

SOP002.22		11.50			
SOP002.23		11.50			
SOP002.24		11.50			
SOP002.25		11.50			
SOP003.1		14.00			
SOP003.2		12.50			
SOP003.3		15.00			
SOP003.4		15.00			
SOP003.5		15.00			
SOP003.6		13.00			
SOP003.7		15.00			
SOP003.8		13.00			
SOP003.9		15.00			
SOP003.10		15.00			
SOP003.11		15.00			
SOP003.12		15.00			
SOP003.13		15.00			
SOP003.14		15.00			
SOP003.15		25.00			
SOP003.16		23.00	SP	50	10.00 – 13.00
Emb 2 Soakaway		2.00	Backfilled with Arisings		
S1-TP101		2.40			
S1-TP102		3.90			
S1-TP103		4.00			
S1-TP104		4.00			
S1-TP105		0.80			
S1-TP106	Machine	4.00			
S1-TP109	Excavated Trial	4.00			
S1-TP110	Pit	3.50			
S1-TP111		3.50			
S1-TP112		1.70			
S1-TP113		4.00			
S1-TP114		2.40			
S1-TP115		0.70			
Trial Emb Cut		2.00			

Notes: SP – Standpipe piezometer; P – Piezometer

Exploratory hole S1-BH101 was extended beyond the proposed scheduled depth of 17.00 m as per Atkins instruction due to bedrock not being encountered within the borehole. The exploratory was extended to a maximum depth of 24.60 m.

Exploratory hole S1-BH107 was terminated at 8.00 m depth due to encountering artesian water. An additional borehole, S1-BH107B, was drilled to 18.00 m depth during the second phase of investigation. S1-BH107B was terminated within possible workings.

Exploratory hole S1-BH114 was terminated at 9.00 m depth due to encountering artesian water. The location was relocated approximately 20 m east and renamed S1-BH114B. This exploratory was subsequently terminated at 4.00 m depth due to encountering artesian water. An additional borehole, S1-BH114C, was drilled to 21.00 m depth during the second phase of investigation.

The rotary open (probe) hole locations (designated SOP001, SOP002 and SOP003) were all terminated at depths as per Atkins onsite instructions.

Exploratory hole S1-TP101 was terminated at 2.40 m depth due to instability.

Exploratory hole S1-TP102 was terminated at 3.90 m depth due to hard ground preventing further excavation.

Exploratory hole S1-TP105 was terminated at 0.80 m depth due to water ingress.

Exploratory holes S1-TP107 and S1-TP108 were not excavated due to waterlogged ground preventing access.

Exploratory hole S1-TP110 was terminated at 3.50 m due to instability.

Exploratory hole S1-TP111 was terminated at 3.50 m depth on bedrock.

Exploratory hole S1-TP112 was terminated at 1.70 m depth due to water ingress and instability.

Exploratory hole S1-TP114 was terminated at 2.40 m due to water ingress and instability.

Exploratory hole S1-TP115 was terminated at 0.70 m due to water ingress.

Fair copy logs, which record the method, samples obtained, in-situ testing completed within the exploratory holes, backfill and descriptions of the material encountered, are presented within Appendix II.

3.3 Logging and Sampling

Samples of the materials encountered were obtained in accordance with The Specification for descriptive and geotechnical and geoenvironmental testing purposes.

The description of the materials encountered was completed in accordance with BS5930:2015+A1:2020, BS EN ISO 14688-1 (2018) and BS EN ISO 14689 (2018).

Geotechnical samples were stored at ambient temperature and protected from extremes of weather until lab testing commenced, either onsite or at the JGS Llantrisant sample storage facility. Once scheduled for testing, the samples were transported to Geo Site and Testing Services (GSTL).

Geoenvironmental samples were packaged appropriately and dispatched directly from site to Eurofins Chemtest ensuring compliance with the deviant sampling policy. The samples were subsequently stored under laboratory conditions until testing commenced.

3.4 In-situ Testing, Monitoring and Well Development during Fieldwork

In-situ testing was completed in accordance with The Specification and relevant associated technical standards. In summary, the in-situ testing comprised the following:

-  Standard Penetration testing
-  Hand shear vane testing
-  Headspace testing using a Photo Ionisation Detector
-  Soakaway Testing

The lateral and vertical spacing of the in-situ testing was determined by Atkins.

Soakaway testing was unable to be completed within exploratory hole locations; S1-TP112 and S1-TP114 due to water ingress and instability during excavation, S1-TP113 due to water ingress occurring into the pit overnight and S1-TP115 due to water ingress during excavation.

The in-situ testing results are presented within Appendix II. Where an in-situ test is not listed as separate item on the appendix cover page, the results of the in-situ testing are presented on the exploratory hole logs. Calibration certificates for the equipment used are presented within Appendix II as appropriate.

Monitoring of the groundwater was undertaken during fieldwork by JGS in accordance with The Specification and relevant technical standards. Monitoring undertaken during the fieldwork period is presented within Appendix III.

Each installation was developed during the fieldwork period. The well development was undertaken in accordance with The Specification and groundwater extracted using an in-situ impellor pump. Records of the well development are presented within Appendix III.

3.5 Post Fieldwork Monitoring and Sampling

Monitoring of the groundwater and ground gas was undertaken post fieldwork by JGS in accordance with The Specification and relevant technical standards. Three post fieldwork monitoring visits were completed; the first round was completed on 9, 10 16 and 17 January 2023, the second round was completed between 31 January and 2 February 2023 and the third round was completed between 13 ad 15 February 2023.

