<10	TM174	<10
Alimbati	>C21 C2E ()	μg/l	TM474	-10
Anpnati	cs >C21-C35 (aq)	<10 µg/l	TM174	<10
Total Al	iphatics >C12-C35 (aq)	<10	TM174	<10
Araz'	ion NECE ECT	μg/l	TMO45	<10
Aromat	ics >EC5-EC7	<10 µg/l	TM245	<10 2
Aromat	ics >EC7-EC8	<10	TM245	<10
Araz	ion >EC0 EC40	μg/l	TMO45	2
Aromat	ics >EC8-EC10	<10 µg/l	TM245	<10
Aromat	ics >EC10-EC12	<10	TM245	<10
Λ	> FO40 FO40 /	μg/l	T14474	2
Aromat	ics >EC12-EC16 (aq)	<10 µg/l	TM174	<10
Aromat	ics >EC16-EC21 (aq)	<10	TM174	<10
Δ	> F004 F005 /	μg/l	T144-1	.40
Aromat	ics >EC21-EC35 (aq)	<10 µg/l	TM174	<10
	romatics >EC12-EC35	<10	TM174	<10
(aq)		μg/l		
Total Al >C5-35	iphatics & Aromatics	<10 µg/l	TM174	<10
	cs >C16-C35 Aqueous	<10	TM174	<10
		μg/l		



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SDG: 210317-67 Client Reference: JFR1451 Report Number: 591965
Location: A303 Stonehenge Order Number: Superseded Report:

I	MS (W)			
#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617
M aq	mCERTS accredited. Aqueous / settled sample.		Death (a)	
diss.filt tot.unfilt	Dissolved / filtered sample. Total / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)
•	Subcontracted - refer to subcontractor rep accreditation status.		Date Sampled Sampled Time	16/03/2021 13:30:00
•	% recovery of the surrogate standard to c efficiency of the method. The results of in	dividual	Date Received	17/03/2021
	compounds within samples aren't correct the recovery	ed for	SDG Ref Lab Sample No.(s)	210317-67 23914784
(F) 1-4+§@	Trigger breach confirmed Sample deviation (see appendix)		AGS Reference	
Compo		LOD/Uni		
Dibromo	ofluoromethane**	%	TM208	122 2
Toluene	e-d8**	/0	TM208	97.1
Toldono	, 40	%	1111200	2
4-Bromo	ofluorobenzene**		TM208	100
		%		2
Dichloro	odifluoromethane	<1	TM208	<1
Chloron	nothano	μg/l <1	TM208	<1
CHIOIOH	letialie	µg/l	1 101200	2
Vinyl ch	loride	<1	TM208	<1
Í		μg/l		2
Bromon	nethane	<1	TM208	<1
011		µg/l	T14000	2
Chloroe	nane	<1 µg/l	TM208	<1 2
Trichlor	ofluoromethane	γg/i <1	TM208	<1
		μg/l	200	. 2
1,1-Dich	nloroethene	<1	TM208	<1
		μg/l		2
Carbon	disulphide	<1 ug/l	TM208	<1
Dichloro	omethane	μg/l <3	TM208	<3
2.01.1010		µg/l	1141200	2
	ertiary butyl ether	<1	TM208	<1
(MTBE)		µg/l		2
trans-1,	2-Dichloroethene	<1	TM208	<1
4.4 Di-l	lese etheres	µg/l	TM000	2
1,1-DIC	nloroethane	<1 µg/l	TM208	<1 2
cis-1,2-l	Dichloroethene	<1	TM208	<1
,		μg/l		2
2,2-Dich	nloropropane	<1	TM208	<1
_		μg/l	71,1000	2
Bromoc	hloromethane	<1 µg/l	TM208	<1
Chlorofo	orm	μg/i <1	TM208	<1
Officion	J	μg/l	1111200	2
1,1,1-Tr	ichloroethane	<1	TM208	<1
		μg/l		2
1,1-Dich	nloropropene	<1	TM208	<1
Carbon	tetrachloride	μg/l <1	TM208	<1
Carbont	.cu do nond	µg/l	I IVI∠UO	2
1,2-Dich	nloroethane	<1	TM208	<1
		μg/l		2
Benzen	e	<1	TM208	<1
T. 11		µg/l	T14000	2
Trichlore	oetnene	<1 µg/l	TM208	<1 2
1.2-Dict	nloropropane	μg/i <1	TM208	<1
.,2 5101	sp. sp	μg/l	1200	2
Dibromo	omethane	<1	TM208	<1
		μg/l		2
Bromod	ichloromethane	<1	TM208	<1
oic 1 2 !	Diobloropresses	μg/l	TM000	2
cis-1,3-l	Dichloropropene	<1 µg/l	TM208	<1 2
Toluene	<b>;</b>	μg/i <1	TM208	<1
		μg/l		2
trans-1,	3-Dichloropropene	<1	TM208	<1
		μg/l		2
1,1,2-Tr	ichloroethane	<1	TM208	<1
		μg/l		2



JFR1451 Report Number: Superseded Report: 591965 SDG: 210317-67 Client Reference: Location: A303 Stonehenge Order Number:

	/IS (W)			
	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617
М	ISO17025 accredited.  mCERTS accredited.  Aqueous / settled sample.			
diss.filt	Dissolved / filtered sample.  Total / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)
*	Subcontracted - refer to subcontractor reaccreditation status.	eport for	Date Sampled	16/03/2021
**	% recovery of the surrogate standard to efficiency of the method. The results of i		Sampled Time Date Received	13:30:00 17/03/2021
	compounds within samples aren't correct		SDG Ref	210317-67 23914784
(F)	the recovery Trigger breach confirmed		Lab Sample No.(s) AGS Reference	23914704
1-4+§@ Compor	Sample deviation (see appendix) nent	LOD/Uni	_	
1,3-Dich	loropropane	<1	TM208	<1
		μg/l		2
Tetrachlo	oroethene	<1	TM208	<1
Dibromo	chloromethane	μg/l <1	TM208	<1
Dibromo	omoromodiano	μg/l	1111200	2
1,2-Dibro	omoethane	<1	TM208	<1
		μg/l		2
Chlorobe	enzene	<1	TM208	<1
4 4 4 O T	Catro ablaro athan a	μg/l <1	TM208	<1
1,1,1,2-1	Tetrachloroethane	µg/l	1 WIZU6	2
Ethylben	nzene	<1	TM208	<1
·		μg/l		2
m,p-Xyle	ene	<1	TM208	<1
V 1		µg/l	71,1000	2
o-Xylene	;	<1 µg/l	TM208	<1 2
Styrene		γg/i <1	TM208	<1
		μg/l		2
Bromofo	rm	<1	TM208	<1
1	db	µg/l	TM208	2
isopropy	lbenzene	<1 µg/l	1 M/208	<1 2
1,1,2,2-T	Tetrachloroethane	<1	TM208	<1
		μg/l		2
1,2,3-Tri	chloropropane	<1	TM208	<1
		μg/l		2
Bromobe	enzene	<1 µg/l	TM208	<1 2
Propylbe	enzene	γg/i <1	TM208	<1
		μg/l	200	. 2
2-Chloro	toluene	<1	TM208	<1
		μg/l		2
1,3,5-Tri	methylbenzene	<1 µg/l	TM208	<1
4-Chloro	toluene	μg/i <1	TM208	<1
4 0111010	Notacino	μg/l	TIMEGO	2
tert-Buty	Ibenzene	<1	TM208	<1
		μg/l		2
1,2,4-Tri	methylbenzene	<1	TM208	<1
sec-Rute	/lbenzene	μg/l <1	TM208	<1
Joo-Duly	IDONEONO	µg/l	TIVIZUU	2
4-iso-Pro	pyltoluene	<1	TM208	<1
		μg/l		2
1,3-Dich	lorobenzene	<1	TM208	<1
1 / Dia-	lorobenzene	μg/l <1	TM208	<1
ı, <del>4</del> -DICN	IOI ODGI IZGI IC	µg/l	I IVI∠U0	2
n-Butylbe	enzene	<1	TM208	<1
		μg/l		2
1,2-Dich	lorobenzene	<1	TM208	<1
1 0 D:L	omo 2 ablerance	μg/l	TM000	2
1,2-Dibro	omo-3-chloropropane	<1 µg/l	TM208	<1 2
1,2,4-Tri	chlorobenzene	γg/i <1	TM208	<1
, =,		μg/l		2
Hexachlo	orobutadiene	<1	TM208	<1
		μg/l		2
tert-Amy	I methyl ether (TAME)	<1	TM208	<1
Naphtha	lene	μg/l <1	TM208	<1
арпипа		µg/l	1200	2
		, mar.		





SDG: 210317-67 Client Reference: JFR1451 Report Number: 591965
Location: A303 Stonehenge Order Number: Superseded Report:

C	MS (W)			
#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617
M aq diss.filt tot.unfilt *	Subcontracted - refer to subcontractor re accreditation status. % recovery of the surrogate standard to efficiency of the method. The results of ir compounds within samples aren't correct	check the	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref	Ground Water (GW) 16/03/2021 13:30:00 17/03/2021 210317-67
(F)	the recovery Trigger breach confirmed Sample deviation (see appendix)		Lab Sample No.(s) AGS Reference	23914784
Compo	onent	LOD/Uni	ts Method	
1,2,3-T	richlorobenzene	<1 µg/l	TM208	<1 2
	richlorobenzene	<1 μg/l	TM208	<1 2
VOC TI			TM208	Not Detected 2
	f detected Xylenes	<2 μg/l	TM208	<2 2
Total V	OC TIC	<10 µg/l	TM208	<10 2
		<del>                                     </del>		



#### **CERTIFICATE OF ANALYSIS**



SDG: 210317-67 Client Reference: JFR1451 Report Number: 591965
Location: A303 Stonehenge Order Number: Superseded Report:

# **Table of Results - Appendix**

	Table Of	Results - Appendix
Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM187	Winkler, L.W, Ber Deutsch. Chem. Ges, 21,2843,1888."	Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM241	Methods for the Examination of Waters and Associated Materials; Chromium in Raw and Potable Waters and Sewage Effluents 1980.	The Determination of Hexavalent Chromium in Waters and Leachates using the Kone Analyser
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).





 SDG:
 210317-67

 Location:
 A303 Stonehenge

Client Reference: Order Number: JFR1451

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# **Test Completion Dates**

Lab Sample No(s)	23914784
Customer Sample Ref.	W617
oustomer oumple Rei.	
AGS Ref.	
Depth	
	Ground Water
Alkalinity as CaCO3	22-Mar-2021
Ammoniacal Nitrogen	19-Mar-2021
Anions by Kone (w)	18-Mar-2021
Chromium III	18-Mar-2021
Conductivity (at 20 deg.C)	19-Mar-2021
Cyanide Comp/Free/Total/Thiocyanate	19-Mar-2021
Dissolved Metals by ICP-MS	18-Mar-2021
Dissolved Organic/Inorganic Carbon	22-Mar-2021
Dissolved Oxygen by Titration	18-Mar-2021
EPH CWG (Aliphatic) Aqueous GC (W)	22-Mar-2021
EPH CWG (Aromatic) Aqueous GC (W)	22-Mar-2021
Fluoride	18-Mar-2021
GRO by GC-FID (W)	22-Mar-2021
Hexavalent Chromium (w)	18-Mar-2021
Mercury Dissolved	19-Mar-2021
Nitrite by Kone (w)	18-Mar-2021
PAH Spec MS - Aqueous (W)	19-Mar-2021
PCB Congeners - Aqueous (W)	23-Mar-2021
Pesticides (Suite I) by GCMS	23-Mar-2021
Pesticides (Suite II) by GCMS	24-Mar-2021
pH Value	18-Mar-2021
Phenols by HPLC (W)	19-Mar-2021
Phosphate by Kone (w)	18-Mar-2021
SVOC MS (W) - Aqueous	23-Mar-2021
Total Dissolved Solids	18-Mar-2021
TPH CWG (W)	22-Mar-2021
Turbidity in waters	18-Mar-2021
VOC MS (W)	23-Mar-2021

Validated



SDG: 210317-67 Location: A303 Stonehenge Client Reference: Order Number: JFR1451

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# **ASSOCIATED AQC DATA**

#### Alkalinity as CaCO3

Component	Method Code	QC 2387
Total Alkalinity as CaCO3	TM043	103.54
		96.40 : 105.98

#### Ammoniacal Nitrogen

Component	Method Code	QC 2367
Ammoniacal Nitrogen as N	TM099	96.8
		91.28 : 106.64

#### Anions by Kone (w)

Component	Method Code	QC 2356
Chloride	TM184	<b>96.5</b> 91.40 : 109.10
Sulphate (soluble)	TM184	<b>100.0</b> 91.99 : 109.30
TON as NO3	TM184	<b>102.0</b> 90.35 : 108.35

# Conductivity (at 20 deg.C)

	Component	Method Code	QC 2337
Ī	Conductivity (at 20 deg.C)	TM120	103.76
ı			100.75 : 105.26

# Cyanide Comp/Free/Total/Thiocyanate

Component	Method Code	QC 2362
Free Cyanide (W)	TM227	80.75
		91.52 : 123.82
Thiocyanate (W)	TM227	101.25
		90.50 : 113.00
Total Cyanide (W)	TM227	104.75
		91.75 : 112.75

# Dissolved Metals by ICP-MS

Component	Method Code	QC 2309
Aluminium	TM152	<b>102.33</b> 90.98 : 111.82
Antimony	TM152	<b>101.17</b> 90.44 : 113.04
Arsenic	TM152	<b>100.33</b> 88.00 : 112.00

Validated



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# Dissolved Metals by ICP-MS

		QC 2309
Barium	TM152	102.5
		90.20 : 111.19
Beryllium	TM152	103.83
		87.77 : 113.97
Bismuth	TM152	100.83
Borate	TM152	91.90 : 112.20
Dorate	1101152	<b>103.09</b> 88.00 : 112.00
Boron	TM152	103.0
		96.48 : 114.93
Cadmium	TM152	101.33
		96.43 : 110.53
Calcium	TM152	102.0
Chromium	TM152	81.38 : 119.09
Gillomium	TWITSE	<b>100.33</b> 91.84 : 108.67
Cobalt	TM152	97.17
		88.00 : 112.00
Copper	TM152	102.17
		92.47 : 118.11
Iron	TM152	100.67
Lead	TM152	92.00 : 113.00
Leau	TWITE	<b>98.83</b> 88.00 : 112.00
Lithium	TM152	103.0
		91.62 : 113.12
Magnesium	TM152	99.33
		93.14 : 107.91
Manganese	TM152	101.0
Molybdenum	TM152	95.03 : 110.58
Molybuolium	111102	<b>99.0</b> 88.00 : 112.00
Nickel	TM152	101.33
		88.00 : 112.00
Phosphorus	TM152	100.67
D	TA4450	88.00 : 112.00
Potassium	TM152	<b>100.67</b> 93.90 : 112.36
Selenium	TM152	93.90 : 112.36
		99.5 91.58 : 115.98
Silver	TM152	102.5
		88.80 : 122.30
Sodium	TM152	99.33
Strontium	TM152	94.28 : 110.71
Suoniunfl	TIVITOZ	<b>101.33</b> 88.00 : 112.00
Tellurium	TM152	103.0
		93.32 : 114.66
Thallium	TM152	97.5
		88.00 : 112.00
Tin	TM152	101.0
Titanium	TM152	92.63 : 109.70
Hamuni	TIVITOZ	<b>101.67</b> 95.58 : 111.68
		00.00 . 111.00

Validated



 SDG:
 210317-67

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 A303 Stonehenge

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JFR1451

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# Dissolved Metals by ICP-MS

		QC 2309
Tungsten	TM152	<b>98.83</b> 81.32 : 124.72
Uranium	TM152	<b>100.5</b> 88.00 : 112.00
Vanadium	TM152	<b>105.0</b> 88.00 : 112.00
Zinc	TM152	<b>102.33</b> 92.98 : 118.95

#### Dissolved Organic/Inorganic Carbon

Component	Method Code	QC 2399
Dissolved Inorganic Carbon	TM090	<b>106.5</b> 93.58 : 112.28
Dissolved Organic Carbon	TM090	<b>102.83</b> 96.13 : 109.53

# EPH CWG (Aliphatic) Aqueous GC (W)

Component	Method Code	QC 2316
Total Aliphatics >C10-C40	TM174	100.83
		69.79 : 134.39

# EPH CWG (Aromatic) Aqueous GC (W)

Component	Method Code	QC 2370
Total Aromatics >EC10-EC40	TM174	99.76
		59.92 : 128.54

#### Fluoride

Component	Method Code	QC 2379
Fluoride	TM104	<b>102.0</b> 96.67 : 108.67

# GRO by GC-FID (W)

Component	Method Code	QC 2364
Benzene by GC	TM245	<b>112.0</b> 79.13 : 118.84
Ethylbenzene by GC	TM245	<b>113.0</b> 79.54 : 115.99
m & p Xylene by GC	TM245	<b>113.75</b> 78.44 : 116.32

Validated



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# GRO by GC-FID (W)

		QC 2364
MTBE GC-FID	TM245	<b>106.5</b> 81.43 : 120.09
o Xylene by GC	TM245	<b>112.5</b> 76.85 : 120.29
QC	TM245	<b>115.81</b> 71.58 : 131.01
Toluene by GC	TM245	<b>112.5</b> 79.00 : 121.96

#### Hexavalent Chromium (w)

Component	Method Code	QC 2303
Hexavalent Chromium	TM241	<b>103.6</b> 94.17 : 106.17

# Mercury Dissolved

Component	Method Code	QC 2300
Mercury Dissolved (CVAF)	TM183	93.2
		69.30 : 128.70