Records of the groundwater and gas levels recorded during monitoring are presented within Appendix III along with associated calibration certificates for the equipment used.

Barometric pressure readings were recorded for a 24 hour time period the day before each monitoring round was completed. The records of the barometric pressure readings recorded are presented within Appendix III.

Samples of the were be obtained from the installations post fieldwork in accordance with The Specification. The samples were obtained using low flow techniques. The record of the in-situ parameters recorded during purging and sampling are presented within Appendix III.

During the first monitoring round, sub-zero temperatures made the extraction of groundwater from the installations extremely difficult as the groundwater froze on contact with the surface. This caused the monitoring and sampling period to be extended to four days over a two week period such that the weather was suitable to allow for groundwater sampling.

4 Laboratory Testing

4.1 Geotechnical Testing

Laboratory testing for geotechnical purposes was completed at Geo Site and Testing Services Limited, UKAS registration number 2788. The testing requirements were specified by Aktins

and the testing has been completed in accordance with the requirements of The Specification and relevant technical standards. The geotechnical testing was completed on 15 March 2023. The testing is summarised in Table 4 and the results are presented within Appendix IV.

Table 4: Geotechnical Testing Summary

Test Type	Number of Tests
Moisture Content	83
Atterberg Limits	45
Particle Size Distribution	69
Organic Matter Content	22
Dry Density / Moisture Content Relationship	4
One Dimensional Consolidation	4
Point Load Index	13
Consolidated Drained Peak Shear Strength	13
BRE Suite D	26

4.2 Geoenvironmental and Geochemical Testing

Laboratory testing for geoenvironmental and geochemical purposes was completed at Eurofins Chemtest, UKAS registration number 2183. The testing requirements were specified by Atkins and the testing has been completed in accordance with The Specification and relevant technical standards. The geoenvironmental testing was completed on 21 February 2023. The testing is summarised within Table 5 and the results are presented within Appendix V.

Table 5: Geoenvironmental Testing Summary

Test Type	Number of Tests
Suite E – Soil	80
Suite F – Leachate	29
Suite G – Waters	37
Suite H – Inert Waste WAC	33

5 References

- AGS. Electronic Transfer of Geotechnical and Geoenvironmental Data (Edition 4.1.1). Association of Geotechnical and Geoenvironmental Specialists. (2022)
- BGS England and Wales Sheet 231, Merthyr Tydfil, 1:50000 geological map (solid and drift). British Geological Survey. (1979)
- BGS GeolIndex (onshore) Map Viewer. www.bgs.ac.uk. British Geological Survey. (2023)
- BRE Digest DG 365. Soakaway design. Building Research Establishment, Garston, Watford. (2016)
- BRE Special Digest 1. Concrete in aggressive ground. Building Research Establishment. (2005)
- BS 1377. Methods of test for soils for civil engineering purposes. British Standards Institution. (1990)
- BS 5930:2015+A1. Code of practice for ground investigations. British Standards Institution. (2020)
- BS 10175:2011+A2. Investigation of potentially contaminated sites. Code of practice. (2017)
- BS EN 1997-2. Eurocode 7. Geotechnical design. Part 2 Ground investigation and testing. British Standards Institution. (2007, incorporating corrigendum June 2010)
- BS EN ISO 14688-1. Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description (2018)
- BS EN ISO 14688-2. Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification (2018)
- BS EN ISO 14689. Geotechnical investigation and testing. Identification, description and classification of rock (2018)
- BS EN ISO 22475-1. Geotechnical investigation and testing. Sampling methods and groundwater measurements. Part 1 Technical principles for the sampling of soil, rock and groundwater. British Standards Institution. (2021)
- BS EN ISO 22476-3:2005+A1. Geotechnical investigation and testing. Field testing. Part 3 Standard penetration test. British Standards Institution. (2011)
- Department for Environment, Food and Rural Affairs (DEFRA) MAGIC maps online application. DEFRA (2022)
- ISRM. The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA). (2007)
- Open Street Map (2022)

Appendix I

Drawings

Exploratory Hole Plan

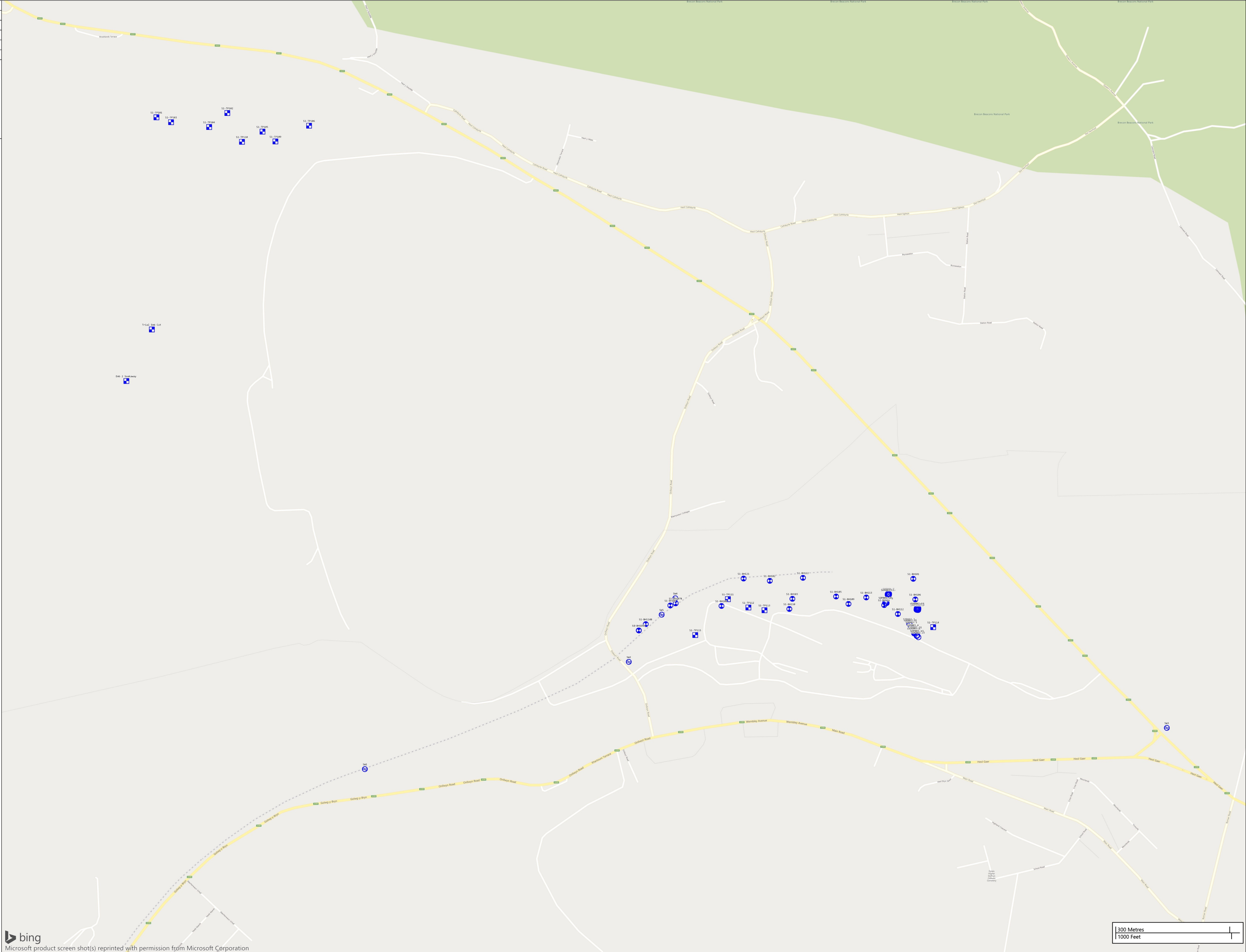
Drawing Numbers: G22069-JGS-001
to G22069-JGS-006

Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-001
Scale	1:6500
Printed	16/03/2023 13:25



Legend Key

- Locations By Type - DS
- Locations By Type - DS+RC
- Locations By Type - RO
- Locations By Type - SLSW
- Locations By Type - TP



Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-003
Scale	1:1500
Printed	16/03/2023 13:27



Legend Key

-  Locations By Type - DS
-  Locations By Type - DS+RC
-  Locations By Type - RO
-  Locations By Type - SLSW
-  Locations By Type - TP

Trial Emb Cut

Emb 2 Soakaway

SITE PLAN

Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-002
Scale	1:1500
Printed	16/03/2023 13:27



Legend Key

-  Locations By Type - DS
-  Locations By Type - DS+RC
-  Locations By Type - RO
-  Locations By Type - SLSW
-  Locations By Type - TP

Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-004
Scale	1:1500
Printed	16/03/2023 13:29



Legend Key

-  Locations By Type - DS
-  Locations By Type - DS+RC
-  Locations By Type - RO
-  Locations By Type - SLSW
-  Locations By Type - TP





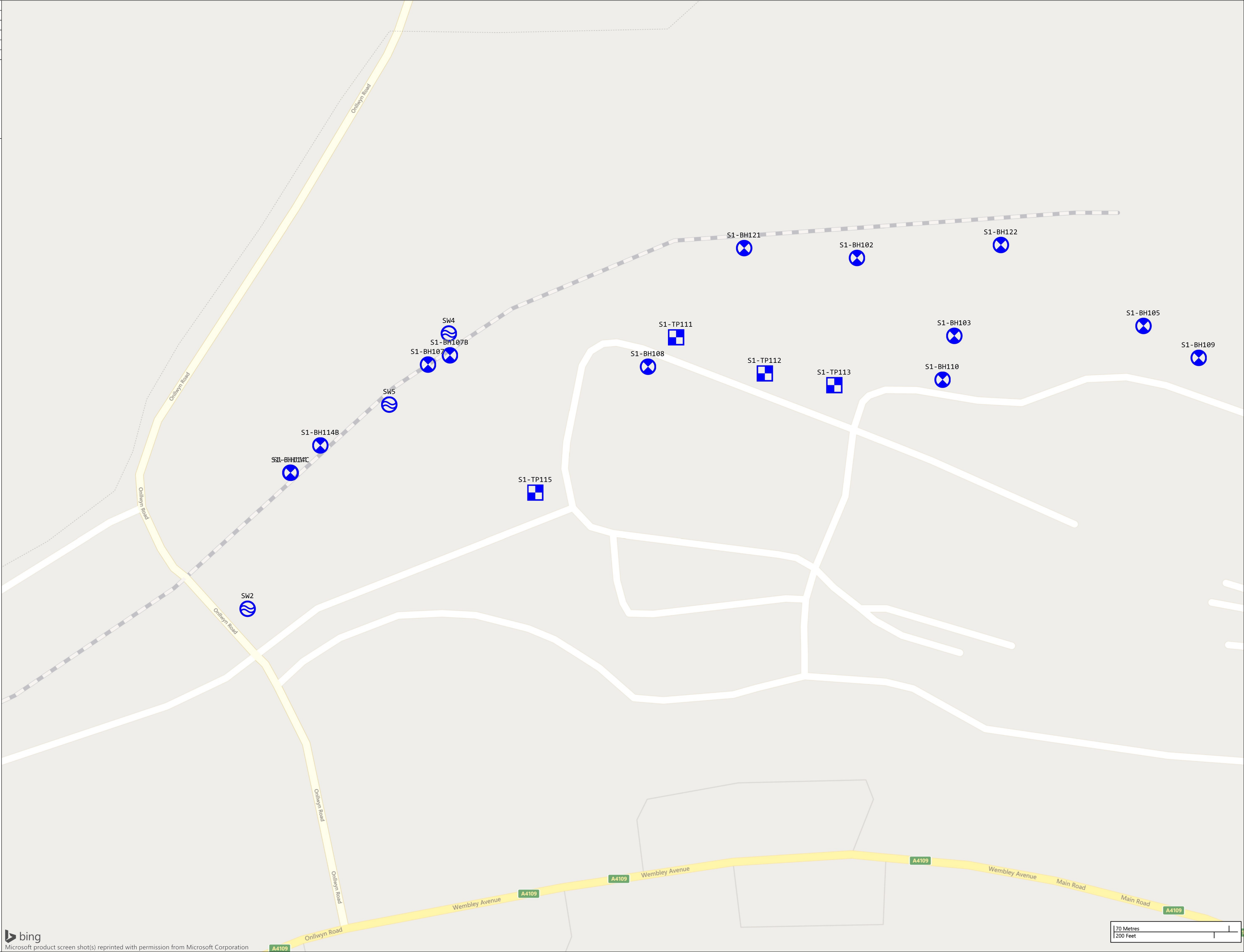
Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-005
Scale	1:1500
Printed	16/03/2023 13:30