#### PAH Spec MS - Aqueous (W)

•		
Component	Method Code	QC 2385
Acenaphthene by GCMS	TM178	103.6
		90.45 : 118.63
Acenaphthylene by GCMS	TM178	101.6
		90.13 : 116.27
Anthracene by GCMS	TM178	102.0
		92.40 : 114.00
Benz(a)anthracene by GCMS	TM178	106.0
		89.51 : 117.69
Benzo(a)pyrene by GCMS	TM178	102.0
		89.43 : 118.57
Benzo(b)fluoranthene by	TM178	101.2
GCMS		87.80 : 121.80
Benzo(ghi)perylene by GCMS	TM178	102.8
		87.10 : 119.30
Benzo(k)fluoranthene by	TM178	108.8
GCMS		93.23 : 123.57
Chrysene by GCMS	TM178	108.8
		88.68 : 116.92
Dibenzo(ah)anthracene by	TM178	98.8
GCMS		86.24 : 118.56
Fluoranthene by GCMS	TM178	103.6
		86.04 : 121.96
Fluorene by GCMS	TM178	101.2
		90.76 : 121.24

Validated



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#### PAH Spec MS - Aqueous (W)

	•	QC 2385
Indeno(123cd)pyrene by GCMS	TM178	<b>102.8</b> 88.39 : 119.61
Naphthalene by GCMS	TM178	<b>106.8</b> 89.40 : 121.80
Phenanthrene by GCMS	TM178	<b>106.8</b> 90.41 : 119.19
Pyrene by GCMS	TM178	<b>101.6</b> 91.00 : 120.20

# PCB Congeners - Aqueous (W)

Component	Method Code	QC 2329
PCB congener 101	TM197	<b>99.2</b> 85.28 : 119.60
PCB congener 105	TM197	<b>99.2</b> 81.16 : 119.80
PCB congener 114	TM197	<b>98.8</b> 88.32 : 118.08
PCB congener 118	TM197	<b>100.4</b> 87.76 : 117.04
PCB congener 123	TM197	<b>98.0</b> 86.80 : 117.28
PCB congener 126	TM197	<b>99.6</b> 84.56 : 116.00
PCB congener 138	TM197	<b>98.0</b> 83.00 : 117.80
PCB congener 153	TM197	<b>98.4</b> 84.12 : 117.00
PCB congener 156	TM197	<b>97.6</b> 82.24 : 119.20
PCB congener 157	TM197	<b>102.8</b> 84.96 : 116.40
PCB congener 167	TM197	<b>98.8</b> 81.64 : 119.32
PCB congener 169	TM197	<b>96.8</b> 84.60 : 117.96
PCB congener 180	TM197	<b>98.8</b> 80.40 : 119.04
PCB congener 189	TM197	<b>96.0</b> 81.56 : 119.00
PCB congener 28	TM197	<b>98.4</b> 83.20 : 117.04
PCB congener 52	TM197	<b>99.2</b> 81.84 : 119.52
PCB congener 77	TM197	<b>99.6</b> 81.96 : 117.24
PCB congener 81	TM197	<b>99.6</b> 82.28 : 120.20

Pesticides (Suite I) by GCMS

Validated



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# Pesticides (Suite I) by GCMS

Component	Method Code	QC 2319	
Aldrin - (Inst.)	TM343	<b>87.27</b> 59.75 : 143.00	
alpha-HCH - (Inst.)	TM343	<b>77.7</b> 75.13 : 166.63	
beta-HCH - (Inst.)	TM343	<b>95.44</b> 85.48 : 166.48	
cis-Chlordane - (Inst.)	TM343	<b>82.24</b> 71.70 : 156.00	
delta-HCH - (Inst.)	TM343	<b>83.15</b> 83.98 : 156.58	
Dieldrin - (Inst.)	TM343	<b>84.39</b> 77.45 : 154.10	
Endosulphan I - (Inst.)	TM343	<b>87.4</b> 91.30 : 168.70	
Endosulphan II - (Inst.)	TM343	<b>95.87</b> 82.68 : 161.13	
Endosulphan Sulphate - (Inst.)	TM343	<b>76.21</b> 69.65 : 165.95	
Endrin - (Inst.)	TM343	<b>78.71</b> 81.33 : 178.68	
gamma-HCH (Lindane) - (Inst.)	TM343	<b>89.33</b> 83.15 : 175.40	
Heptachlor - (Inst.)	TM343	<b>88.04</b> 63.65 : 167.80	
Heptachlor epoxide - (Inst.)	TM343	<b>84.63</b> 73.28 : 159.38	
Isodrin - (Inst.)	TM343	<b>87.13</b> 58.34 : 153.81	
o,p-DDD (TDE) - (Inst.)	TM343	<b>82.89</b> 66.93 : 162.03	
o,p-DDE - (Inst.)	TM343	<b>83.97</b> 64.68 : 156.78	
o,p-DDT - (Inst.)	TM343	<b>77.71</b> 72.20 : 170.15	
o,p-Methoxychlor - (Inst.)	TM343	<b>78.3</b> 73.33 : 171.13	
p,p-DDD (TDE) - (Inst.)	TM343	<b>81.74</b> 67.95 : 160.20	
p,p-DDE - (Inst.)	TM343	<b>82.4</b> 67.80 : 159.45	
p,p-DDT - (Inst.)	TM343	<b>80.96</b> 68.30 : 178.25	
p,p-Methoxychlor - (Inst.)	TM343	<b>79.59</b> 66.94 : 176.47	
Permethrin I - (Inst.)	TM343	<b>90.23</b> 63.25 : 146.35	
Permethrin II - (Inst.)	TM343	<b>86.31</b> 66.00 : 151.80	
trans-Chlordane - (Inst.)	TM343	<b>80.39</b> 71.68 : 165.88	
Trifluralin - (Inst.)	TM343	<b>87.59</b> 64.73 : 161.48	

Validated

SDG:

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#### pH Value

Component	Method Code	QC 2332
рН	TM256	100.94
		99.33 : 102.54

# Phenols by HPLC (W)

Component	Method Code	QC 2367
2.3.5 Trimethyl-Phenol by HPLC (W)	TM259	<b>52.0</b> 77.41 : 127.55
2-Isopropyl Phenol by HPLC (W)	TM259	<b>51.0</b> 82.77 : 126.51
Cresols by HPLC (W)	TM259	<b>49.67</b> 76.60 : 126.28
Napthol by HPLC (W)	TM259	<b>60.0</b> 75.40 : 129.40
Phenol by HPLC (W)	TM259	<b>52.0</b> 85.77 : 125.91
Xylenols by HPLC (W)	TM259	<b>51.5</b> 79.09 : 131.82

#### Phosphate by Kone (w)

Component	Method Code	QC 2327
Phosphate (Ortho as PO4)	TM184	<b>98.8</b> 96.40 : 109.60

# SVOC MS (W) - Aqueous

Component	Method Code	QC 2351
4-Bromophenylphenylether	TM176	<b>80.8</b> 52.80 : 111.84
Benzo(a)anthracene	TM176	<b>81.6</b> 59.28 : 107.76
Benzo(a)pyrene	TM176	<b>84.0</b> 54.40 : 105.76
Butylbenzyl phthalate	TM176	<b>77.36</b> 51.68 : 117.92
Hexachlorobutadiene	TM176	<b>62.16</b> 48.64 : 95.68
Naphthalene	TM176	<b>85.6</b> 63.04 : 111.04
Nitrobenzene	TM176	<b>87.2</b> 59.92 : 108.40
Phenol	TM176	<b>50.96</b> 36.88 : 72.40

#### **Total Dissolved Solids**

Validated



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#### **Total Dissolved Solids**

	Component	Method Code	QC 2333
Ī	Total Dissolved Solids	TM123	98.4
ı			97.30 : 100.92

# Turbidity in waters

Component	Method Code	QC 2310
Turbidity	TM195	<b>95.75</b> 83.75 : 121.25

# VOC MS (W)

Component	Method Code	QC 2360
1,1,1,2-Tetrachloroethane	TM208	111.0
		78.82 : 115.90
1,1,1-Trichloroethane	TM208	104.5
		86.83 : 113.41
1,1-Dichloroethane	TM208	98.0
		79.99 : 118.57
1,2-Dichloroethane	TM208	107.0
		79.35 : 124.02
2-Chlorotoluene	TM208	101.5
		79.67 : 114.74
4-Chlorotoluene	TM208	102.5
_		80.15 : 113.42
Benzene	TM208	93.5
- "		82.57 : 114.10
Bromomethane	TM208	99.0
	T11000	78.77 : 123.20
Carbontetrachloride	TM208	112.5
Ohlasahasasas	TM000	79.73 : 118.91
Chlorobenzene	TM208	106.0
Chloroform	TM208	88.28 : 110.81
Chiorolom	I IVIZUO	104.5
Chloromethane	TM208	82.31 : 120.71
Chioromethane	TIVIZUO	<b>102.5</b> 62.46 : 124.98
Cis-1,2-Dichloroethene	TM208	
CIS-1,2-DICHIOTOERIENE	TIVIZUO	<b>96.0</b> 83.75 : 118.91
Dichloromethane	TM208	
Distribution	TIVIZOO	<b>96.5</b> 81.20 : 120.83
Ethylbenzene	TM208	
Ettylbolizolio	TIVIZOO	<b>97.0</b> 80.54 : 112.31
Hexachlorobutadiene	TM208	
	200	<b>89.5</b> 73.65 : 117.84
o-Xylene	TM208	100.5
, , , ,		86.17 : 109.69
		00.17 . 100.00

Validated



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Location: A303 Stonehenge Order Number: Superseded Report:

VOC MS (W)

		QC 2360
p/m-Xylene	TM208	<b>94.75</b> 83.09 : 113.86
Tert-butyl methyl ether	TM208	<b>86.5</b> 70.94 : 119.66
Tetrachloroethene	TM208	<b>105.5</b> 84.41 : 112.73
Toluene	TM208	<b>95.5</b> 81.59 : 111.56
Trichloroethene	TM208	<b>102.5</b> 79.53 : 112.32
Vinyl Chloride	TM208	<b>96.5</b> 71.92 : 126.73

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.

The figure detailed is the percentage recovery result for the AQC.

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.



SDG: 210317-67 Location: A303 Stonehenge Client Reference: Order Number:

W617

JFR1451

->

Report Number: Superseded Report:

591965

# Chromatogram

Sample No : Sample ID : Analysis: EPH CWG (Aliphatic) Aqueous GC (W) Depth: 23920691

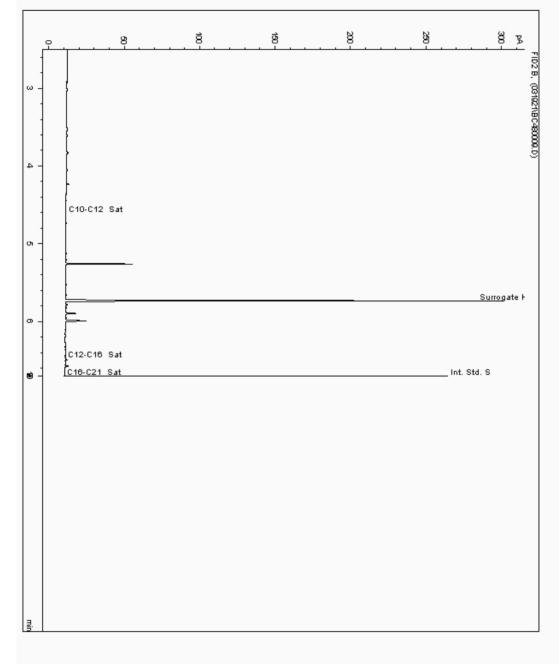
Alcontrol/Geochem Analytical Services Speciated TPH - SATS ( Cl2 - C40 )

Sample Identity: 22423691-

Date Acquired : 19/03/2021 22:13:33 PM

ppb SE W617[] Dilution CF

: 1 : 0.025 Multiplier





SDG: 591965 210317-67 JFR1451 Client Reference: Report Number: Superseded Report: Location: A303 Stonehenge Order Number:

Chromatogram

->

Analysis: EPH CWG (Aromatic) Aqueous GC (W) Sample No : Depth: 23920691 Sample ID :

Alcontrol/Geochem Analytical Services Speciated TPH - AROM ( Cl2 - C40 )

W617

Sample Identity: 22423692-

Date Acquired : 19/03/2021 21:51:10 PM

ppb SE W617[]

Dilution CF

: 1 : 0.025 Multiplier

8 8 8 8 छे B ģ Ot EC10-EC12 AROM EC12-EC16 AROM σ EC16-EC21 AROM EC35-EC40 AROM Int. Std. S Surrogate [

Validated



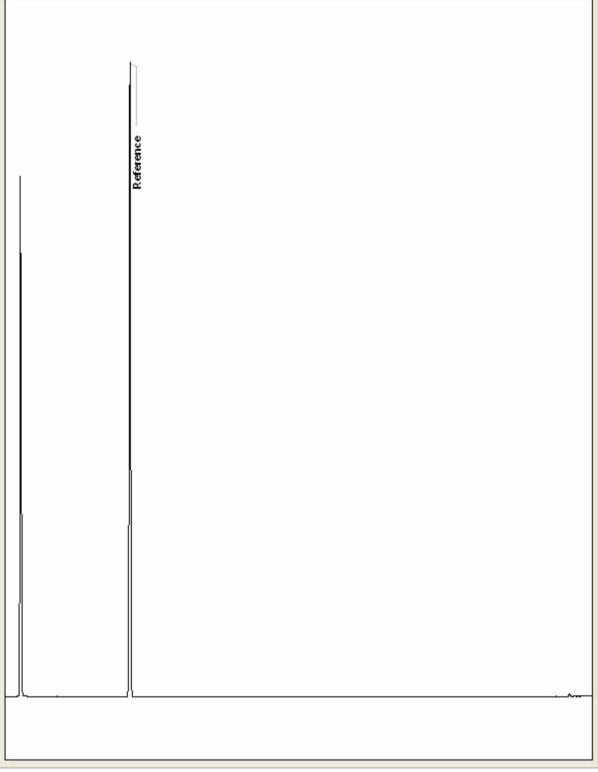
SDG: 210317-67 Location: A303 Stonehenge

Client Reference: Order Number: JFR1451

Report Number: Superseded Report: 591965

# Chromatogram

23930491_GRO_W.DATA - HP6850 Signal 1



ALS

SDG: 210317-67 Location: A303 Stonehenge Client Reference: Order Number: JFR1451

Report Number: Superseded Report: 591965

# **Appendix**

#### General

- 1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.
- 2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.
- 3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
- 4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
- 5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.
- 6. NDP No determination possible due to insufficient/unsuitable sample.
- 7. Results relate only to the items tested.
- 8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content
- 9. Surrogate recoveries Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.
- 10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- 11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
- 12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
- 13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.
- 14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
- 15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.
- 16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

#### 18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
•	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

#### 19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbe stos Type	Common Name
Chrysofile	White Asbests
Amosite	Brown Asbestos
Cro di dolite	Blue Asbe stos
Fibrous Act nolite	-
Fib to us Anthop hyll ite	-
Fibrous Tremolite	-

#### Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

#### Respirable Fibres

Respirable fibres are defined as fibres of <3  $\mu$ m diameter, longer than 5  $\mu$ m and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, The Quantification of Asbestos in Soil (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 12: 210320-39 Groundwater Analysis Report



Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside

> Tel: (01244) 528700 Fax: (01244) 528701

CH5 3US

email: haward encustomers er vices@alsglobal.com

Website: www.alsenvironmental.co.uk

RPS Consultants Ltd 260 Park Avenue Aztec West Almondsbury Bristol BS32 4SY

Attention: Benjamin Briere

#### **CERTIFICATE OF ANALYSIS**

Date of report Generation: 08 April 2021

Customer: RPS Consultants Ltd

Sample Delivery Group (SDG):210320-39Your Reference:JFR1451

Location: A303 Stonehenge

**Report No:** 593368

This report has been revised and directly supersedes 591829 in its entirety.

We received 1 sample on Saturday March 20, 2021 and 1 of these samples were scheduled for analysis which was completed on Thursday April 08, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.



Sonia McWhan

Operations Manager







SDG: 210320-39 A303 Stonehenge Location:

Client Reference: Order Number:

JFR1451 PO21-326 Report Number: Superseded Report:

593368 591829

## **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23941073	W617			19/03/2021

Only received samples which have had analysis scheduled will be shown on the following pages.