Legend Key

- Locations By Type - DS
- Locations By Type - DS+RC
- Locations By Type - RO
- Locations By Type - SLSW
- Locations By Type - TP

SITE PLAN

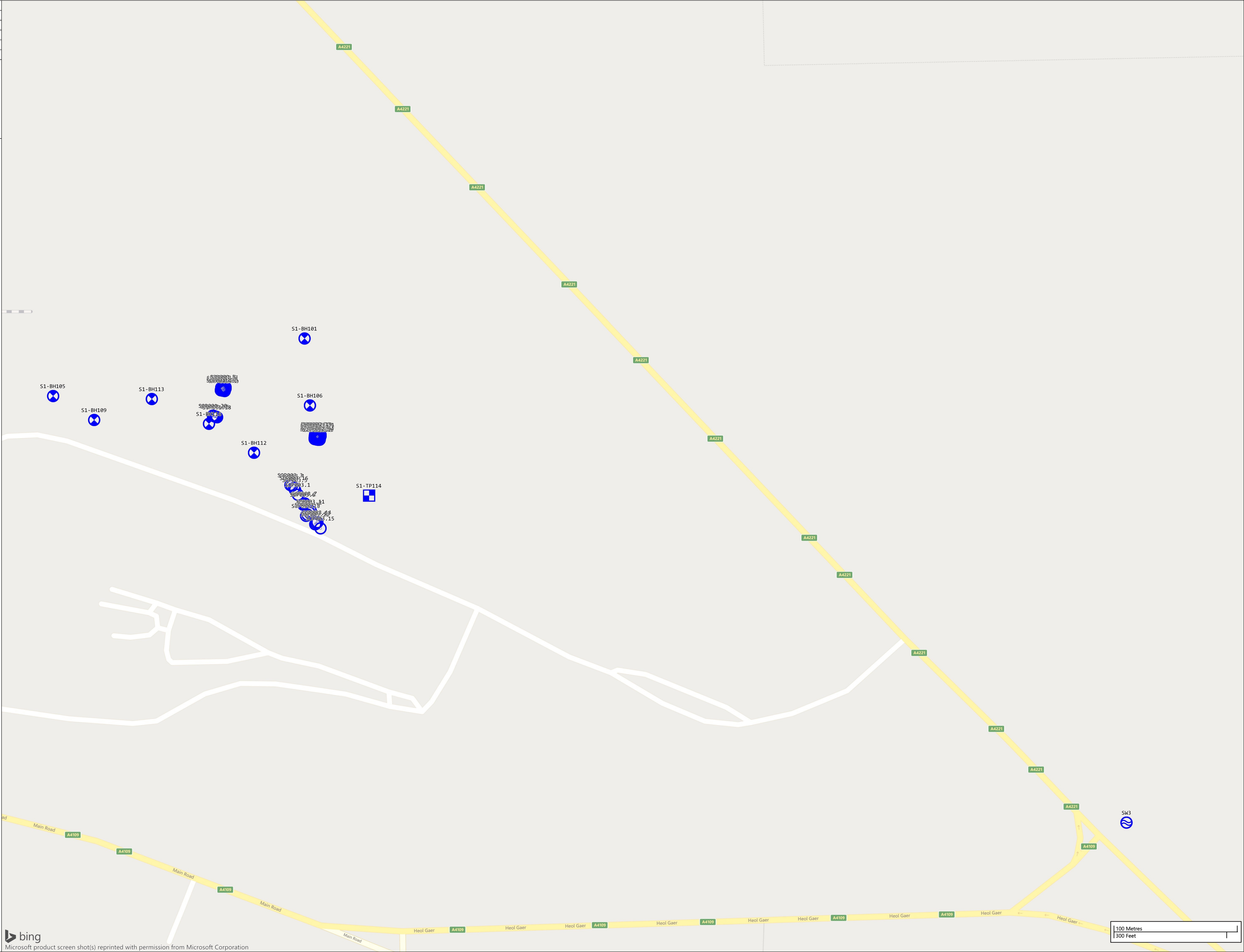


Project	Global Centre of Rail Excellence
Client	Walters UK Limited
Project Number	G22069
Drawing Number	G22069-JGS-006
Scale	1:2000
Printed	16/03/2023 13:32