15:58:31 08/04/2021

Page 2 of 30

#### **CERTIFICATE OF ANALYSIS**



() (33) <u>======</u>	I								_
Results Legend									Ņ
X Test	Lab Sample	No(s)							23941073
No Determination									073
No Determination Possible									
	Custom	er							_
	Sample Refe	erence							W617
	•								7
Sample Types -									
S - Soil/Solid									
UNS - Unspecified Solid	400 D-f-								
GW - Ground Water SW - Surface Water	AGS Refer	ence							
LE - Land Leachate									
PL - Prepared Leachate PR - Process Water									
SA - Saline Water	Depth (	m)							
TE - Trade Effluent TS - Treated Sewage		,							
US - Untreated Sewage				Ŋ					7
RE - Recreational Water DW - Drinking Water Non-regulatory			).51 gl (AL	50ml PT	330n ottle	500n (AL	ΣΞ	(A)	VaOH
UNL - Unspecified Liquid	Contain	er	ass t E22	Ambi	ni pla (ALE	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	(ALE
SL - Sludge G - Gas			ottle 7)	250ml Amber GI. PTFE/PE	330ml plastic bottle (ALE503)	stic 8)	4 4	ered 4)	NaOH (ALE245)
OTH - Other									_
	Sample T	ype	GW	GW	GW	GW	GW	GW	GW
Alkalinity as CaCO3	All	NDPs: 0							
		Tests: 1				Х			
Ammonicoal Nitrogen	All	NDD 2				^			
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 1							
		100.0. 1					X		
Anions by Kone (w)	All	NDPs: 0							
		Tests: 1				Х			
						^			
Chromium III	All	NDPs: 0 Tests: 1							
		10313. 1						Х	
Conductivity (at 20 deg.C)	All	NDPs: 0							
		Tests: 1			v				
					Х				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1							
Compilition rotal rinesyanate		16515. 1							Х
Dissolved Metals by ICP-MS	All	NDPs: 0							
·		Tests: 1							
								Х	
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 1							
		icolo. I	Х						
Dissolved Oxygen by Probe	All	NDPs: 0							
, ,		Tests: 1			v				
					Х				
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 1							
\···/		16919. I		X					
EPH CWG (Aromatic) Aqueous GC	All	NDPs: 0							
(W)		Tests: 1							
				Х					
Fluoride	All	NDPs: 0							
		Tests: 1			Х				
GRO by GC-FID (W)	All	NDPs: 0							
		Tests: 1							
				X					
Hexavalent Chromium (w)	All	NDPs: 0							
		Tests: 1			Х				
Mercury Dissolved	All	NDPs: 0							
Diocolived		Tests: 1							
								Х	
	•								

#### **CERTIFICATE OF ANALYSIS**



Location:	A303 St0	lenenge		Jiuei	Nun	iber.		PU	21-326
Results Legend	Lab Sample	No(e)							2394
No Determination	Lab Sample	140(5)							23941073
Possible	Custom Sample Refe								
Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate	AGS Refer								
PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	Depth (ı	m)							
RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Contain	er	0.5l glass bottle (ALE227)	250ml Amber Gl. PTFE/PE	330ml plastic bottle (ALE503)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
om out	Sample T	ype	GW	GW	GW	G₩	GW	GW	GW
Nitrite by Kone (w)	All	NDPs: 0 Tests: 1							Х
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 1		X					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 1		Х					
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 1	Х						
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 1	Х						
pH Value	All	NDPs: 0 Tests: 1			X				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1					X		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 1				X			
Sulphide	All	NDPs: 0 Tests: 1			X				
Suspended Solids	All	NDPs: 0 Tests: 1				X			
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 1	X						
Total Dissolved Solids	All	NDPs: 0 Tests: 1				X			
TPH CWG (W)	All	NDPs: 0 Tests: 1	X						
Turbidity in waters	All	NDPs: 0 Tests: 1				X			
VOC MS (W)	All	NDPs: 0 Tests: 1		X					





#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617			
M aq	mCERTS accredited. Aqueous / settled sample.						
diss.filt tot.unfilt	Dissolved / filtered sample. Total / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)			
*	Subcontracted - refer to subcontractor repo	ort for	Date Sampled	19/03/2021			
	accreditation status. % recovery of the surrogate standard to ch	eck the	Sampled Time	09:00:00			
	efficiency of the method. The results of ind	ividual	Date Received SDG Ref	20/03/2021 210320-39			
	compounds within samples aren't corrected the recovery	u tor	Lab Sample No.(s)	23941073			
(F) 1-4+§@	Trigger breach confirmed Sample deviation (see appendix)		AGS Reference				
Compo		LOD/Unit	s Method				
Suspend	ded solids, Total	<2	TM022	11.3			
		mg/l		#			
Alkalinit	y, Total as CaCO3	<2	TM043	224			
		mg/l		#			
	y, Bicarbonate as	<2	TM043	224			
CaCO3		mg/l					
Alkalinit	y, Carbonate as CaCO3	<2	TM043	<2			
		mg/l					
Oxygen	, dissolved	<0.3	TM046	10.8			
		mg/l					
Carbon,	Organic (diss.filt)	<3	TM090	<3			
Δ.	in al Nilean At	mg/l	T14000	-0.0			
Ammon	iacal Nitrogen as N	<0.2	TM099	<0.2			
Cula I I I		mg/l	T84404	# -0.01			
Sulphide	Э	<0.01	TM101	<0.01			
Flore 1.1		mg/l	T14404	2#			
Fluoride	•	<0.5	TM104	<0.5			
Conduct	tivity @ 20 deg.C	mg/l <0.02	TM400	0.524			
Conduc	uvity @ 20 deg.C	<0.02 mS/cm	TM120	0.524 #			
Dissolve	ed solids, Total (meter)	<5	TM123	427			
DISSUIVE	eu solius, Total (Meter)	mg/l	1101123	421			
Chromii	um, Trivalent	<0.03	TM152	<0.03			
Official	in, mvalent	mg/l	1111102	10.00			
Antimon	y (diss.filt)	<1	TM152	<1			
7 414111011	y (dioc.int)	μg/l	1111102	#			
Arsenic	(diss.filt)	<0.5	TM152	<0.5			
7 4 001110	(dioc.int)	μg/l	1111102	#			
Bervlliur	m (diss.filt)	<0.1	TM152	<0.1			
.,.	(	μg/l		#			
Boron (d	diss.filt)	<10	TM152	16.5			
,	,	μg/l		#			
Cadmiu	m (diss.filt)	<0.08	TM152	<0.08			
		μg/l		#			
Chromiu	um (diss.filt)	<1	TM152	<1			
		μg/l		#			
Copper	(diss.filt)	<0.3	TM152	1.54			
		μg/l		#			
Lead (di	iss.filt)	<0.2	TM152	0.456			
		μg/l		#			
Mangan	ese (diss.filt)	<3	TM152	<3			
	/ P - 603	μg/l	T14450	#			
Molybde	enum (diss.filt)	<3	TM152	<3			
NE L L	J EIIV	μg/l	T14450	4.04			
Nickel (d	uiss.Tiit)	<0.4	TM152	1.81			
Dhoonh	orus (diss.filt)	μg/l <10	TM152	10.3			
Filospho	urus (uiss.iiil)	×10 μg/l	1101102	10.3			
Seleniu	m (diss.filt)	μg/i <1	TM152	<1			
Ocidillul	ii (uloo.iiit)	μg/l	1101102	×1 #			
Zinc (dis	ss.filt)	μg/i <1	TM152	83.4			
		μg/l	1111102	#			
Sodium	(Dis.Filt)	<0.076	TM152	24.2			
	,	mg/l	-	#			
Magnes	ium (Dis.Filt)	<0.036	TM152	1.45			
L	· ,	mg/l		#			
Potassiu	um (Dis.Filt)	<0.2	TM152	0.692			
	· · ·	mg/l		#		 	
Calcium	(Dis.Filt)	<0.2	TM152	99.8			
		mg/l		#			
Iron (Dis	s.Filt)	<0.019	TM152	<0.019			
		mg/l		#			
Mercury	(diss.filt)	<0.01	TM183	<0.01			
		μg/l		#			

#### **CERTIFICATE OF ANALYSIS**



# M	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617	
M aq diss.filt	mCERTS accredited.  Aqueous / settled sample.  Dissolved / filtered sample.		Depth (m)		
tot.unfilt	Total / unfiltered sample.  Subcontracted - refer to subcontractor re	port for	Sample Type	Ground Water (GW)	
	accreditation status.  % recovery of the surrogate standard to c		Date Sampled Sampled Time	19/03/2021 09:00:00	
	efficiency of the method. The results of in compounds within samples aren't correct	dividual	Date Received SDG Ref	20/03/2021 210320-39	
(F)	the recovery Trigger breach confirmed		Lab Sample No.(s)	23941073	
1-4+§@ Compo	Sample deviation (see appendix)	LOD/Unit	AGS Reference s Method		
Nitrite a		<0.05	TM184	<0.05	
		mg/l			#
Phosph	ate (Ortho as PO4)	<0.05	TM184	<0.05	
0.1.1.1		mg/l	T14404	40.0	#
Sulphat	е	<2 mg/l	TM184	19.6	#
Chloride		<2	TM184	38.1	#
		mg/l			#
Phosph	ate (Ortho as P)	<0.02	TM184	<0.02	
		mg/l			#
Nitrate a	as NO3	<0.3 mg/l	TM184	34	
Turbidit	v	<0.1	TM195	14.4	
, arbian	j	ntu			) #
PCB co	ngener 28	<0.015	TM197	<0.015	
		μg/l			
PCB co	ngener 52	<0.015	TM197	<0.015	
PCR co	ngener 101	μg/l <0.015	TM197	<0.015	
. 55 00		νσ.σ13 μg/l	TWITE	50.010	
PCB co	ngener 118	<0.015	TM197	<0.015	
		μg/l			
PCB co	ngener 138	<0.015	TM197	<0.015	
PCB co	ngener 153	μg/l <0.015	TM197	<0.015	
F C B C C	ngener 133	νσ.σ13 μg/l	1101197	<b>\0.013</b>	
PCB co	ngener 180	<0.015	TM197	<0.015	
		μg/l			
Sum of	detected EC7 PCB's	<0.105	TM197	<0.105	
0 11	T	μg/l	T14007	-0.05	_
Cyanide	e, lotal	<0.05 mg/l	TM227	<0.05	) #
Cyanide	e. Free	<0.05	TM227	<0.05	,#
.,		mg/l			) #
Chromit	um, Hexavalent	<0.03	TM241	<0.03	
		mg/l			#
pН		<1 pH Units	TM256	7.78	#
Phenol		<0.002	TM259	<0.002	#
		mg/l	250		#
Cresols		<0.006	TM259	<0.006	
		mg/l		4 4	#
Xylenols	S	<0.008	TM259	<0.008	ш
Phenologic	s, Total Detected	mg/l <0.016	TM259	<0.016	#
monohy		mg/l	LIMIZOS	\U.U10	#
Triflural		<0.01	TM343	<0.01	.,
		μg/l			
alpha-H	CH	<0.01	TM343	<0.01	
gamma	-HCH (Lindane)	μg/l <0.01	TM343	<0.01	
yanıma	-i ion (Lindane)	<0.01 µg/l	1101343	<b>\U.U</b> 1	
Heptach	nlor	<0.01	TM343	<0.01	
		μg/l			
Aldrin		<0.01	TM343	<0.01	
h. 1 112		µg/l	T14040	.0.04	
beta-HC	JH	<0.01 µg/l	TM343	<0.01	
Isodrin		μg/i <0.01	TM343	<0.01	
.couiiii		μg/l	1,11,0,10	-0.01	
delta-H	CH	<0.01	TM343	<0.01	
		μg/l			
Heptach	nlor epoxide	<0.01	TM343	<0.01	
		μg/l			

#### **CERTIFICATE OF ANALYSIS**



	Results Legend IS017025 accredited.		Customer Sample Ref.	W617			
aq	mCERTS accredited. Aqueous / settled sample.		Depth (m)				
tot.unfilt	Dissolved / filtered sample. Total / unfiltered sample.		Sample Type	Ground Water (GW)			
	Subcontracted - refer to subcontractor rep accreditation status.	ort for	Date Sampled Sampled Time	19/03/2021 09:00:00			
	% recovery of the surrogate standard to che efficiency of the method. The results of ind		Date Received	20/03/2021			
	compounds within samples aren't correcte the recovery		SDG Ref	210320-39 23941073			
(F)	Trigger breach confirmed Sample deviation (see appendix)		Lab Sample No.(s) AGS Reference	20011010			
Compor		LOD/Units	Method				
o,p'-DDE		<0.01	TM343	<0.01			
		μg/l					
Endosul	ohan I	<0.01	TM343	<0.01			
trans-Ch	lordano	μg/l <0.01	TM343	<0.01			
uans-on	lordane	νσ/l	110043	<b>\0.01</b>			
cis-Chlor	dane	<0.01	TM343	<0.01			
		μg/l					
p,p'-DDE		<0.01	TM343	<0.01			
		μg/l					
Dieldrin		<0.01	TM343	<0.01			
	) (TDE)	μg/l	T14040	-0.04			
o,p'-DDE	(IDE)	<0.01 µg/l	TM343	<0.01			
Endrin		μg/i <0.01	TM343	<0.01			
		νσ/l	11070	· · · · · · · · · · · · · · · · · · ·			
o,p'-DDT	-	<0.01	TM343	<0.06			
•		μg/l					
p,p'-DDE	(TDE)	<0.01	TM343	<0.01	 	 	
		μg/l	1				
Endosul	ohan II	<0.02	TM343	<0.02			
' DDT	-	μg/l	TM343	<0.06			
p,p'-DDT		<0.01 µg/l	1101343	<0.06			
o.p'-Meth	noxychlor	<0.01	TM343	<0.05			
-,-	,	μg/l	'				
p,p'-Meth	noxychlor	<0.01	TM343	<0.1			
		μg/l					
Endosul	ohan Sulphate	<0.02	TM343	<0.04			
D	ata. I	μg/l	TM242	-0.04			
Permeth	rin i	<0.01 µg/l	TM343	<0.01			
Permeth	rin II	<0.01	TM343	<0.01			
		μg/l	'				
1,3,5-Tri	chlorobenzene	<0.01	TM344	<0.02			
		μg/l					
Hexachlo	orobutadiene	<0.01	TM344	<0.01			
4047		μg/l	711011	0.04			
1,2,4-1ri	chlorobenzene	<0.01 µg/l	TM344	<0.01			
1 2 3-Tri	chlorobenzene	μg/i <0.01	TM344	<0.01			
·,=,U-111	55105011 <u>2</u> 0110	νσ/l	11110-14	· · · · · · · · · · · · · · · · · · ·			
Dichlorvo	OS	<0.01	TM344	<0.01			
		μg/l					
Dichlobe	nil	<0.01	TM344	<0.01			
		μg/l	7110//	0.04			
Mevinph	os	<0.01	TM344	<0.01			
Tecnaze	ne	μg/l <0.01	TM344	<0.01			
- condze	110	νυ.υ τ μg/l	1 101044	<b>~</b> 0.01			
Hexachlo	probenzene	<0.01	TM344	<0.01			
		μg/l					
Demetor	n-S-methyl	<0.01	TM344	<0.01			
		μg/l	1 1				
Phorate		<0.01	TM344	<0.01			
Dia-!:		μg/l	T140//	-0.04			
Diazinon		<0.01 µg/l	TM344	<0.01			
Triallate		μg/i <0.01	TM344	<0.01			
manate		νο.στ μg/l	1100-14	NO.01			
Atrazine		<0.01	TM344	<0.01			
		μg/l					
Simazine	<del></del>	<0.01	TM344	<0.01			
		μg/l					

#### **CERTIFICATE OF ANALYSIS**



# M	Results Legend ISO17025 accredited. mCERTS accredited.		Customer Sample Ref.	W617
aq diss.filt	Aqueous / settled sample.		Depth (m)	
tot.unfilt	Subcontracted - refer to subcontractor re	port for	Sample Type Date Sampled	Ground Water (GW) 19/03/2021
••	accreditation status. % recovery of the surrogate standard to c efficiency of the method. The results of in		Sampled Time Date Received	09:00:00 20/03/2021
	compounds within samples aren't correct the recovery		SDG Ref Lab Sample No.(s)	210320-39 23941073
(F) 1-4+§@		1	AGS Reference	
Comp Disulfo	onent oton	<b>LOD/Uni</b> <0.01	ts Method TM344	<0.01
		µg/l	=======	
Prope	tamphos	<0.01 µg/l	TM344	<0.01
Chlorp	pyriphos-methyl	<0.01	TM344	<0.01
Dimet	hoato	μg/l <0.01	TM344	<0.01
Dilliet	noate	νσ/l	TWOTT	<b>~0.01</b>
Pirimi	phos-methyl	<0.01	TM344	<0.01
Chlore	pyriphos	μg/l <0.01	TM344	<0.01
		μg/l		
Methy	l Parathion	<0.01 µg/l	TM344	<0.01
Malath	nion	<0.01	TM344	<0.01
Face 0.1		μg/l	TM044	-0.04
Fenthi	UII	<0.01 µg/l	TM344	<0.01
Fenitro	othion	<0.01	TM344	<0.01
Triadir	mefon	μg/l <0.01	TM344	<0.01
		μg/l		
Pendi	methalin	<0.01 µg/l	TM344	<0.01
Parath	nion	<0.01	TM344	<0.01
011		μg/l	T14044	.0.04
Chlorf	envinphos	<0.01 µg/l	TM344	<0.01
trans-	Chlordane	<0.01	TM344	<0.01
cje.Ch	lordane	μg/l <0.01	TM344	<0.01
013-011	moruane	νο.στ μg/l	I IVIJ44	<b>\0.01</b>
Ethion	1	<0.01	TM344	<0.01
Carbo	phenothion	μg/l <0.01	TM344	<0.01
		μg/l		
Triazo	phos	<0.01 µg/l	TM344	<0.01
Phosa	lone	<0.01	TM344	<0.01
		μg/l		
Azınpl	nos methyl	<0.02 µg/l	TM344	<0.02
Azinpl	nos ethyl	<0.02	TM344	<0.02
		μg/l		

#### **CERTIFICATE OF ANALYSIS**



Report Number: Superseded Report: 593368 SDG: 210320-39 JFR1451 Client Reference: Location: A303 Stonehenge Order Number: 591829 PO21-326

ЭΔН	Spec	MS -	· Aqueous	(W)

PAH Spec MS - Aqueous	s (W)					
Results Legend # ISO17025 accredited.		Customer Sample Ref.	W617			
M mCERTS accredited.  aq Aqueous / settled sample.		Double (va)				
diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.		Depth (m) Sample Type	Ground Water (GW)			
* Subcontracted - refer to subcontractor rep	ort for	Date Sampled	19/03/2021			
accreditation status.  ** % recovery of the surrogate standard to ch		Sampled Time Date Received	09:00:00 20/03/2021			
efficiency of the method. The results of ind compounds within samples aren't correcte		SDG Ref	210320-39			
the recovery (F) Trigger breach confirmed		Lab Sample No.(s) AGS Reference	23941073			
1-4+§@ Sample deviation (see appendix)  Component	LOD/Units					
Naphthalene (aq)	<0.01	TM178	<0.01			
1 ( )	μg/l		@#			
Acenaphthene (aq)	<0.005	TM178	<0.005			
	μg/l		@#			
Acenaphthylene (aq)	<0.005	TM178	<0.005			
Fluoranthene (aq)	μg/l <0.005	TM178	@# <0.005			
i idorantiferie (aq)	μg/l	110170	~0.003 @#			
Anthracene (aq)	<0.005	TM178	<0.005			
. "	μg/l		@#			
Phenanthrene (aq)	<0.005	TM178	<0.005		 	 
	µg/l		@#			
Fluorene (aq)	<0.005	TM178	<0.005			
Chrysene (aq)	μg/l <0.005	TM178	@# <0.005			
Omysonic (ay)	νυ.υυ5 μg/l	11011/0	<0.005 @#			
Pyrene (aq)	<0.005	TM178	<0.005			
- \ 1/	μg/l		@#		 	
Benzo(a)anthracene (aq)	<0.005	TM178	<0.005			
	μg/l		@#			
Benzo(b)fluoranthene (aq)	<0.005	TM178	<0.005			
Panza(k)fluoranthana (ag)	μg/l <0.005	TM178	@# <0.005			
Benzo(k)fluoranthene (aq)	νο.003 μg/l	TIVITO	<0.005 @#			
Benzo(a)pyrene (aq)	<0.002	TM178	<0.002			
(- /1-) (- 1)	μg/l		@#			
Dibenzo(a,h)anthracene (aq)	<0.005	TM178	<0.005			
	μg/l		@#			
Benzo(g,h,i)perylene (aq)	<0.005	TM178	<0.005			
Indone/1.0.2 ad/nimene (ag)	μg/l	TM178	@#			
Indeno(1,2,3-cd)pyrene (aq)	<0.005 µg/l	I IVI I / O	<0.005 @#			
PAH, Total Detected USEPA 16	<0.082	TM178	<0.082			
(aq)	μg/l		@#			
		_				