Legend Key

-  Locations By Type - DS
-  Locations By Type - DS+RC
-  Locations By Type - RO
-  Locations By Type - SLSW
-  Locations By Type - TP



Appendix II

Exploratory Hole Logs and In-situ Testing

SPT Hammer Calibration Certificate	Certificate Numbers: TECH1, AR1327 (JD01), AR2394 (JD04), AR2724 (JD06), AR3829 (JD07)
Dynamic Sampling and Rotary Coring Borehole Logs	S1-BH101 to S1-BH103, S1-BH105 to S1-BH110 (inc. S1-BH107B), S1-BH112 to S1-BH114, S1-BH114B S1-BH114C, S1-BH116, S1-BH121 and S1-BH122
Rotary Open Hole Logs	SOP1.1 to SOP1.20, SOP2.1 to SOP2.25 and SOP3.1 to SOP3.16
Trial Pits Logs	Emb 2 Soakaway, S1-TP101 to S1-TP106, S1-TP109 to S1-TP115 and Trial Emb Cut
Soakaway Test Results	Emb 2 Soakaway Test 1 to Test 3 S1-TP111 Test 1 Trial Emb Cut Test 1 to Test 3



Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic Sampling
Unit 8
Victory Park
Victory Road
Derby
DE248ZF

Hammer Ref: TECH1
Test Date: 28/01/2022
Report Date: 28/01/22
File Name: TECH1.spt
Test Operator: B HUNTER

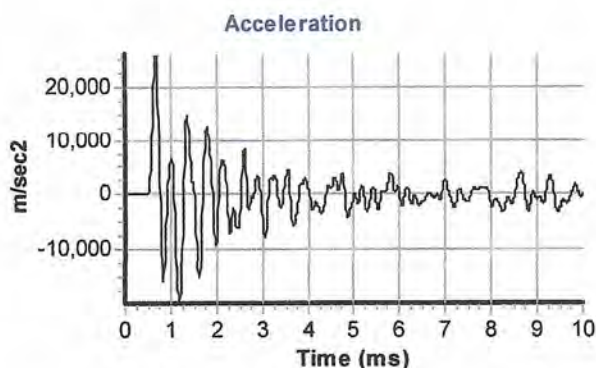
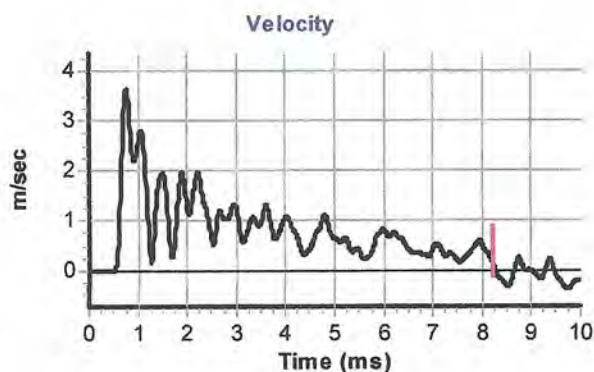
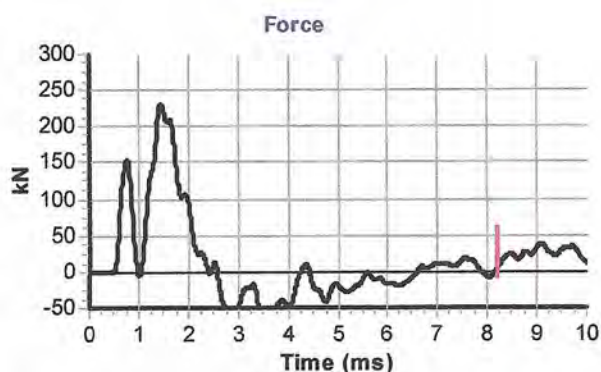
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 62901
Accelerometer No.2: 62902

Hammer Information

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

Comments / Location



Calculations

Area of Rod A (mm^2): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 312

Energy Ratio E_r (%): **66**

Signed: B Hunter
Title: Operations Manager

The recommended calibration interval is 12 months

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: AR1327
Test Date: 10/01/2022
Report Date: 10/01/2022
File Name: AR1327.spt
Test Operator: MT