SVOC MS (W) - Aqueous

JFR1451 Report Number: Superseded Report: 593368 SDG: 210320-39 Client Reference:

Location: A303 Stonehenge Order Number: 591829 PO21-326

Results Legend	<u>.                                    </u>	Customer Sample Ref.	W617			
# ISO17025 accredited.  M mCERTS accredited.  aq Aqueous / settled sample. diss.filt Dissolved filtered sample. tot.unfilt Total / unfiltered sample.  Subcontracted - refer to subcontractor repaccreditation status.  ** % recovery of the surrogate standard to clefficiency of the method. The results of in compounds within samples aren't correct the recovery	heck the dividual	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s)	Ground Water (GW) 19/03/2021 09:00:00 20/03/2021 21/03/20-39 23941073			
(F) Trigger breach confirmed 1-4+§@ Sample deviation (see appendix)		AGS Reference				
Component	LOD/Uni	_				
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 @#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 @,#			
1,3-Dichlorobenzene (aq)	<1 μg/l	TM176	<1 @,#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 @#			
2,4,5-Trichlorophenol (aq)	<1	TM176	<1			
2,4,6-Trichlorophenol (aq)	μg/l <1	TM176	<u>@</u> #			
2,4-Dichlorophenol (aq)	μg/l <1	TM176	<u>@</u> #			
O A Dissette data and (a a)	μg/l	TM470				
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	@#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 @#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 @#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 @,#			
2-Chlorophenol (aq)	<1 μg/l	TM176	<1 @,#			
2-Methylnaphthalene (aq)	<1 μg/l	TM176	<1 @,#			
2-Methylphenol (aq)	<1	TM176	<1			
2-Nitroaniline (aq)	μg/l <1	TM176				
2-Nitrophenol (aq)	μg/l <1	TM176	<1 0 4			
3-Nitroaniline (aq)	μg/l <1	TM176	<u>@</u> #			
4-Bromophenylphenylether (aq)	μg/l <1	TM176	<u>@</u> #			
4-Chloro-3-methylphenol (aq)	μg/l <1	TM176	<u>@</u> #_			
4-Chloroaniline (aq)	μg/l <1	TM176	<u>@</u> #			
4 Ohlassahassilahassilahkas (a.a.)	μg/l	TM470	<1			
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	@#			
4-Methylphenol (aq)	<1 µg/l	TM176	<1 @#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 @#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1			
Azobenzene (aq)	<1 µg/l	TM176	<1 @#			
Acenaphthylene (aq)	<1 µg/l	TM176	<1 @# @#			
Acenaphthene (aq)	<1	TM176	<1			
Anthracene (aq)	μg/l <1	TM176	<u>@</u> #			
bis(2-Chloroethyl)ether (aq)	μg/l <1	TM176	<u>@</u> #			
bis(2-Chloroethoxy)methane	μg/l <1	TM176	@ # <1			
(aq) bis(2-Ethylhexyl) phthalate (aq)	μg/l <2	TM176	@# <2			
Butylbenzyl phthalate (aq)	μg/l <1	TM176				
3	μg/l		@#			





Report Number: Superseded Report: 593368 SDG: 210320-39 JFR1451 Client Reference: Location: A303 Stonehenge Order Number: 591829 PO21-326

# ISO M mC aq hodiss.file tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile tot.unfile saccomporter fright con trip tot.unfile tot.unfile tot.unfile saccomporter fright con tot.unfile tot.unfile saccomporter fright con tot.unfile saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright saccomporter fright sac	AS (W) - Aqueous  Results Logend  17025 accredited.  LERTS accredited.  LERTS accredited.  Lerts accredited.  Lerts accredited.  Lerts accredited.  Lerts accredited.  Lerts accredited.  Lerts accredited.  Lerts ample.  Lerts ample.  Lerts ample.  Lerts are ample.  Lerts ample.  Lerts are accovery of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the method. The results of Indi  Manual Manual Company of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the surrogate standard to che ciciency of the sur	rt for skk the vidual for  LOD/Units <1  µg/l	Depth (m) Sample Type Date Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference Method	W617  Ground Water (GW) 19/03/2021 05/00:00 20/03/2021 21/03/20-39			
M mC aq diss.filit tot.unfilit tot.unfilit tot.unfilit square " % n effic con the filit 1.44 \$\int \text{3} \text{3} \text{3} \text{4} \text{4} \text{4} \text{4} \text{5} \text{4} \text{5} \text{4} \text{5} \text{5} \text{3} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{6} \text{7} \text{7} \text{6} \text{7} \text{6} \text{7} \text{7} \text{6} \text{7} \text{7} \text{6} \text{7} \text{7} \text{7} \text{6} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{6} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \text{7} \te	ERT's accredited.  ueous / settled sample.  solved / filtered sample.  al / unfiltered sample.  al / unfiltered sample.  al / unfiltered sample.  contracted - refer to subcontractor reporceditation status.  recovery of the surrogate standard to checisincy of the method. The results of indirection of the surrogate standard to checisincy of the method. The results of indirection of the surrogate standard to checisincy of the method. The results of indirection of the surrogate standard to checisincy of the method. The results of indirection of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to check of the surrogate standard to che	LOD/Units <1  µg/l	Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	19/03/2021 09:00:00 20/03/2021			
totunfilt Tot Sut Sut Sut Sut Sut Sut Sut Sut Sut Su	Lal Junfillered sample. becontracted - refer to subcontractor reporeditation status. secovery of the surrogate standard to che ciency of the method. The results of Indi mpounds within samples aren't corrected recovery gger breach confirmed mple deviation (see appendix)  nt  uthracene (aq)  uoranthene (aq)	LOD/Units <1  µg/l	Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	19/03/2021 09:00:00 20/03/2021			
acc when the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the sec	reditation status.  recovery of the surrogate standard to che ciency of the method. The results of indi mpounds within samples aren't corrected recovery gger breach confirmed migle deviation (see appendix)  nt  nthracene (aq)  uoranthene (aq)	LOD/Units <1  µg/l	Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	09:00:00 20/03/2021			
Gentle Benzo(a) ar  Benzo(b) flu  Benzo(a) py	cioncy of the method. The results of indimpounds within samples aren't corrected recovery gager breach confirmed mpile deviation (see appendix)  nt  thracene (aq)  uoranthene (aq)	LOD/Units <1  µg/l	SDG Ref Lab Sample No.(s) AGS Reference				
Benzo(a)py	grecovery ggger breach confirmed mple deviation (see appendix)  nt  thtracene (aq)  uoranthene (aq)	LOD/Units <1 µg/l	Lab Sample No.(s) AGS Reference	210320-39			
1-14-\$@ San Componet Benzo(a)ar Benzo(b)flu Benzo(k)flu Benzo(a)py	mple deviation (see appendix)  nt  nthracene (aq)  uoranthene (aq)	<1 µg/l		23941073			
Benzo(a)ar Benzo(b)flu Benzo(k)flu Benzo(a)py	nthracene (aq) uoranthene (aq)	<1 µg/l					
Benzo(b)flu Benzo(k)flu Benzo(a)py	uoranthene (aq)	μg/l	TM176	<1			
Benzo(k)flu Benzo(a)py			"""	@#			
Benzo(a)py	uoranthene (aq)	<1	TM176	<1			
Benzo(a)py	ioranthene (aq)	μg/l		@#			
		<1 µg/l	TM176	<1 @#			
	vrene (ag)	<1	TM176	<1			
Benzo(g,h,i	, , , , , , , , , , , , , , , , , , , ,	μg/l		@#			
	i)perylene (aq)	<1	TM176	<1			
0 1 1	( )	μg/l	71470	@#			
Carbazole (	(aq)	<1 µg/l	TM176	<1 @#			
Chrysene (a	aq)	μg/i <1	TM176	<1			
		μg/l		@#			
Dibenzofura	an (aq)	<1	TM176	<1			
n Dibutul ni	hthalata (aa)	μg/l <1	TM176	<u>@</u> #			
ויייוטעוער-וו βו	hthalate (aq)	νς ι μg/l	11011/0	<1 @#			
Diethyl phth	halate (aq)	<1	TM176	<1			
		μg/l		@#			
Dibenzo(a,l	h)anthracene (aq)	<1	TM176	<1			
Dimethyl nh	hthalate (aq)	μg/l <1	TM176	<u>@</u> #			
Dillietilyi pi	ililialate (aq)	μg/l	110170	@#			
n-Dioctyl ph	hthalate (aq)	<5	TM176	<5			
		μg/l		@#			
Fluoranther	ne (aq)	<1 µg/l	TM176	<1 @#			
Fluorene (a	ag)	μg/i <1	TM176	<u>@#</u>			
	~4/	μg/l		. @#			
Hexachloro	bbenzene (aq)	<1	TM176	<1			
		µg/l	T14470	@#			
Hexacnioro	obutadiene (aq)	<1 µg/l	TM176	<1 @#			
Pentachlor	ophenol (aq)	<1	TM176	<1			
		μg/l					
Phenol (aq)	)	<1	TM176	<1			
n_Nitroso_n	-dipropylamine (aq)	μg/l <1	TM176	<1			
	. a.propjianino (aq)	μg/l		@#			
Hexachloro	pethane (aq)	<1	TM176	<1			
A.P	( )	μg/l	T11172	@#			
Nitrobenzei	ne (aq)	<1 µg/l	TM176	<1 @#			
Naphthalen	ne (aq)	μg/i <1	TM176	<1			
		μg/l		@#			
Isophorone	e (aq)	<1	TM176	<1	 		
Llovashi	ovolonontadiana (==)	μg/l	TM470	@#			
i iexacillofo	ocyclopentadiene (aq)	<1 µg/l	TM176	<1			
Phenanthre	ene (aq)	<1	TM176	<1			
		μg/l		@#			
ndeno(1,2,	,3-cd)pyrene (aq)	<1	TM176	<1			
Pyrene (aq	)	μg/l <1	TM176	<u>@</u> #			
Arene (ad	)	μg/l	1101170	@#			
SVOC TIC	(aq)	1.5.	TM176	Not Detected			
				@			
Total SVO	C TIC	<10	TM176	<10			
		μg/l					





Report Number: Superseded Report: 593368 SDG: 210320-39 JFR1451 Client Reference: Location: A303 Stonehenge Order Number: 591829 PO21-326

грц	CWG	$\Lambda \Lambda \Lambda$
ırn	CVVG	( V V )

	:WG (W)			
#	Results Legend ISO17025 accredited.		Customer Sample Ref.	W617
	mCERTS accredited.  Aqueous / settled sample.  Dissolved / filtered sample.		Depth (m)	
tot.unfilt	Total / unfiltered sample.  Subcontracted - refer to subcontractor re	eport for	Sample Type Date Sampled	Ground Water (GW) 19/03/2021
	accreditation status. % recovery of the surrogate standard to	check the	Sampled Time Date Received	09:00:00 20/03/2021
	efficiency of the method. The results of it compounds within samples aren't correct.		SDG Ref	210320-39 23941073
(F)	the recovery Trigger breach confirmed Sample deviation (see appendix)		Lab Sample No.(s) AGS Reference	23341073
Compor	nent	LOD/Un		00
GRO Su	rrogate % recovery**	%	TM245	89 1
GRO >C	5-C12	<50	TM245	<50
Methyl te	ertiary butyl ether	μg/l <3	TM245	1 # <3
(MTBE)	ordary batty out of	μg/l	TIMETO	1#
Benzene	)	<7 ug/l	TM245	<7
Toluene		μg/l <4	TM245	1 # <4
		µg/l		1#
Ethylben	nzene	<5 µg/l	TM245	<5 1#
m,p-Xyle	ene	<8	TM245	<8
o-Xylene	<u> </u>	μg/l <3	TM245	1 # <3
0-Aylerie	;	µg/l	1101245	\ 1#
Sum of c	detected Xylenes	<11	TM245	<11
Sum of c	detected BTEX	μg/l <28	TM245	1 <28
		μg/l		1
Aliphatic	s >C5-C6	<10 µg/l	TM245	<10 1
Aliphatic	s >C6-C8	<10	TM245	<10
Alimbatia	s >C8-C10	μg/l <10	TM245	1 <10
Aliphatic	s >00-010	µg/l	1101245	1
Aliphatic	s >C10-C12	<10	TM245	<10
Alinhatic	s >C12-C16 (aq)	μg/l <10	TM174	<10 <10
		μg/l		110
Aliphatic	s >C16-C21 (aq)	<10	TM174	<10
Aliphatic	s >C21-C35 (aq)	μg/l <10	TM174	<10
		μg/l		
Total Alip	phatics >C12-C35 (aq)	<10 µg/l	TM174	<10
Aromatic	cs >EC5-EC7	<10	TM245	<10
Aromat:	00 \EC7 EC0	μg/l	TMOAE	1
Aromatio	cs >EC7-EC8	<10 µg/l	TM245	<10 1
Aromatic	cs >EC8-EC10	<10	TM245	<10
Aromatic	cs >EC10-EC12	μg/l <10	TM245	<10 <10
		μg/l		1
Aromatic	cs >EC12-EC16 (aq)	<10 µg/l	TM174	<10
Aromatic	cs >EC16-EC21 (aq)	μg/i <10	TM174	<10
		μg/l		.40
Aromatic	es >EC21-EC35 (aq)	<10 µg/l	TM174	<10
	omatics >EC12-EC35	<10	TM174	<10
(aq)	phatics & Aromatics	μg/l <10	TM174	<10
>C5-35 (	(aq)	×10 μg/l	11011/4	\1U
	s >C16-C35 Aqueous	<10	TM174	<10
		µg/l		
		+		





$\mathbf{I}$	$\sim$	MAC	\\\\\	

Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Cont	VOC M				
The content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the		Results Legend		Customer Sample Ref.	W617
Second State Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process Process	M aq A diss.filt I tot.unfilt 3	mCERTS accredited. Aqueous / settled sample. Dissolved / filtered sample. Total / unfiltered sample. Subcontracted - refer to subcontractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the contractor reportance of the con		Sample Type Date Sampled	19/03/2021
Component         LODItality         Methods         1           Disconductorenthere***         N.         TMX88         116            Totales-66***         N.         TMX88         98-9             4-Bronofulucostrorene***         N.         TMX88         94.7              Obritosofiluromethane         <1	(F)	efficiency of the method. The results of indi compounds within samples aren't corrected the recovery Trigger breach confirmed	vidual	SDG Ref Lab Sample No.(s)	210320-39
5	Compon	ent	LOD/Unit		
Tourine-dell' 1/1008	Dibromof	luoromethane**	0/	TM208	
1	Toluene-	d8**		TM208	98.9
Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Ligh	4-Bromof	fluorobenzene**	%	TM208	
Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Ligh	Dichlorod	lifluoromethane		TM208	
Bromomethane	Chlorome	ethane		TM208	
Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics   Mathematics	Vinyl chlo	oride		TM208	
Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Mathematical   Math	Bromome	ethane		TM208	
Tinchiorosethane	Chloroeth	nane		TM208	
1,1-Dichloroethene	Trichlorof	fluoromethane		TM208	
Carbon disulphide	1,1-Dichlo	oroethene		TM208	
Dichloromethane	Carbon d	lisulphide	<1	TM208	<1
Methy terrary butyl ether (MTBE)         41         TM208         41         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 #         1 # <td< td=""><td>Dichloron</td><td>nethane</td><td>&lt;3</td><td>TM208</td><td>&lt;3</td></td<>	Dichloron	nethane	<3	TM208	<3
trans-1,2-Dichloroethene		rtiary butyl ether	<1	TM208	<1
1,1-Dichloroethane		-Dichloroethene	<1	TM208	<1
cis-1,2-Dichloroethene       <1	1,1-Dichlo	oroethane	<1	TM208	<1
2,2-Dichloropropane	cis-1,2-Di	ichloroethene	<1	TM208	<1
Bromochloromethane         41	2,2-Dichlo	oropropane	<1	TM208	<1
Chloroform	Bromochl	loromethane	<1	TM208	<1
1,1,1-Trichloroethane	Chlorofor	m	<1	TM208	<1
1,1-Dichloropropene	1,1,1-Tric	chloroethane	<1	TM208	<1
Carbontetrachloride     <1	1,1-Dichlo	oropropene	<1	TM208	<1
1,2-Dichloroethane	Carbonte	etrachloride	<1	TM208	<1
Benzene	1,2-Dichlo	oroethane	<1	TM208	<1
Trichloroethene	Benzene		<1	TM208	<1
1,2-Dichloropropane	Trichloroe	ethene	<1	TM208	<1
Dibromomethane         <1	1,2-Dichlo	oropropane	<1	TM208	<1
Bromodichloromethane         <1 μg/l         TM208 μg/l         <1 μg/l         1 #	Dibromor	methane	<1	TM208	<1
cis-1,3-Dichloropropene	Bromodio	chloromethane	<1	TM208	<1
Toluene	cis-1,3-Di	ichloropropene	<1	TM208	<1
μg/l         1#         6         1#         6         6         6         6         6         6         6         6         6         6         6         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7         7 </td <td>Tolue</td> <td></td> <td></td> <td>TMOOO</td> <td></td>	Tolue			TMOOO	
μg/l         1#         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         =         = <td></td> <td></td> <td>μg/l</td> <td></td> <td>1#</td>			μg/l		1#
			μg/l		1#
	1,1,2-Tric	chloroethane		TM208	





Report Number: Superseded Report: 593368 SDG: 210320-39 JFR1451 Client Reference: Location: A303 Stonehenge Order Number: 591829 PO21-326

	/IS (W)			
	Results Legend		Customer Sample Ref.	W617
М	ISO17025 accredited. mCERTS accredited.			
diss.filt	Aqueous / settled sample. Dissolved / filtered sample.		Depth (m)	
	Total / unfiltered sample. Subcontracted - refer to subcontractor r	report for	Sample Type Date Sampled	Ground Water (GW) 19/03/2021
**	accreditation status. % recovery of the surrogate standard to		Sampled Time Date Received	09:00:00 20/03/2021
	efficiency of the method. The results of compounds within samples aren't corre		SDG Ref	210320-39
(F)	the recovery Trigger breach confirmed		Lab Sample No.(s)	23941073
	Sample deviation (see appendix)	LOD/Uni	AGS Reference	
	loropropane	<1	TM208	<1
ĺ		μg/l		1#
Tetrachlo	oroethene	<1	TM208	<1
		μg/l		1#
Dibromo	chloromethane	<1	TM208	<1
1.0 Diba	omoethane	μg/l <1	TM208	1 # <1
1,2-01010	omoethane	µg/l	TIVIZUO	1#
Chlorobe	enzene	<1	TM208	<1
		μg/l		1#
1,1,1,2-T	etrachloroethane	<1	TM208	<1
		μg/l		1#
Ethylben	zene	<1	TM208	<1
m n Vula	nno.	μg/l <1	TM208	1 # <1
m,p-Xyle	ene	µg/l	1101208	<1 1#
o-Xylene	<u> </u>	<1	TM208	<1
0 713.0	•	μg/l	200	. 1#
Styrene		<1	TM208	<1
		μg/l		1#
Bromofo	rm	<1	TM208	<1
		μg/l	T14000	1#
Isopropy	lbenzene	<1 µg/l	TM208	<1 1#
1.1.2.2-T	etrachloroethane	<1	TM208	<1
.,.,_,		μg/l	200	. 1#
1,2,3-Tri	chloropropane	<1	TM208	<1
		μg/l		1#
Bromobe	enzene	<1	TM208	<1
5 "		μg/l	T11000	1#
Propylbe	enzene	<1 µg/l	TM208	<1
2-Chloro	toluene	μg/i <1	TM208	1 # <1
2 0111010	tolucito	μg/l	11/1/200	1#
1,3,5-Tri	methylbenzene	<1	TM208	<1
	•	μg/l		1#
4-Chloro	toluene	<1	TM208	<1
		μg/l		1#
tert-Buty	Ibenzene	<1	TM208	<1
101T=	methylbenzene	μg/l <1	TM208	1 # <1
1,∠,4-1¶	пешушенzепе	<1 μg/l	1101∠08	<1 1#
sec-Ruty	lbenzene	μg/i <1	TM208	<1
		μg/l	200	1#
4-iso-Pro	pyltoluene	<1	TM208	<1
		μg/l		1#
1,3-Dich	lorobenzene	<1	TM208	<1
4.4 51.11		µg/l	T1 1022	1#
1,4-Dich	lorobenzene	<1 ug/l	TM208	<1
n-Butylbe	enzene	μg/l <1	TM208	1 # <1
טונאוטם-וו	01120110	µg/l	TIVIZUO	1#
1,2-Dich	lorobenzene	γg/1 <1	TM208	<1
		μg/l		. 1#
1,2-Dibro	omo-3-chloropropane	<1	TM208	<1
		μg/l		1
1,2,4-Tri	chlorobenzene	<1	TM208	<1
11	1.1.2	µg/l	T1 1022	1#
Hexachlo	orobutadiene	<1	TM208	<1
tart Am.	I methyl ether (TAME)	μg/l <1	TM208	1 # <1
tort-AIIIY	i meniyi enler (TAME)	×1 μg/l	I IVI∠UO	<1 1#
Naphtha	lene	<1	TM208	<1
		μg/l	200	1#
		, , , ,	•	





Report Number: Superseded Report: 593368 SDG: 210320-39 JFR1451 Client Reference: Location: A303 Stonehenge Order Number: 591829 PO21-326

VOC MS (W)						
Results Legend # ISO17025 accredited.		Customer Sample Ref.	W617			
m CERTS accredited.  aq Aqueous' settled sample. diss.filt Dissolved / filtered sample. tot.urfilt Total / unfiltered sample.  * Subcontracted - refer to subcontractor re accreditation status.  ** % recovery of the surrogate standard to efficiency of the method. The results of it compounds within samples aren't correc the recovery  Trigger breach confirmed  1-4-\$@ Sample deviation (see appendix)	check the	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 19/03/2021 09/00:00 20/03/2021 21/03/20-39 2394/1073			
Component	LOD/Unit					
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1 1#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1 1			
VOC TIC		TM208	Not Detected 1			
Sum of detected Xylenes	<2 µg/l	TM208	<2			
Total VOC TIC	<10 µg/l	TM208	<10 1			
	<del>                                     </del>					
	-					
	+					





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### **Table of Results - Appendix**

	Table of Results - Appendix						
Method No	Reference	Description					
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters					
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples					
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter					
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water					
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser					
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser					
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser					
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter					
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water					
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS					
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID					
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS					
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters					
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry					
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers					
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices					
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters					
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters					
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate					
TM241	Methods for the Examination of Waters and Associated Materials; Chromium in Raw and Potable Waters and Sewage Effluents 1980.	The Determination of Hexavalent Chromium in Waters and Leachates using the Kone Analyser					
TM245	By GC-FID	Determination of GRO by Headspace in waters					
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter					
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC					
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS					
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS					

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).





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## **Test Completion Dates**

Lab Sample No(s)	23941073
Customer Sample Ref.	W617
Cuctomor Campio Ron	
AGS Ref.	
Depth	
Type	Ground Water
Alkalinity as CaCO3	01-Apr-2021
Ammoniacal Nitrogen	01-Apr-2021
Aninons by Kone (w)	30-Mar-2021
Chromium III	31-Mar-2021
Conductivity (at 20 deg.C)	01-Apr-2021
Cyanide Comp/Free/Total/Thiocyanate	31-Mar-2021
Dissolved Metals by ICP-MS	31-Mar-2021
Dissolved Organic/Inorganic Carbon	07-Apr-2021
· · · · · · · · · · · · · · · · · · ·	21-Mar-2021
Dissolved Oxygen by Probe	08-Apr-2021
EPH CWG (Aliphatic) Aqueous GC (W)  EPH CWG (Aromatic) Aqueous GC (W)	08-Apr-2021
Fluoride	30-Apr-2021
1 144 144	01-Apr-2021
GRO by GC-FID (W)	30-Mar-2021
Hexavalent Chromium (w)	
Mercury Dissolved	01-Apr-2021 30-Mar-2021
Nitrite by Kone (w)	
PAH Spec MS - Aqueous (W)	07-Apr-2021
PCB Congeners - Aqueous (W)	07-Apr-2021
Pesticides (Suite I) by GCMS	08-Apr-2021
Pesticides (Suite II) by GCMS	01-Apr-2021
pH Value	31-Mar-2021
Phenols by HPLC (W)	01-Apr-2021
Phosphate by Kone (w)	30-Mar-2021
Sulphide	23-Mar-2021
Suspended Solids	23-Mar-2021
SVOC MS (W) - Aqueous	07-Apr-2021
Total Dissolved Solids	06-Apr-2021
TPH CWG (W)	08-Apr-2021
Turbidity in waters	30-Mar-2021
VOC MS (W)	01-Apr-2021

Validated



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## **ASSOCIATED AQC DATA**

#### Alkalinity as CaCO3

Component	Method Code	QC 2486
Total Alkalinity as CaCO3	TM043	98.99
		94.47 : 104.41

#### Ammoniacal Nitrogen

Component	Method Code	QC 2493
Ammoniacal Nitrogen as N	TM099	<b>98.8</b> 91.28 : 106.64

#### Anions by Kone (w)

Component	Method Code	QC 2346
Chloride	TM184	102.0
		92.93 : 115.43
Sulphate (soluble)	TM184	101.2
		90.53 : 113.03
TON as NO3	TM184	103.0
		99.60 : 111.90

#### Conductivity (at 20 deg.C)

Component	Method Code	QC 2450
Conductivity (at 20 deg.C)	TM120	<b>103.76</b> 100.75 : 105.26

#### Cyanide Comp/Free/Total/Thiocyanate

Component	Method Code	QC 2472
Free Cyanide (W)	TM227	83.0
		91.52 : 123.82
Thiocyanate (W)	TM227	100.0
		90.50 : 113.00
Total Cyanide (W)	TM227	106.25
		91.75 : 112.75

#### Dissolved Metals by ICP-MS

Component	Method Code	QC 2468
Aluminium	TM152	<b>96.0</b> 90.78 : 110.89
Antimony	TM152	<b>96.5</b> 77.22 : 119.42
Arsenic	TM152	<b>94.83</b> 86.77 : 107.67

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## Dissolved Metals by ICP-MS

· ·		
	,	QC 2468
Barium	TM152	<b>94.67</b> 87.86 : 110.23
Beryllium	TM152	<b>98.67</b> 86.19 : 112.98
Bismuth	TM152	<b>97.33</b> 84.06 : 106.46
Borate	TM152	<b>96.3</b> 88.00 : 112.00
Boron	TM152	<b>96.67</b> 83.92 : 114.90
Cadmium	TM152	<b>95.0</b> 88.89 : 106.69
Calcium	TM152	<b>99.33</b> 80.24 : 117.95
Chromium	TM152	97.17
Cobalt	TM152	83.22 : 110.16 <b>96.0</b> 82.49 : 112.36
Copper	TM152	<b>96.5</b> 83.14 : 113.00
Iron	TM152	<b>97.33</b> 88.40 : 109.24
Lead	TM152	<b>95.83</b> 83.71 : 109.58
Lithium	TM152	<b>96.5</b> 84.50 : 114.28
Magnesium	TM152	<b>96.0</b> 87.56 : 114.57
Manganese	TM152	<b>98.67</b> 90.01 : 108.72
Molybdenum	TM152	<b>92.67</b> 85.53 : 107.42
Nickel	TM152	<b>96.83</b> 88.05 : 106.42
Phosphorus	TM152	<b>96.67</b> 82.76 : 107.72
Potassium	TM152	<b>96.0</b> 88.45 : 106.42
Selenium	TM152	<b>94.5</b> 85.61 : 111.03
Silver	TM152	<b>91.67</b> 88.48 : 110.48
Sodium	TM152	<b>95.33</b> 88.32 : 106.30
Strontium	TM152	<b>96.0</b> 83.77 : 107.87
Tellurium	TM152	<b>93.17</b> 82.83 : 104.73
Thallium	TM152	<b>91.83</b> 77.47 : 113.87
Tin	TM152	<b>96.17</b> 87.36 : 109.55
Titanium	TM152	<b>97.67</b> 87.29 : 108.31

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#### Dissolved Metals by ICP-MS

		QC 2468
Tungsten	TM152	<b>93.5</b> 68.27 : 122.97
Uranium	TM152	<b>96.33</b> 82.46 : 105.16
Vanadium	TM152	<b>99.83</b> 88.43 : 114.30
Zinc	TM152	<b>97.67</b> 85.57 : 114.31

#### Dissolved Organic/Inorganic Carbon

Component	Method Code	QC 2470
Dissolved Inorganic Carbon	TM090	<b>109.5</b> 93.58 : 112.28
Dissolved Organic Carbon	TM090	<b>103.5</b> 96.13 : 109.53

#### EPH CWG (Aliphatic) Aqueous GC (W)

Component	Method Code	QC 2466
Total Aliphatics >C10-C40	TM174	115.02
		68.59 : 134.82

#### EPH CWG (Aromatic) Aqueous GC (W)

Component	Method Code	QC 2446
Total Aromatics >EC10-EC40	TM174	110.49
		60.75 : 129.09

#### Fluoride

Component	Method Code	QC 2375
Fluoride	TM104	<b>102.67</b> 96.67 : 108.67

#### GRO by GC-FID (W)

Component	Method Code	QC 2459
Benzene by GC	TM245	<b>102.0</b> 79.13 : 118.84
Ethylbenzene by GC	TM245	<b>99.5</b> 79.54 : 115.99
m & p Xylene by GC	TM245	<b>98.5</b> 78.44 : 116.32

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## GRO by GC-FID (W)

		QC 2459
MTBE GC-FID	TM245	<b>102.0</b> 81.43 : 120.09
o Xylene by GC	TM245	<b>101.0</b> 76.85 : 120.29
QC	TM245	<b>106.29</b> 71.58 : 131.01
Toluene by GC	TM245	<b>101.0</b> 79.00 : 121.96

#### Hexavalent Chromium (w)

Component	Method Code	QC 2393
Hexavalent Chromium	TM241	99.8
		94.17 : 106.17

#### Mercury Dissolved

Component	Method Code	QC 2337
Mercury Dissolved (CVAF)	TM183	98.0
		69.30 : 128.70

#### PAH Spec MS - Aqueous (W)

Component	Method Code	QC 2459
Acenaphthene by GCMS	TM178	<b>106.4</b> 90.45 : 118.63
Acenaphthylene by GCMS	TM178	<b>106.0</b> 90.13 : 116.27
Anthracene by GCMS	TM178	<b>107.6</b> 92.40 : 114.00
Benz(a)anthracene by GCMS	TM178	<b>100.8</b> 89.51 : 117.69
Benzo(a)pyrene by GCMS	TM178	<b>101.6</b> 89.43 : 118.57
Benzo(b)fluoranthene by GCMS	TM178	<b>99.2</b> 87.80 : 121.80
Benzo(ghi)perylene by GCMS	TM178	<b>106.8</b> 87.10 : 119.30
Benzo(k)fluoranthene by GCMS	TM178	<b>101.2</b> 93.23 : 123.57
Chrysene by GCMS	TM178	<b>102.8</b> 88.68 : 116.92
Dibenzo(ah)anthracene by GCMS	TM178	<b>99.2</b> 86.24 : 118.56
Fluoranthene by GCMS	TM178	<b>110.0</b> 86.04 : 121.96
Fluorene by GCMS	TM178	<b>107.6</b> 90.76 : 121.24

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### PAH Spec MS - Aqueous (W)

		QC 2459
Indeno(123cd)pyrene by GCMS	TM178	<b>102.4</b> 88.39 : 119.61
Naphthalene by GCMS	TM178	<b>107.6</b> 89.40 : 121.80
Phenanthrene by GCMS	TM178	<b>105.2</b> 90.41 : 119.19
Pyrene by GCMS	TM178	<b>108.4</b> 91.00 : 120.20

### PCB Congeners - Aqueous (W)

Component	Method Code	QC 2467
PCB congener 101	TM197	<b>112.8</b> 85.28 : 119.60
PCB congener 105	TM197	<b>103.2</b> 81.16 : 119.80
PCB congener 114	TM197	<b>102.4</b> 88.32 : 118.08
PCB congener 118	TM197	<b>108.8</b> 87.76 : 117.04
PCB congener 123	TM197	<b>96.8</b> 86.80 : 117.28
PCB congener 126	TM197	<b>97.6</b> 84.56 : 116.00
PCB congener 138	TM197	<b>99.2</b> 83.00 : 117.80
PCB congener 153	TM197	<b>105.6</b> 84.12 : 117.00
PCB congener 156	TM197	<b>99.2</b> 82.24 : 119.20
PCB congener 157	TM197	<b>107.2</b> 84.96 : 116.40
PCB congener 167	TM197	<b>103.2</b> 81.64 : 119.32
PCB congener 169	TM197	<b>100.0</b> 84.60 : 117.96
PCB congener 180	TM197	<b>106.8</b> 80.40 : 119.04
PCB congener 189	TM197	<b>100.0</b> 81.56 : 119.00
PCB congener 28	TM197	<b>110.0</b> 83.20 : 117.04
PCB congener 52	TM197	<b>104.4</b> 81.84 : 119.52
PCB congener 77	TM197	<b>99.2</b> 81.96 : 117.24
PCB congener 81	TM197	<b>102.4</b> 82.28 : 120.20

Pesticides (Suite I) by GCMS

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#### Pesticides (Suite I) by GCMS