JD01

Instrumented Rod Data

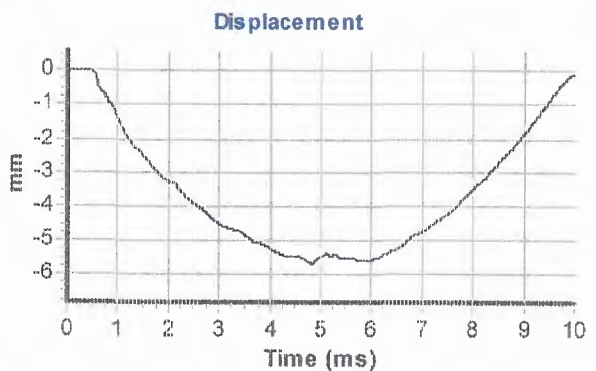
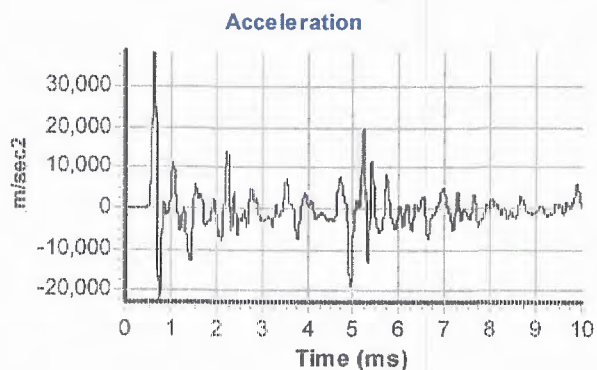
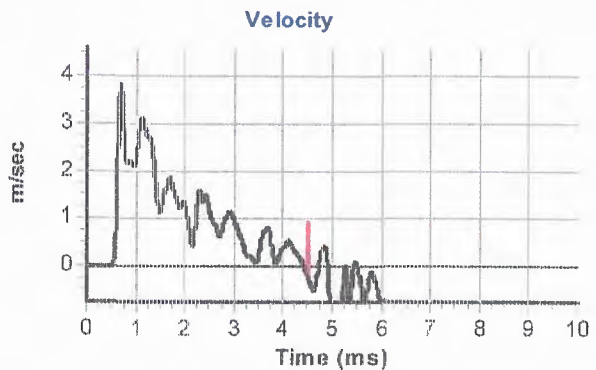
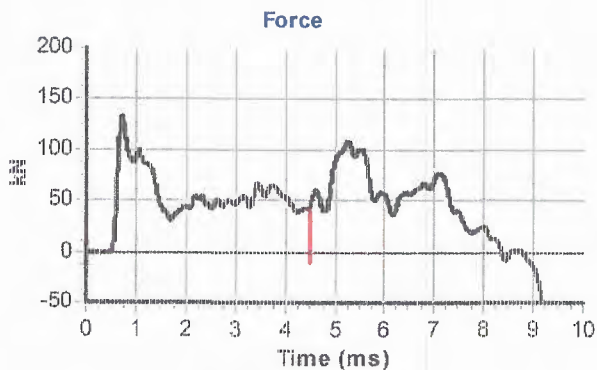
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location

JACKSON DRILLINGS HOLDINGS LTD - 78642



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 332

Energy Ratio E_r (%): **70**

Signed: M. TONER
Title: FITTER

The recommended calibration interval is 12 months

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Hammer
JD04

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

SPT Hammer Ref: AR2394
Test Date: 10/01/2022
Report Date: 10/01/2022
File Name: AR2394.spt
Test Operator: MT

Instrumented Rod Data

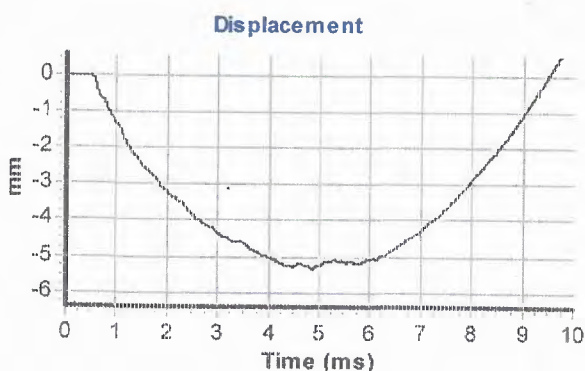
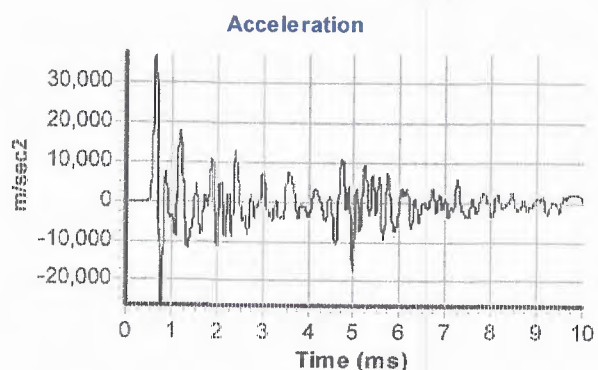
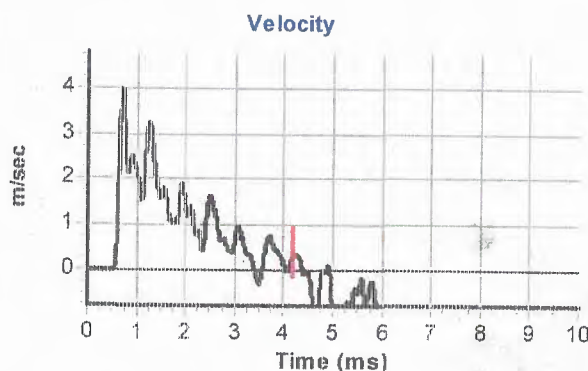
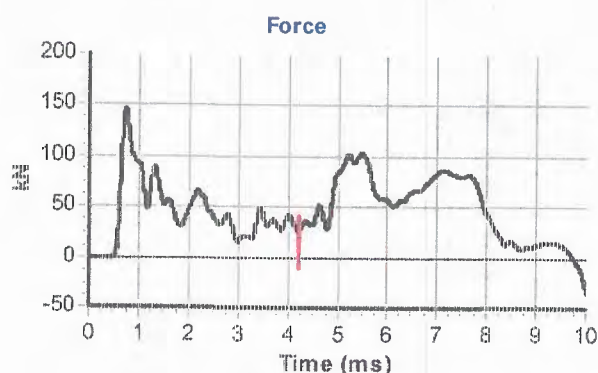
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location

JACKSON DRILLING HOLDINGS LTD - 78642



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 318

Energy Ratio E_r (%): **67**



Signed: M. TONER
Title: FITTER

The recommended calibration interval is 12 months

J. Lock Fitter 

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: AR2724
Test Date: 10/01/2022
Report Date: 10/01/2022
File Name: AR2724.spt
Test Operator: MT

JDO6

Instrumented Rod Data

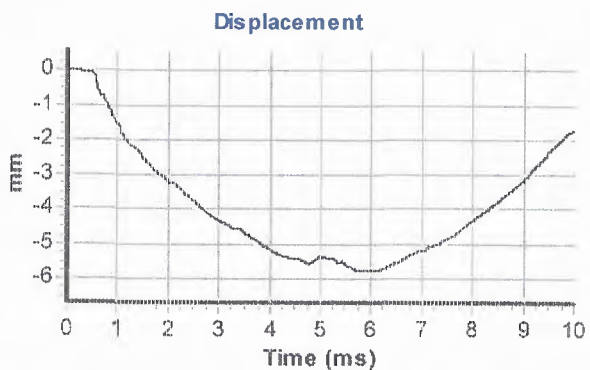
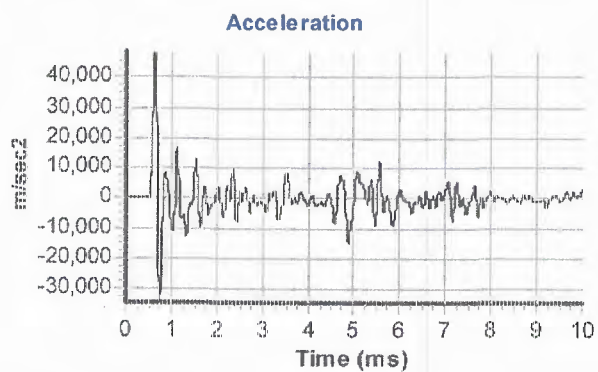
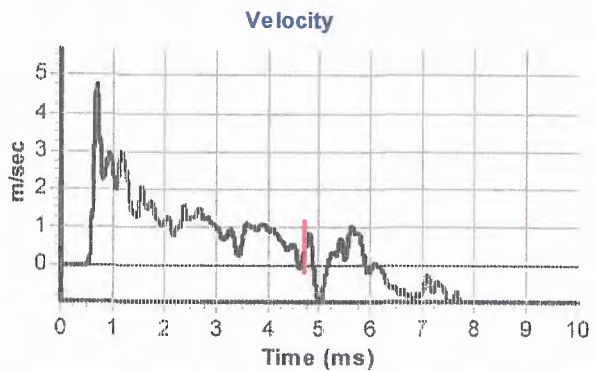
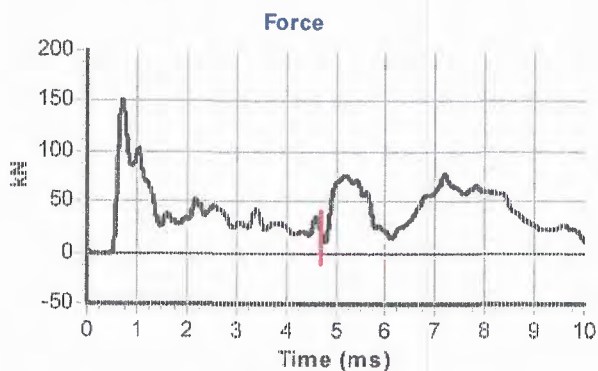
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Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location

JACKSON DRILLING HOLDINGS LTD - 78642



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 326

Energy Ratio E_r (%): **69**

Signed: M.TONER
Title: TRAINER
FITTER

The recommended calibration interval is 12 months

J. Lock Atter JOK

SPT Hammer Energy Test Report

in accordance with BS EN ISO 22476-3:2005

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

SPT Hammer Ref: AR3829
Test Date: 22/12/2021
Report Date: 22/12/2021
File Name: AR3829.spt
Test Operator: JL