Component	Method Code	QC 2331
Aldrin - (Inst.)	TM343	<b>82.92</b> 59.75 : 143.00
alpha-HCH - (Inst.)	TM343	<b>78.74</b> 75.13 : 166.63
beta-HCH - (Inst.)	TM343	<b>96.16</b> 85.48 : 166.48
cis-Chlordane - (Inst.)	TM343	<b>75.86</b> 71.70 : 156.00
delta-HCH - (Inst.)	TM343	<b>76.89</b> 83.98 : 156.58
Dieldrin - (Inst.)	TM343	<b>80.92</b> 77.45 : 154.10
Endosulphan I - (Inst.)	TM343	<b>75.39</b> 91.30 : 168.70
Endosulphan II - (Inst.)	TM343	<b>78.56</b> 82.68 : 161.13
Endosulphan Sulphate - (Inst.)	TM343	<b>75.45</b> 69.65 : 165.95
Endrin - (Inst.)	TM343	<b>99.57</b> 81.33 : 178.68
gamma-HCH (Lindane) - (Inst.)	TM343	<b>78.37</b> 83.15 : 175.40
Heptachlor - (Inst.)	TM343	<b>107.12</b> 63.65 : 167.80
Heptachlor epoxide - (Inst.)	TM343	<b>79.58</b> 73.28 : 159.38
Isodrin - (Inst.)	TM343	<b>80.51</b> 58.34 : 153.81
o,p-DDD (TDE) - (Inst.)	TM343	<b>78.37</b> 66.93 : 162.03
o,p-DDE - (Inst.)	TM343	<b>74.0</b> 64.68 : 156.78
o,p-DDT - (Inst.)	TM343	<b>86.95</b> 72.20 : 170.15
o,p-Methoxychlor - (Inst.)	TM343	<b>91.51</b> 73.33 : 171.13
p,p-DDD (TDE) - (Inst.)	TM343	<b>80.47</b> 67.95 : 160.20
p,p-DDE - (Inst.)	TM343	<b>74.83</b> 67.80 : 159.45
p,p-DDT - (Inst.)	TM343	<b>95.62</b> 68.30 : 178.25
p,p-Methoxychlor - (Inst.)	TM343	<b>99.86</b> 66.94 : 176.47
Permethrin I - (Inst.)	TM343	<b>82.02</b> 63.25 : 146.35
Permethrin II - (Inst.)	TM343	<b>81.68</b> 66.00 : 151.80
trans-Chlordane - (Inst.)	TM343	<b>78.76</b> 71.68 : 165.88
Trifluralin - (Inst.)	TM343	<b>116.98</b> 64.73 : 161.48

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#### pH Value

Component	Method Code	QC 2485
рН	TM256	<b>101.74</b> 99.33 : 102.54

### Phenols by HPLC (W)

Component	Method Code	QC 2436
2.3.5 Trimethyl-Phenol by HPLC (W)	TM259	<b>50.0</b> 77.41 : 127.55
2-Isopropyl Phenol by HPLC (W)	TM259	<b>49.0</b> 82.77 : 126.51
Cresols by HPLC (W)	TM259	<b>49.33</b> 76.60 : 126.28
Napthol by HPLC (W)	TM259	<b>49.0</b> 75.40 : 129.40
Phenol by HPLC (W)	TM259	<b>50.0</b> 85.77 : 125.91
Xylenols by HPLC (W)	TM259	<b>49.67</b> 79.09 : 131.82

#### Phosphate by Kone (w)

Component	Method Code	QC 2381
Phosphate (Ortho as PO4)	TM184	<b>102.0</b> 96.40 : 109.60

#### Sulphide

Component	Method Code	QC 2326
Sulphide	TM101	<b>101.33</b> 88.90 : 112.50

#### Suspended Solids

Component	Method Code	QC 2340
Total Suspended Solids	TM022	<b>98.14</b> 96.27 : 102.13

#### SVOC MS (W) - Aqueous

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#### SVOC MS (W) - Aqueous

Component	Method Code	QC 2445
4-Bromophenylphenylether	TM176	<b>83.2</b> 61.60 : 106.72
Benzo(a)anthracene	TM176	<b>78.96</b> 64.64 : 115.52
Benzo(a)pyrene	TM176	<b>78.24</b> 60.56 : 115.28
Butylbenzyl phthalate	TM176	<b>81.6</b> 57.12 : 116.16
Hexachlorobutadiene	TM176	<b>78.16</b> 52.88 : 95.12
Naphthalene	TM176	<b>84.8</b> 65.68 : 110.32
Nitrobenzene	TM176	<b>75.2</b> 57.12 : 109.44
Phenol	TM176	<b>44.56</b> 37.60 : 70.72

#### **Total Dissolved Solids**

	Component	Method Code	QC 2498
I	Total Dissolved Solids	TM123	99.9
ı			97.30 : 100.92

#### Turbidity in waters

Component	Method Code	QC 2384
Turbidity	TM195	<b>100.75</b> 83.75 : 121.25

#### VOC MS (W)

Component	Method Code	QC 2479
1,1,1,2-Tetrachloroethane	TM208	<b>100.0</b> 79.47 : 113.27
1,1,1-Trichloroethane	TM208	<b>96.0</b> 81.01 : 112.00
1,1-Dichloroethane	TM208	<b>96.0</b> 82.09 : 116.41
1,2-Dichloroethane	TM208	<b>99.5</b> 80.28 : 123.63
2-Chlorotoluene	TM208	<b>98.0</b> 83.31 : 110.91
4-Chlorotoluene	TM208	<b>100.0</b> 84.01 : 111.46
Benzene	TM208	<b>98.5</b> 87.46 : 118.30
Bromomethane	TM208	<b>92.0</b> 76.99 : 118.39

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VOC MS (W)

		QC 2479
Carbontetrachloride	TM208	100.5
		81.73 : 114.22
Chlorobenzene	TM208	102.5
		90.24 : 109.71
Chloroform	TM208	98.0
		83.67 : 118.08
Chloromethane	TM208	86.0
		70.42 : 127.06
Cis-1,2-Dichloroethene	TM208	96.5
		83.95 : 112.60
Dichloromethane	TM208	96.5
		81.65 : 120.83
Ethylbenzene	TM208	95.5
		85.59 : 106.44
Hexachlorobutadiene	TM208	93.0
		66.83 : 108.27
o-Xylene	TM208	97.5
		78.40 : 110.68
p/m-Xylene	TM208	97.0
		82.64 : 112.12
Tert-butyl methyl ether	TM208	82.5
		68.23 : 127.69
Tetrachloroethene	TM208	104.5
		81.10 : 112.63
Toluene	TM208	100.5
		87.40 : 109.78
Trichloroethene	TM208	98.5
		81.17 : 111.80
Vinyl Chloride	TM208	84.0
		72.73 : 123.40

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.

The figure detailed is the percentage recovery result for the AQC.

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.





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Chromatogram

Sample No : Sample ID : Analysis: EPH CWG (Aliphatic) Aqueous GC (W) Depth: 23993785

Speciated TPH - SATS ( C12 - C40 )

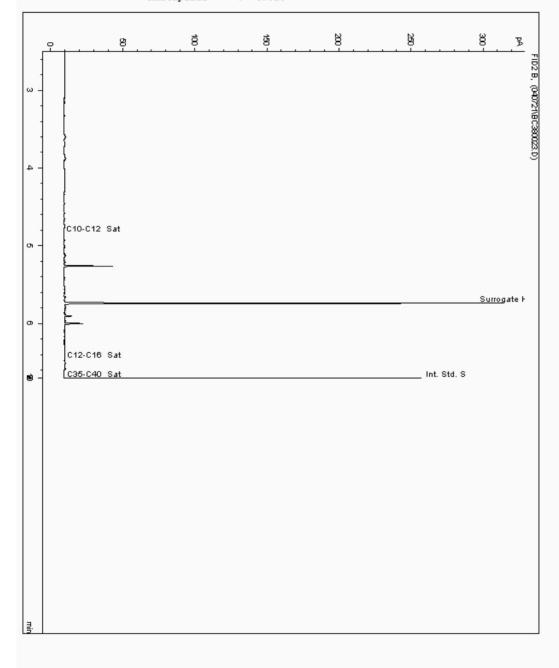
W617

Sample Identity: 22486994-

Date Acquired : 08/04/21 05:37:16 PM

Dilution CF

Multiplier 0.026







SDG: 210320-39 Location: A303 Stonehenge

Client Reference: Order Number:

W617

JFR1451 PO21-326 Report Number: Superseded Report:

593368 591829

Validated

## Chromatogram

Sample No : Sample ID : Analysis: EPH CWG (Aromatic) Aqueous GC (W) Depth: 23993785

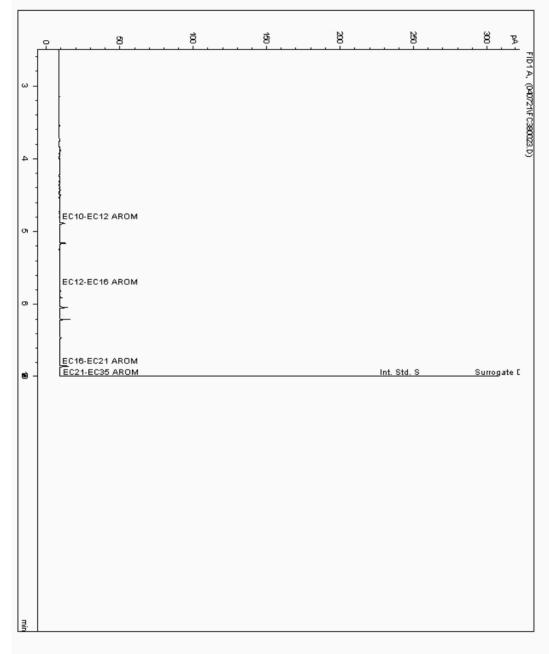
Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 22486995-

Date Acquired : 08/04/21 05:37:16 PM

Dilution CF

Multiplier 0.026







SDG: 210320-39 A303 Stonehenge Location:

Client Reference: Order Number:

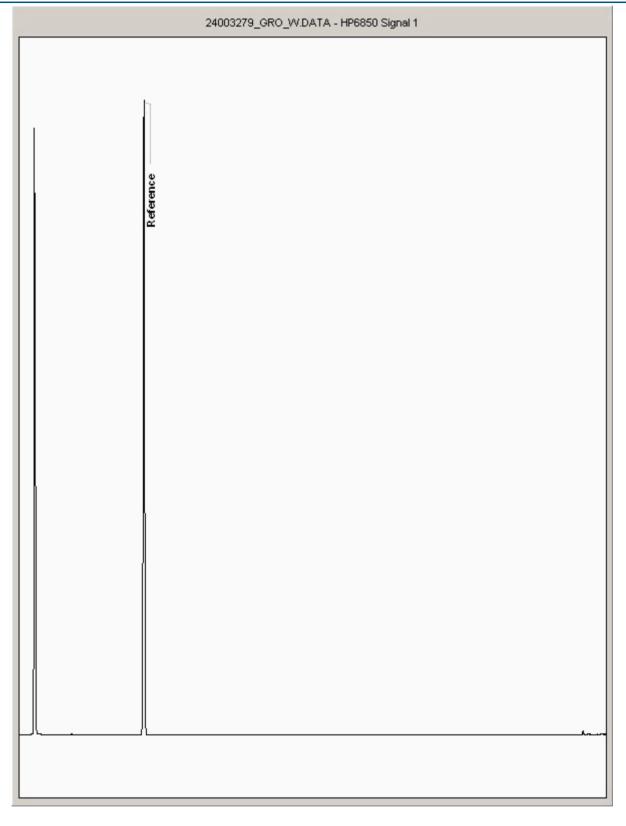
JFR1451 PO21-326 Report Number: Superseded Report:

593368 591829

Chromatogram

Sample No : Sample ID : Analysis: GRO by GC-FID (W) Depth: 24003279

W617





 SDG:
 210320-39
 Client Reference:
 JFR1451
 Report Number:
 593368

 Location:
 A303 Stonehenge
 Order Number:
 PO21-326
 Superseded Report:
 591829

**Appendix** 

#### General

- 1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.
- 2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.
- 3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
- 4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
- 5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.
- 6. NDP No determination possible due to insufficient/unsuitable sample.
- 7. Results relate only to the items tested.
- 8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.
- 9. Surrogate recoveries Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.
- 10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- 11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
- 12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
- 13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.
- 14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
- 15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.
- 16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

#### 18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
•	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

#### 19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbe stos Type	Common Name
Chrysof le	WhiteAsbests
Amosite	Brown Asbestos
Cro a dolite	Blue Asbe stos
Fibrous Act nolite	-
Fib to us Anthop hyll ite	-
Fibrous Tremolite	-

#### Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

#### Respirable Fibres

Respirable fibres are defined as fibres of <3  $\mu$ m diameter, longer than 5  $\mu$ m and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, The Quantification of Asbestos in Soil (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 13: SmartTROLL Calbration Report 16/03/21

# **Calibration Report**

Instrument SmarTROLL MP

Serial Number 479040 Created 16/03/2021

Sensor RDO

Serial Number 732173 Last Calibrated 11/02/2021

Calibration Details

Slope 1.014273 Offset -0.05 mg/L

Calibration point 100%

Concentration 10.53 mg/L
Temperature 12.48 °C
Barometric Pressure 1,010.4 mbar

Calibration point 0%

Concentration 0.05 mg/L Temperature 12.30 °C

Sensor Conductivity

Serial Number 479040 Last Calibrated 15/03/2021

Calibration Details

Cell Constant 1.001
Reference Temperature 25.00 °C
TDS Conversion Factor (ppm) 0.65

Sensor Level

Serial Number 457172 Last Calibrated 11/02/2021

Calibration Details

Zero Offset -0.18 psi Reference Depth 0.00 ft Reference Offset 0.00 psi Sensor pH

Serial Number 19912 Last Calibrated 15/03/2021

Calibration Details

Total Calibration Points 1

Calibration Point 1

pH of Buffer 4.00 pH pH mV 86.9 mV Temperature 11.93 °C

Slope and Offset 1

Slope -56.57 mV/pH Offset -82.8 mV

Sensor ORP

Serial Number 19912 Last Calibrated 15/03/2021

Calibration Details

ORP Solution ZoBell's
Offset 65.3 mV
Temperature 11.66 °C

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 14: SmartTROLL Calbration Report 17/03/21

# **Calibration Report**

Instrument SmarTROLL MP

Serial Number 479040 Created 17/03/2021

Sensor RDO

Serial Number 732173 Last Calibrated 11/02/2021

Calibration Details

Slope 1.014273 Offset -0.05 mg/L

Calibration point 100%

Concentration 10.53 mg/L
Temperature 12.48 °C
Barometric Pressure 1,010.4 mbar

Calibration point 0%

Concentration 0.05 mg/L Temperature 12.30 °C

Sensor Conductivity

Serial Number 479040 Last Calibrated 17/03/2021

Calibration Details

Cell Constant 0.927
Reference Temperature 25.00 °C
TDS Conversion Factor (ppm) 0.65

Sensor Level

Serial Number 457172 Last Calibrated 11/02/2021

Calibration Details

Zero Offset -0.18 psi Reference Depth 0.00 ft Reference Offset 0.00 psi Sensor pH
Serial Number 19912
Last Calibrated 17/03/2021

#### Calibration Details

Total Calibration Points 2

#### Calibration Point 1

pH of Buffer 4.00 pH pH mV 78.6 mV Temperature 7.75 °C

#### Calibration Point 2

pH of Buffer 7.06 pH pH mV -84.0 mV Temperature 7.78 °C

#### Slope and Offset 1

Slope -53.15 mV/pH Offset -80.8 mV

#### Sensor ORP

Serial Number 19912 Last Calibrated 15/03/2021

## Calibration Details

ORP Solution	ZoBell's
Offset	65.3 mV
Temperature	11 66 °C

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 15: SmartTROLL Calbration Report 18/03/21

### **Calibration Report**

Instrument SmarTROLL MP

Serial Number 479040 Created 18/03/2021

Sensor RDO

Serial Number 732173 Last Calibrated 11/02/2021

Calibration Details

Slope 1.014273 Offset -0.05 mg/L

Calibration point 100%

Concentration 10.53 mg/L
Temperature 12.48 °C
Barometric Pressure 1,010.4 mbar

Calibration point 0%

Concentration 0.05 mg/L Temperature 12.30 °C

Sensor Conductivity

Serial Number 479040 Last Calibrated 18/03/2021

Calibration Details

Cell Constant 0.989
Reference Temperature 25.00 °C
TDS Conversion Factor (ppm) 0.65

Sensor Level

Serial Number 457172 Last Calibrated 11/02/2021

Calibration Details

Zero Offset -0.18 psi Reference Depth 0.00 ft Reference Offset 0.00 psi Sensor **pH**Serial Number 19912

Last Calibrated 18/03/2021

Calibration Details

Total Calibration Points 2

Calibration Point 1

pH of Buffer 4.00 pH pH mV 95.2 mV Temperature 21.10 °C

Calibration Point 2

pH of Buffer 7.00 pH pH mV -75.5 mV Temperature 22.93 °C

Slope and Offset 1

Slope -56.9 mV/pH Offset -75.5 mV

Sensor ORP

Serial Number 19912 Last Calibrated 15/03/2021

Calibration Details

ORP Solution ZoBell's
Offset 65.3 mV
Temperature 11.66 °C

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 16: SmartTROLL Calbration Report 19/03/21

### **Calibration Report**

Instrument SmarTROLL MP

Serial Number 479040 Created 19/03/2021

Sensor RDO

Serial Number 732173 Last Calibrated 11/02/2021

Calibration Details

Slope 1.014273 Offset -0.05 mg/L

Calibration point 100%

Concentration 10.53 mg/L
Temperature 12.48 °C
Barometric Pressure 1,010.4 mbar

Calibration point 0%

Concentration 0.05 mg/L Temperature 12.30 °C

Sensor Conductivity

Serial Number 479040 Last Calibrated 19/03/2021

Calibration Details

Cell Constant 0.978
Reference Temperature 25.00 °C
TDS Conversion Factor (ppm) 0.65

Sensor Level

Serial Number 457172 Last Calibrated 11/02/2021

Calibration Details

Zero Offset -0.18 psi Reference Depth 0.00 ft Reference Offset 0.00 psi

Sensor	рН
Serial Number	19912

Last Calibrated 19/03/2021

#### Calibration Details

Total Calibration Points 2

#### Calibration Point 1

pH of Buffer 4.00 pH pH mV 89.3 mV Temperature 14.12 °C

#### Calibration Point 2

pH of Buffer 7.02 pH pH mV -76.7 mV Temperature 17.41 °C

#### Slope and Offset 1

Slope -54.95 mV/pH Offset -75.6 mV

#### Sensor ORP

Serial Number 19912 Last Calibrated 15/03/2021

### Calibration Details

ORP Solution	ZoBell's
Offset	65.3 mV
Temperature	11 66 °C

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 17: Levelogger Calibration Reports



#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M100

Serial Number:

2092507

Pressure Range:

0-100 m H20

Resolution:

0.6 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2092507

Model Number: M100

**Test Results:** 

Calibration Date:

7/26/2018

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.4930 psi	1.3981 m	1.3931 m	0.004%
45.5 psi	45.4913 psi	22.5086 m	22.5025 m	0.005%
75.5 psi	75.5124 psi	43.6191 m	43.6278 m	-0.007%
105.5 psi	105.5104 psi	64.7297 m	64.7370 m	-0.006%
135.5 psi	135.4883 psi	85.8402 m	85.8319 m	0.007%
165.5 psi	165.5087 psi	106.9507 m	106.9568 m	-0.005%

Hysteresis:

0.0025%

Standard Deviation: 0.0066%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	6.0000 °C	0.000%
18 °C	17.9997 °C	0.000%
36 °C	35.9996 °C	0.000%

Standard Deviation: 0.0002%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%

Calibration Manager:



Page 2 of 2



#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M100

Serial Number:

2090963

Pressure Range:

0-100 m H20

Resolution:

0.6 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2090963

Model Number: M100

**Test Results:** 

Calibration Date:

6/5/2018

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.5049 psi	1.3981 m	1.4015 m	-0.003%
45.5 psi	45.4962 psi	22.5086 m	22.5060 m	0.002%
75.5 psi	75.4926 psi	43.6191 m	43.6140 m	0.004%
105.5 psi	105.5081 psi	64.7297 m	64.7353 m	-0.005%
135.5 psi	135.4938 psi	85.8402 m	85.8359 m	0.004%
165.5 psi	165.4910 psi	106.9507 m	106.9444 m	0.005%

Hysteresis:

0.0004%

Standard Deviation: 0.0042%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	6.0007 °C	0.001%
18 °C	18.0006 °C	0.001%
36 °C	36.0008 °C	0.001%

Standard Deviation: 0.0001%

**Conclusion: This instrument fulfils the specifications** 

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M20

Serial Number:

2117153

Pressure Range:

0-20 m H20

Resolution:

0.12 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2117153

Model Number: M20

Test Results:

Calibration Date:

1/10/2020

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.5037 psi	1.3981 m	1.4007 m	-0.008%
21.5 psi	21.4962 psi	5.6202 m	5.6175 m	0.008%
27.5 psi	27.5036 psi	9.8423 m	9.8448 m	-0.008%
33.5 psi	33.5029 psi	14.0644 m	14.0664 m	-0.006%
39.5 psi	39.4976 psi	18.2865 m	18.2848 m	0.005%
45.5 psi	45.4993 psi	22.5086 m	22.5081 m	0.002%

Hysteresis:

0.0064%

Standard Deviation: 0.0072%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	5.9999 °C	0.000%
18 °C	17.9997 °C	0.000%
36 °C	35.9997 °C	0.000%

Standard Deviation: 0.0001%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M30

Serial Number:

2090209

Pressure Range:

0-30 m H20

Resolution:

0.18 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation mutliplied by a factor of two.





Serial Number:

2090209

Model Number: M30

**Test Results:** 

Calibration Date:

5/24/2018

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.4980 psi	1.3981 m	1.3967 m	0.003%
24.5 psi	24.5022 psi	7.7312 m	7.7328 m	-0.004%
33.5 psi	33.4973 psi	14.0644 m	14.0625 m	0.005%
42.5 psi	42.4966 psi	20.3976 m	20.3951 m	0.006%
51.5 psi	51.5034 psi	26.7307 m	26.7331 m	-0.006%
60.5 psi	60.4976 psi	33.0639 m	33.0622 m	0.004%

Hysteresis:

0.0012%

Standard Deviation: 0.0047%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	5.9999 °C	0.000%
18 °C	17.9999 °C	0.000%
36 °C	35.9997 °C	0.000%

Standard Deviation: 0.0001%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%







# LTC Edge Calibration Report

#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 LTC Levelogger Edge

Model Number:

M100

Serial Number:

1074142

Pressure Range:

0-100 m H20

Resolution:

0.6 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

Conductivity Range: @25 C

50 - 80,000 / µS/cm

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points to an accuracy of 3 decimal places. The units of pressure are in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @ 4°C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range of pressure for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

The LTC Edge is calibrated using thirteen distinct conductivity readings at  $25^{\circ}$ C. Results are compared to Mettler Toledo S70K Conductivity Meter, which is calibrated on a quarterly basis. During the calibration procedure, the Levelogger is in a water bath at a constant temperature of  $25^{\circ}$ C. The logger is then calibrated to thirteen conductivity points, covering the range of  $50\mu$ S/cm to 80,000  $\mu$ S/cm to check for any non-linearity. Once all specifications for accuracy and stability have been met, the LTC Edge has passed the calibration process.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0 Conductivity Solutions: Confirmed with Mettler Toledo 570 k Conductivity Meter

#### Uncertainty:

The reported uncertainty is stated as the standard deviation mutliplied by a factor of two. The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in





# LTC Edge Calibration Report

temperature compensation,

Page 1 of 2

#### **Test Results**

Serial Number: 1074142

Model Number: M100

Calibration Date: 5/30/2017

#### **Pressure Tests**

Pressure	Reading (6°C)	Level	Reading	Error (%FS)
15.5 psi	15.5041 psi	1.3981 m	1.4009 m	-0.003%
45.5 psi	45.4927 psi	22.5086 m	22.5034 m	0.005%
75.5 psi	75.5005 psi	43.6191 m	43.6195 m	-0.000%
105.5 psi	105.5022 psi	64.7297 m	64.7312 m	-0.001%
135.5 psi	135.5033 psi	85.8402 m	85.8425 m	-0.002%
165.5 psi	165.4946 psi	106.9507 m	106.9469 m	0.004%

Hysteresis:	0:0004%
Standard Deviation:	0.0032%

#### **Temperature Tests**

Temperature	Read	ing	Error (%FS)
6 °C	6.0000°C		0.000%
18 °C	18.0000°C		0.000%
36 °C	36.0000°C		0.000%
Standard Deviation:			0.0000%

#### **Conductivity Readings**

Reference Meter	LTC	% Error
80000	79899.21	-0.1260
50050	49881.79	-0.3361
12930	13012.07	0.6347
5015	5000.87	-0.2818
1419.5	1396.37	-1.6298
501.5	502.95	0.2899
84.45	84.96	0.6081

#### Conclusion:

This instrument fulfils the specifications.

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003% Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M100

Serial Number:

2087407

Pressure Range:

0-100 m H20

Resolution:

0.6 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2087407

Model Number: M100

Test Results:

Calibration Date:

3/15/2018

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.4946 psi	1.3981 m	1.3943 m	0.003%
45.5 psi	45.5060 psi	22.5086 m	22.5129 m	-0.004%
75.5 psi	75.5087 psi	43.6191 m	43.6253 m	-0.005%
105.5 psi	105.5104 psi	64.7297 m	64.7370 m	-0.006%
135.5 psi	135.4906 psi	85.8402 m	85.8336 m	0.006%
165.5 psi	165.5077 psi	106.9507 m	106.9561 m	-0.005%

Hysteresis:

0.0010%

Standard Deviation: 0.0050%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	6.0004 °C	0.000%
18 °C	18.0004 °C	0.000%
36 °C	36.0004 °C	0.000%

Standard Deviation: 0.0000%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%





# LTC Edge Calibration Report

#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 LTC Levelogger Edge

Model Number:

M30

Serial Number:

1075634

Pressure Range:

0-30 m H20

Resolution:

0.18 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

Conductivity Range: @25 C

50 - 80,000 / µS/cm

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points to an accuracy of 3 decimal places. The units of pressure are in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @ 4°C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range of pressure for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

The LTC Edge is calibrated using thirteen distinct conductivity readings at  $25^{\circ}$ C. Results are compared to Mettler Toledo S70K Conductivity Meter, which is calibrated on a quarterly basis. During the calibration procedure, the Levelogger is in a water bath at a constant temperature of  $25^{\circ}$ C. The logger is then calibrated to thirteen conductivity points, covering the range of  $50\mu$ S/cm to 80,000  $\mu$ S/cm to check for any non-linearity. Once all specifications for accuracy and stability have been met, the LTC Edge has passed the calibration process.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0 Conductivity Solutions: Confirmed with Mettler Toledo 570 k Conductivity Meter

#### Uncertainty:

The reported uncertainty is stated as the standard deviation mutliplied by a factor of two. The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in





# LTC Edge Calibration Report

temperature compensation,

Page 1 of 2

#### **Test Results**

Serial Number: 1075634

Model Number: M30

Calibration Date: 4/24/2018

#### **Pressure Tests**

Pressure	Reading (6°C)	Level	Reading	Error (%FS)
15.5 psi	15.5000 psi	1.3981 m	1.3981 m	0.000%
24.5 psi	24.5002 psi	7.7312 m	7.7314 m	-0.000%
33.5 psi	33.5001 psi	14.0644 m	14.0645 m	-0.000%
42.5 psi	42.4992 psi	20.3976 m	20.3970 m	0.002%
51.5 psi	51.5009 psi	26.7307 m	26.7313 m	-0.002%
60.5 psi	60.4994 psi	33.0639 m	33.0634 m	0.001%

Hysteresis:	0.0012%
Standard Deviation:	0.0013%

#### **Temperature Tests**

Temperature	Read	ing	Error (%FS)
6°C	5.9998°C		0.000%
18 °C	17.9999°C		0.000%
36 °C	35.9999°C		0.000%
Standard Dev	riation:		0.0000%

### **Conductivity Readings**

Reference Meter	LTC	% Error
80100	80119.03	0.0238
50000	49962.44	-0.0751
12960	12960.78	0.0060
5030	5015.95	-0.2794
1424.5	1434.21	0.6820
505	504.64	-0.0719
84.95	84.97	0.0220

#### Conclusion:

This instrument fulfils the specifications.

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003% Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 LT Barologger

Model Number:

M1.5

Serial Number:

2103372

Pressure Range:

0-1.5 m H20

Resolution:

0.03 mm H20

Temperature Range:

'-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2103372

Model Number: M1.5

Test Results:

Calibration Date:

3/15/2019

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
12.5 psi	12.5005 psi	-0.7116 m	-0.7113 m	-0.003%
13.2 psi	13.1495 psi	-0.2546 m	-0.2550 m	0.003%
13.8 psi	13.8006 psi	0.2024 m	0.2028 m	-0.004%
14.5 psi	14.4503 psi	0.6594 m	0.6596 m	-0.002%
15.1 psi	15.1005 psi	1.1164 m	1.1167 m	-0.003%
15.8 psi	15.7504 psi	1.5734 m	1.5737 m	-0.003%

Hysteresis:

0.0013%

Standard Deviation: 0.0026%

### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	5.9997 °C	0.000%
18 °C	17.9997 °C	0.000%
36 °C	35.9998 °C	0.000%

Standard Deviation: 0.0001%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%

Calibration Manager:



Page 2 of 2



#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M100

Serial Number:

2087525

Pressure Range:

0-100 m H20

Resolution:

0.6 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.





Serial Number:

2087525

Model Number: M100

Test Results:

Calibration Date:

4/4/2018

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.4953 psi	1.3981 m	1.3948 m	0.003%
45.5 psi	45.5060 psi	22.5086 m	22.5129 m	-0.004%
75.5 psi	75.5058 psi	43.6191 m	43.6232 m	-0.003%
105.5 psi	105.5063 psi	64.7297 m	64.7341 m	-0.004%
135.5 psi	135.4905 psi	85.8402 m	85.8335 m	0.006%
165.5 psi	165.5088 psi	106.9507 m	106.9569 m	-0.005%

Hysteresis:

0.0011%

Standard Deviation: 0.0045%

#### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	6.0003 °C	0.000%
18 °C	18.0003 °C	0.000%
36 °C	36.0003 °C	0.000%

Standard Deviation: 0.0000%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003% Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 Levelogger Edge LT

Model Number:

M20

Serial Number:

2117139

Pressure Range:

0-20 m H20

Resolution:

0.12 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation multiplied by a factor of two.

Solinst



Serial Number:

2117139

Model Number: M20

Test Results:

Calibration Date:

1/21/2020

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
15.5 psi	15.5013 psi	1.3981 m	1.3990 m	-0.003%
21.5 psi	21.4979 psi	5.6202 m	5.6187 m	0.005%
27.5 psi	27.4976 psi	9.8423 m	9.8406 m	0.005%
33.5 psi	33.5018 psi	14.0644 m	14.0657 m	-0.004%
39.5 psi	39.5011 psi	18.2865 m	18.2873 m	-0.002%
45.5 psi	45.4994 psi	22.5086 m	22.5082 m	0.001%

Hysteresis:

0.0017%

Standard Deviation: 0.0040%

### **Temperature Tests**

Temperature	Reading	Error (%FS)		
6 °C	5.9996 °C	0.000%		
18 °C	17.9997 °C	0.000%		
36 °C	35.9998 °C	0.000%		

Standard Deviation: 0.0001%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%





#### Instrument:

Manufacturer:

Solinst Canada

Product:

3001 LT Barologger

Model Number:

M1.5

Serial Number:

2119095

Pressure Range:

0-1.5 m H20

Resolution:

0.03 mm H20

Temperature Range:

-20 - +80 °C

Temperature Resolution:

0.003 °C

#### Method of Calibration:

The Levelogger is calibrated against a range of set reference points, with units of pressure in pounds per square inch. The conversion factor for pounds per square inch relates to pressure in bars and meters of water column is as follows: 1 pound per square inch = 0.0689476 bar = 0.703070 m H20 @  $4^{\circ}$ C.

During the calibration procedure, the Levelogger is fully submerged in a highly accurate water bath, set to 6°C. The pressure is then calibrated to six separate pressure points covering the entire range for that particular Levelogger, to check for any non-linearity. This process is repeated at 18°C and then 36°C to check for temperature effects. The Levelogger is approved after all specifications for accuracy, precision, stability and hysteresis have been met.

#### Traceability:

Pressure standard: ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, NIST Temperature standard: ISO/IEC 17025:2005, NVLAP LAB CODE: 200348-0

#### Uncertainty:

The standard deviation of the temperature was calculated from the contributions of uncertainties originating from the measurement standard, the bath homogeneity, and from any short term contribution from the instrument being calibrated. The standard deviation of the pressure was calculated from the contributions of the uncertainties originating from the measurement standard, any short term contribution from the instrument, and the uncertainty resulting from the uncertainty in temperature compensation. The reported uncertainty is stated as the standard deviation muliplied by a factor of two.

Solinst[®]



Serial Number:

2119095

Model Number: M1.5

**Test Results:** 

Calibration Date:

3/5/2020

#### **Pressure Tests**

Pressure	Reading (6 °C)	Level	Reading	Error (%FS)
12.5 psi	12.4996 psi	-0.7116 m	-0.7119 m	0.003%
13.2 psi	13.1494 psi	-0.2546 m	-0.2550 m	0.004%
13.8 psi	13.7995 psi	0.2024 m	0.2020 m	0.003%
14.5 psi	14.4502 psi	0.6594 m	0.6595 m	-0.001%
15.1 psi	15.0997 psi	1.1164 m	1.1162 m	0.002%
15.8 psi	15.7504 psi	1.5734 m	1.5736 m	-0.003%

Hysteresis:

0.0012%

Standard Deviation: 0.0026%

### **Temperature Tests**

Temperature	Reading	Error (%FS)
6 °C	5.9997 °C	0.000%
18 °C	17.9998 °C	0.000%
36 °C	35.9997 °C	0.000%

Standard Deviation: 0.0000%

Conclusion: This instrument fulfils the specifications

Uncertainty temperature standard: 0.003 °C Overall uncertainty temperature: ±1.002 Uncertainty pressure standard: <0.003%

Overall uncertainty pressure: 0.01%

Calibration Manager:



Page 2 of 2

Stonehenge A303: Pumping Test W617 Rev.02



Appendix 18: MAG 5100 W Flow Measurement Calibration Report Flowmeter 1



### **Industry Sector**

# Factory Calibration Certificate / Werkskalibrierungszertifikat / Certificat d'étalonnage usine

Topic / Thema / Suj &:

SITRANS F Fl owmeter / Durchfl ussmessgerät / Débitmètre

#### Object / Betreff / Objet:

Flowmeter type / Durchflussmessgerättyp / Type de débitmétre

Sitrans FM MAG5100 W

Nominal sensor diameter / Messaufnehmer-Nennweite / Diamétre nominal de capteur

DN 100 (4")

Product order No. / Produktbestellnummer / N° de référence d'appareil

7ME65203TC122AA1

System serial No. / System Seriennummer / N° de série du systeme

216007H048

#### Technical data / Technische Daten / Données techniques:

Calibration factor / Kalibrierungsfaktor / Facteur d'étalonnage

5.896703251

Calibration medium / Kalibriermedium / Moyen de calibration

Water / Wasser / Eau

Calibrated full scale flow / Kalibrierter Messbereichsendwert / Fin de plage de mesure

vvaler / vvasser / Eau

étalonnée

140 m³/h / 616.403 US gpm

Calibration rig / Kalibrierstand / Plate-forme d'étalonnage

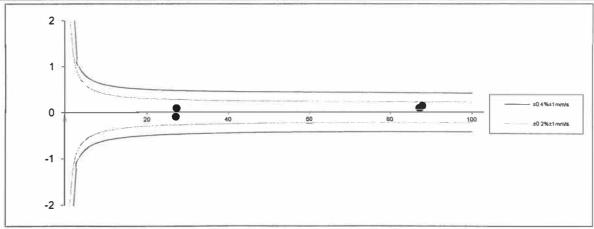
LTR HNU

#### Standards / Normen / Normes:

Reference meter method (reference meter calibrated according to ISO 4185-1980) / Referenzmessgerätmethode (Referenzgerät kalibriert laut ISO 4185-1980) / Méthode avec compteur de référence (étalonné suivant ISO 4185-1980)

#### Results / Ergebnisse / Résultats:

Point #	Flowrate	Fluid ten	id temperature Reference flow value Flowmeter output / Duchflussmessgerätausgang / Sortie de débitm			ng / Sortie de débitmètre		
Messpunkt nr Point mesure n°	Durchfluss Débit		stemperatur re du fluide	Referenz Durchflusswert Débit de référence		Flowrate Durchflussmenge / Débit		Error Fehler / Erreur
	[%]	[°C]	[°F]	[m ³ /h]	[US gpm]	[m ³ /h]	[US gpm]	[%]
1	87	18.5	65.3	122.0778	537.4924	122.1815	537.9489	0.09
2	27	18.5	65.3	37.9796	167.2193	37.9472	167.0767	-0.09
3	27	18.6	65.5	38.2788	168.5365	38.3126	168.6855	0.09
4	88	18.6	65.5	123.1081	542.0287	123.2788	542.7801	0.14



Summary of the results / Zusammenfassung der Ergebnisse: / Sommaire des résultats obtenus : :

- The measured values are within the specified limits / Die gemessenen Werte liegen innerhalb der Toleranzen / Les résultats de mesure se trouvent dans les tolérances définies

Siemens SAS
Etablissement de Haguenau

Issued by / Erstellt von / émis par

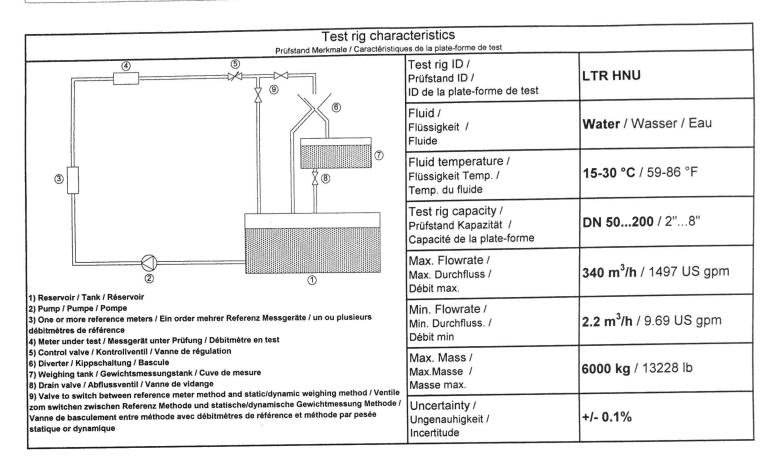
Date / Datum / Date

Weber

2018/01/31



# Factory Calibration Certificate / Werkskalibrierungszertifikat / Certificat d'étalonnage usine



#### Traceability / Rückverfolgbarkeit / Tracabilité

The Siemens flowmeter calibration process is ISO9001-certified, ensuring the entire calibration procedure is controlled to the highest quality standards.

All primary measuring instrumentation used by the Siemens Flow Laboratory during the performance of its calibrations, has been calibrated with international standards traceability referring directly to the physical unit of measurement according to the International System of Units (SI). Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Der Siemens Kalibrierungsprozess für Durchflussmessgeräte ist ISO9001 zertifiziert, sicherstellend, dass das ganze Kalibrierungsverfahren nach den höchsten Qualitätsstandards kontrolliert ist.

Alle Hauptmessinstrumente, die zur Durchführung der Kalibrierungen vom Siemens Durchfluss Laboratorium genutzt werden, sind kalibriert, um eine Rückverfolgbarkeit auf internationale Normen sicherzustellen. Dies bezieht sich direkt auf die Maßeinheit gemäß dem Internationalen Einheitensystem (SI). Das Kalibrierungszertifikat gewährleistet daher die Anerkennung der Prüfergebnisse weltweit, einschließlich in den USA (NIST-Rückverfolgbarkeit).

Le processus d'étalonnage des débitmètres Siemens est certifiée ISO9001 et est contrôlé périodiquement selon les normes qualités en vigueur les plus élevées.

Tous les instruments de mesure primaires utilisés dans les laboratoires Siemens Flow durant les opérations d'étalonnage ont été étalonnés en conformité avec les normes internationales relatives à l'unité de mesure physique, conformément au système international d'unités (SI). Le certificat d'étalonnage garantit ainsi que les résultats obtenus lors des essais sont conformes aux normes internationales, y compris NIST (USA).

Siemens SAS

Etablissement de Haguenau 1, Chemin de la Sandlach CS60189 F – 67506 Haguenau Cedex Tel (+33) 03.69.06.55.55 Fax (+33) 03.69.06.66.66

### **SIEMENS**

### Quality inspection certificate / Certificat d'inspection qualité

Nº de serie / Serial number 254702 H 6 48

VERIFICATION DE L'ASPECT DU SENSOR / Sensor visual aspect check	Resultat / result
Vérifier le collage du rebord du liner / Check the sticking of the edge of the liner Vérifier l'absence de patch sur les electrodes / Check	OK
Vérifier l'aspect intérieur du liner + montage des electrodes + absence de patch de protection des electrodes ==> Voir catalogue d'erreurs FCC / Check the internal appearance of the liner, assembly of electrodes and lack of electrodes patches	OK
Vérifier l'aspect exterieur de la peinture (peinture écaillée, rayures, peau d'orange, excès de peinture, impuretés, problèmes d'apparences, nuances de couleur) ==> Voir catalogue d'erreurs FCC / Check the external appearance of the painting	oK
MAG8000 Afficheur LCD. Vérifier l'aspect (propreté, absence de chocs -coins-, film de protection enlevé) / MAG8000 LCD display. Check of cosmetic errors (cleanliness, no damage, protective film removed)	NA
Vérifier la présence de l'étiquette verte + étoile et contrôler si collées distinctement / Verify the presence and the good sticking of the green label + Star label	OK
Si potting demandé (cockpit) verifier s'il est réalisé (MAG8000, option Y41, spéciaux)  / If MAG8000 check if potting is needed (cockpit) and if it's realized (MAG8000, Y41 option, specials)	NA

La signature certifie la conformité des opérations cidessus / The signature certify the conformity of the above operations

Nom et visa de l'opérateur / Name and visa controller Date

ANTOINE Guillaume
3 0 JAN, 2018

VERIFICATION DE L'EMBALLAGE	Resultat / result
Si MAG8000 Remote avec potting dans l'electronique - Vérifier concordance des N° de série sur les étiquettes de l'electronique, du couvercle et du sensor / Compare the serial numbers on the labels between PCBA, the lid and the sensor	NA
Vérification de l'état de l'emballage (aspect du carton, présence mousse de protection) => Voir catalogue d'erreurs FCC / Verify the condition of the packaging (appearance of the box, foam presence)	OK
Si batterie au lithium : Contrôler la présence de l'étiquette "produit dangereux" sur carton  / If lithium-ion battery : check the presence of the label "Dangerous product" on the box	NA

DIVERS - AUTRES OPTIONS	Resultat / result
Certificat de calibration / Product labels / Etiquette emballage / OF: vérifier la concordance du n° de série système et de la désignation entre les différents supports / Calibration certificate - Compare the serial number of the system and designation with the OF	OK
Product label - vérifier le Calfactor par rapport au certificat de calibration / Check the Calfactor with the calibration certificate	OK

La signature certifie la conformité des opérations cidessus / The signature certify the conformity of the above operations

Nom et visa de l'opérateur / Name and visa controller Date

ANTOINE Guillaume
3 0 JAN. 2018

#### SIEMENS SAS

Division Production Sensors and Communication

Etablissement de Haguenau 1, Chemin de la Sandlach CS60189 F – 67506 Haguenau Cedex

Tél (+33) 03.69.06.55.55 Fax (+33) 03.69.06.66.66 Stonehenge A303: Pumping Test W617 Rev.02



Appendix 19: MAG 5100 W Flow Measurement Calibration Report Flowmeter 2





# Factory Calibration Certificate / Werkskalibrierungszertifikat / Certificat d'étalonnage usine

Topic / Thema / Sujet:

SITRANS F Flowmeter / Durchflussmessgerät / Débitmètre

#### Object / Betreff / Objet:

Flowmeter type / Durchflussmessgerättyp / Type de débitmètre

Sitrans FM MAG5100 W

Nominal sensor diameter / Messaufnehmer-Nennweite / Diamètre nominal de capteur :

DN 100 (4")

Product order No. / Produktbestellnummer / N° de référence d'appareil

7ME65203TC122AA1

System serial No. / System Seriennummer / N° de série du systeme

311402H058

#### Technical data / Technische Daten / Données techniques:

Calibration factor / Kalibrierungsfaktor / Facteur d'étalonnage

5.798195839

Calibration medium / Kalibriermedium / Moyen de calibration

Water / Wasser / Eau

Calibrated full scale flow / Kalibrierter Messbereichsendwert / Fin de plage de mesure

Water / Wasser / Lau

étalonnée

110 m³/h / 484.322 US gpm

Calibration rig / Kalibrierstand / Plate-forme d'étalonnage

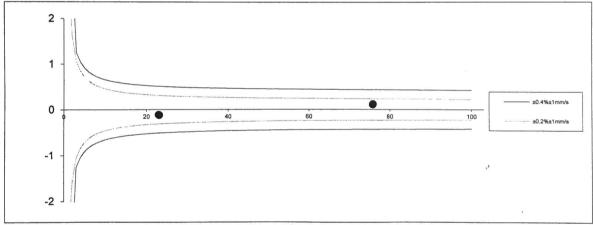
LTR HNU

#### Standards / Normen / Normes:

Reference meter method (reference meter calibrated according to ISO 4185-1980) / Referenzmessgerätmethode (Referenzgerät kalibriert laut ISO 4185-1980) / Méthode avec compteur de référence (étalonné suivant ISO 4185-1980)

#### Results / Ergebnisse / Résultats:

Point #	Flowrate	Fluid ten	Fluid temperature Reference flow value			Flowmeter output / Du	chflussmessgerätausgan	g / Sortie de débitmètre
Messpunkt nr Point mesure n°	Durchfluss Débit		stemperatur re du fluide	Referenz Durchflusswert Débit de référence		Flowrate Durchflussmenge / Débit		Error Fehler / Erreur
1	[%]	[°C]	[°F]	[m ³ /h]	[US gpm]	[m ³ /h]	[US gpm]	[%]
1	23	21.9	71.4	25.2911	111.3533	25.2626	111.2281	-0.11
2	23	21.9	71.4	25.4009	111.8367	25.3703	111.7020	-0.12
3	76	22.0	71.6	83.3551	367.0016	83.4487	367.4137	0.11
4	76	21.9	71.4	83.4120	367.2520	83.5128	367.6958	0.12



Summary of the results / Zusammenfassung der Ergebnisse: / Sommaire des résultats obtenus ::

- The measured values are within the specified limits / Die gemessenen Werte liegen innerhalb der Toleranzen / Les résultats de mesure se trouvent dans les tolérances définies

Hot

Siemens SAS
Etablissement de Haguenau

Issued by / Erstellt von / émis par

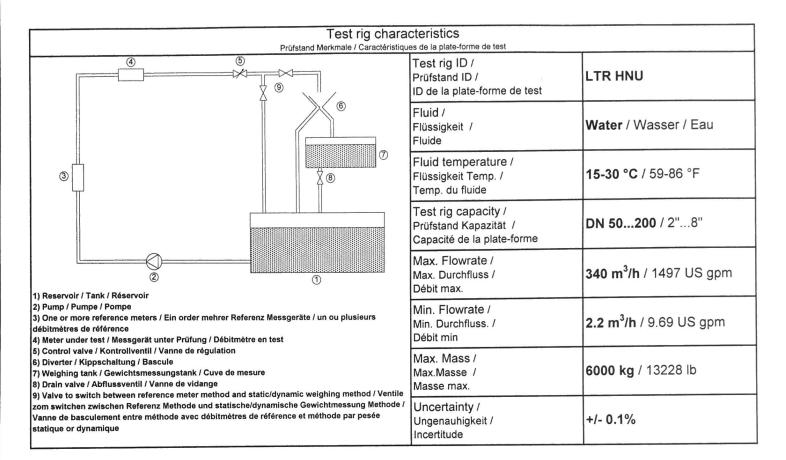
2018/02/01

Date / Datum / Date

20-



# Factory Calibration Certificate / Werkskalibrierungszertifikat / Certificat d'étalonnage usine



#### Traceability / Rückverfolgbarkeit / Traçabilité

The Siemens flowmeter calibration process is ISO9001-certified, ensuring the entire calibration procedure is controlled to the highest quality standards.

All primary measuring instrumentation used by the Siemens Flow Laboratory during the performance of its calibrations, has been calibrated with international standards traceability referring directly to the physical unit of measurement according to the International System of Units (SI). Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Der Siemens Kalibrierungsprozess für Durchflussmessgeräte ist ISO9001 zertifiziert, sicherstellend, dass das ganze Kalibrierungsverfahren nach den höchsten Qualitätsstandards kontrolliert ist.

Alle Hauptmessinstrumente, die zur Durchführung der Kalibrierungen vom Siemens Durchfluss Laboratorium genutzt werden, sind kalibriert, um eine Rückverfolgbarkeit auf internationale Normen sicherzustellen. Dies bezieht sich direkt auf die Maßeinheit gemäß dem Internationalen Einheitensystem (SI). Das Kalibrierungszertifikat gewährleistet daher die Anerkennung der Prüfergebnisse weltweit, einschließlich in den USA (NIST-Rückverfolgbarkeit).

Le processus d'étalonnage des débitmètres Siemens est certifiée ISO9001 et est contrôlé périodiquement selon les normes qualités en vigueur les plus élevées.

Tous les instruments de mesure primaires utilisés dans les laboratoires Siemens Flow durant les opérations d'étalonnage ont été étalonnés en conformité avec les normes internationales relatives à l'unité de mesure physique, conformément au système international d'unités (SI). Le certificat d'étalonnage garantit ainsi que les résultats obtenus lors des essais sont conformes aux normes internationales, y compris NIST (USA).

Siemens SAS

Etablissement de Haguenau 1, Chemin de la Sandlach CS60189

F - 67506 Haguenau Cedex

Tel (+33) 03.69.06.55.55 Fax (+33) 03.69.06.66.66

### Quality inspection certificate / Certificat d'inspection qualité

N° de serie / Serial number 344 402 H 038

VERIFICATION DE L'ASPECT DU SENSOR / Sensor visual aspect check	Resultat / result
Vérifier le collage du rebord du liner / Check the sticking of the edge of the liner Vérifier l'absence de patch sur les electrodes / Check	CA
Vérifier l'aspect intérieur du liner + montage des electrodes + absence de patch de protection des electrodes ==> Voir catalogue d'erreurs FCC / Check the internal appearance of the liner, assembly of electrodes and lack of electrodes patches	Car
Vérifier l'aspect exterieur de la peinture (peinture écaillée, rayures, peau d'orange, excès de peinture, impuretés, problèmes d'apparences, nuances de couleur) ==> Voir catalogue d'erreurs FCC / Check the external appearance of the painting	OK
MAG8000 Afficheur LCD. Vérifier l'aspect (propreté, absence de chocs -coins-, film de protection enlevé) / MAG8000 LCD display. Check of cosmetic errors (cleanliness, no damage, protective film removed)	ΝΔ
Vérifier la présence de l'étiquette verte + étoile et contrôler si collées distinctement / Verify the presence and the good sticking of the green label + Star label	
Si potting demandé (cockpit) verifier s'il est réalisé (MAG8000, option Y41, spéciaux)  I If MAG8000 check if potting is needed (cockpit) and if it's realized (MAG8000, Y41 option, specials)	NA

La signature certifie la conformité des opérations cidessus / The signature certify the conformity of the above operations

Nom et visa de l'opérateur / Name and visa controller Date

ANTOINE Quillaume

0 1 FEV. 2018

VERIFICATION DE L'EMBALLAGE	Resultat / result
Si MAG8000 Remote avec potting dans l'electronique - Vérifier concordance des N° de série sur les étiquettes de	
l'electronique, du couvercle et du sensor / Compare the serial numbers on the labels between PCBA, the lid and the sensor	NΔ
Vérification de l'état de l'emballage (aspect du carton, présence mousse de protection) => Voir catalogue d'erreurs	
FCC	
/ Verify the condition of the packaging (appearance of the box, foam presence)	E 1 5 2 3
Si batterie au lithium : Contrôler la présence de l'étiquette "produit dangereux" sur carton	0.1 4
/ If lithium-ion battery : check the presence of the label "Dangerous product" on the box	NA

DIVERS - AUTRES OPTIONS	Resultat / result
Certificat de calibration / Product labels / Etiquette emballage / OF : vérifier la concordance du n° de série	100 m W
système et de la désignation entre les différents supports	Will Street
Calibration certificate - Compare the serial number of the system and designation with the OF	45 7 8
Product label - vérifier le Calfactor par rapport au certificat de calibration	- 7
/ Check the Calfactor with the calibration certificate	W 1 3 3

La signature certifie la conformité des opérations cidessus / The signature certify the conformity of the above operations

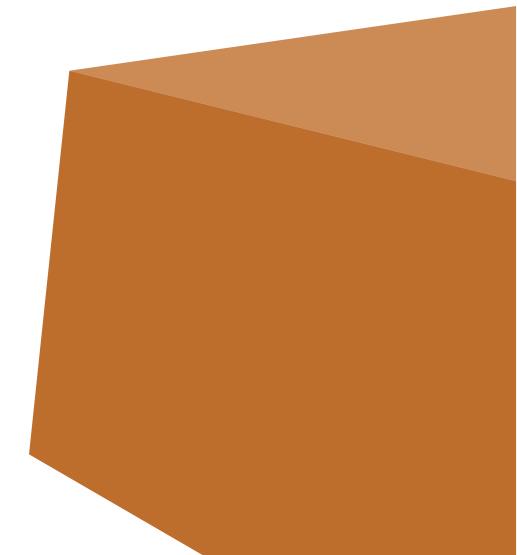
Nom et visa de l'opérateur / Name and visa controller Date ANTOINE Guillaume
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SIEMENS SAS

Division Production Sensors and Communication

Etablissement de Haguenau 1, Chemin de la Sandlach CS60189 F – 67506 Haguenau Cedex

Tél (+33) 03.69.06.55.55 Fax (+33) 03.69.06.66.66



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