JDO7

Instrumented Rod Data

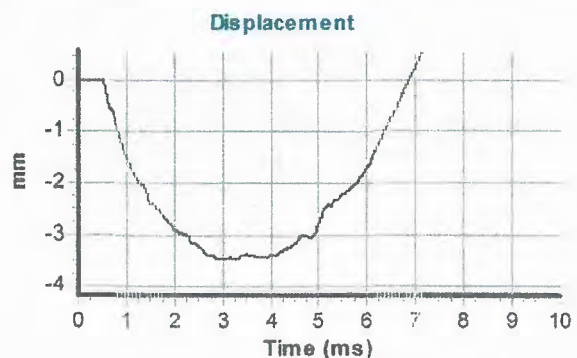
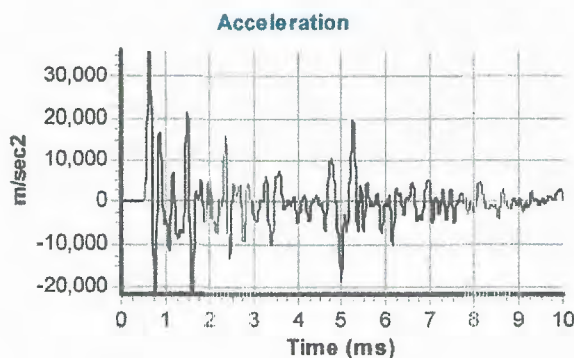
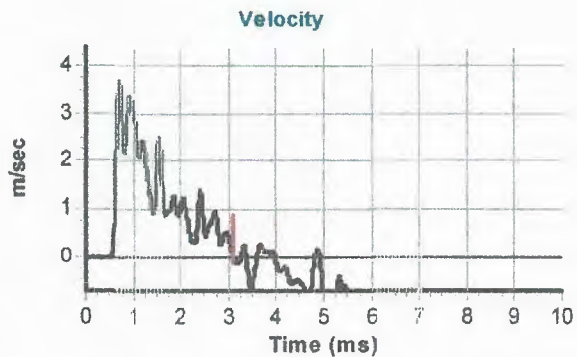
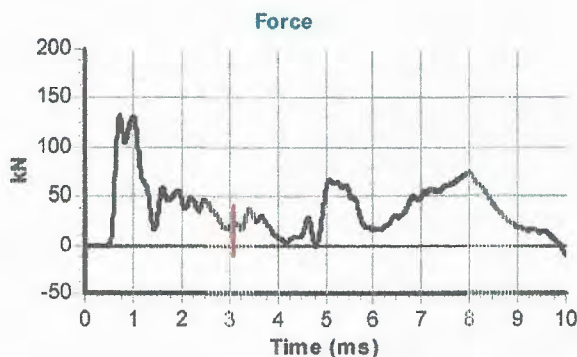
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_s (GPa): 200
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location

JACKSON DRILLING HOLDINGS LTD - 78579



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 286

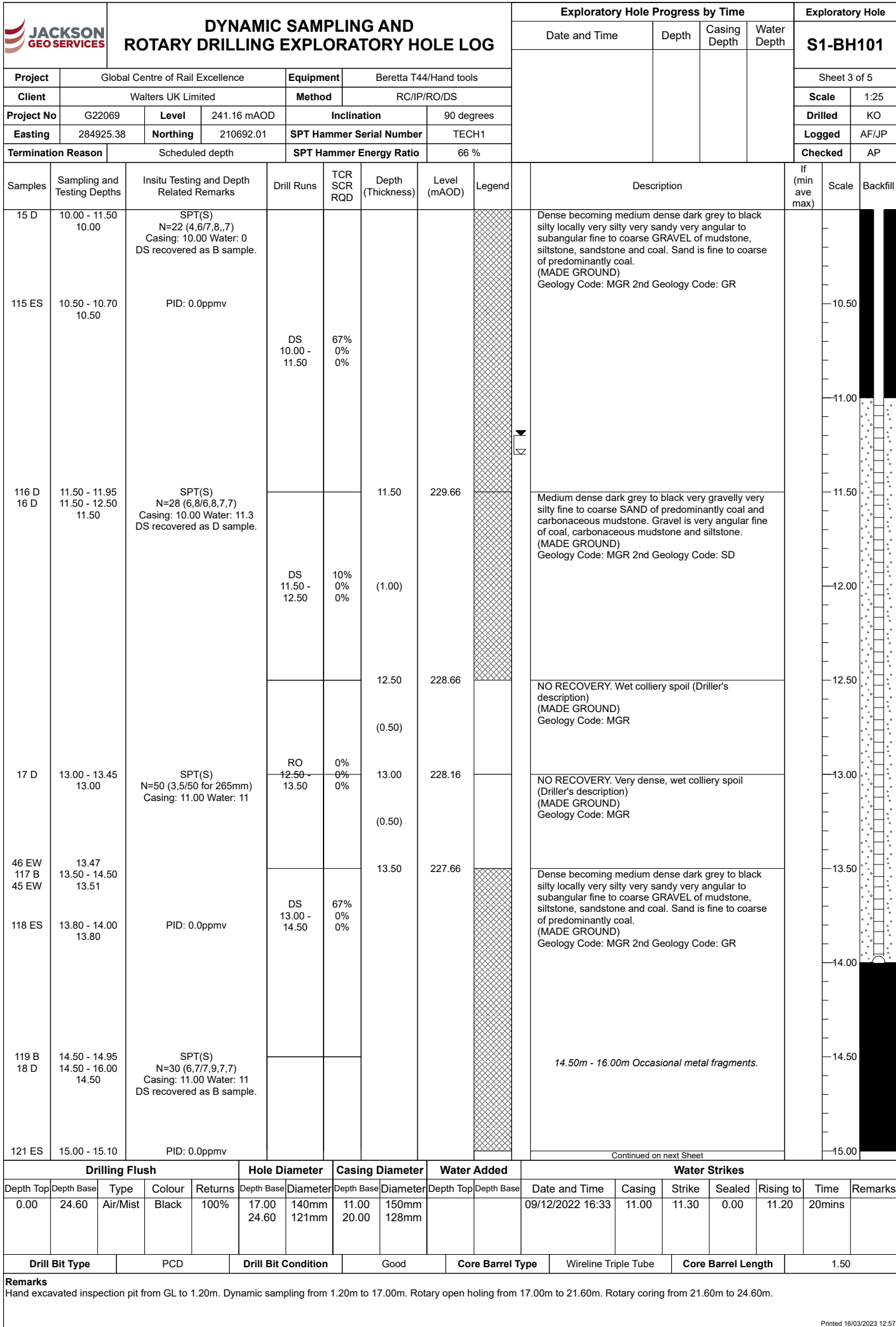
Energy Ratio E_r (%): **61**

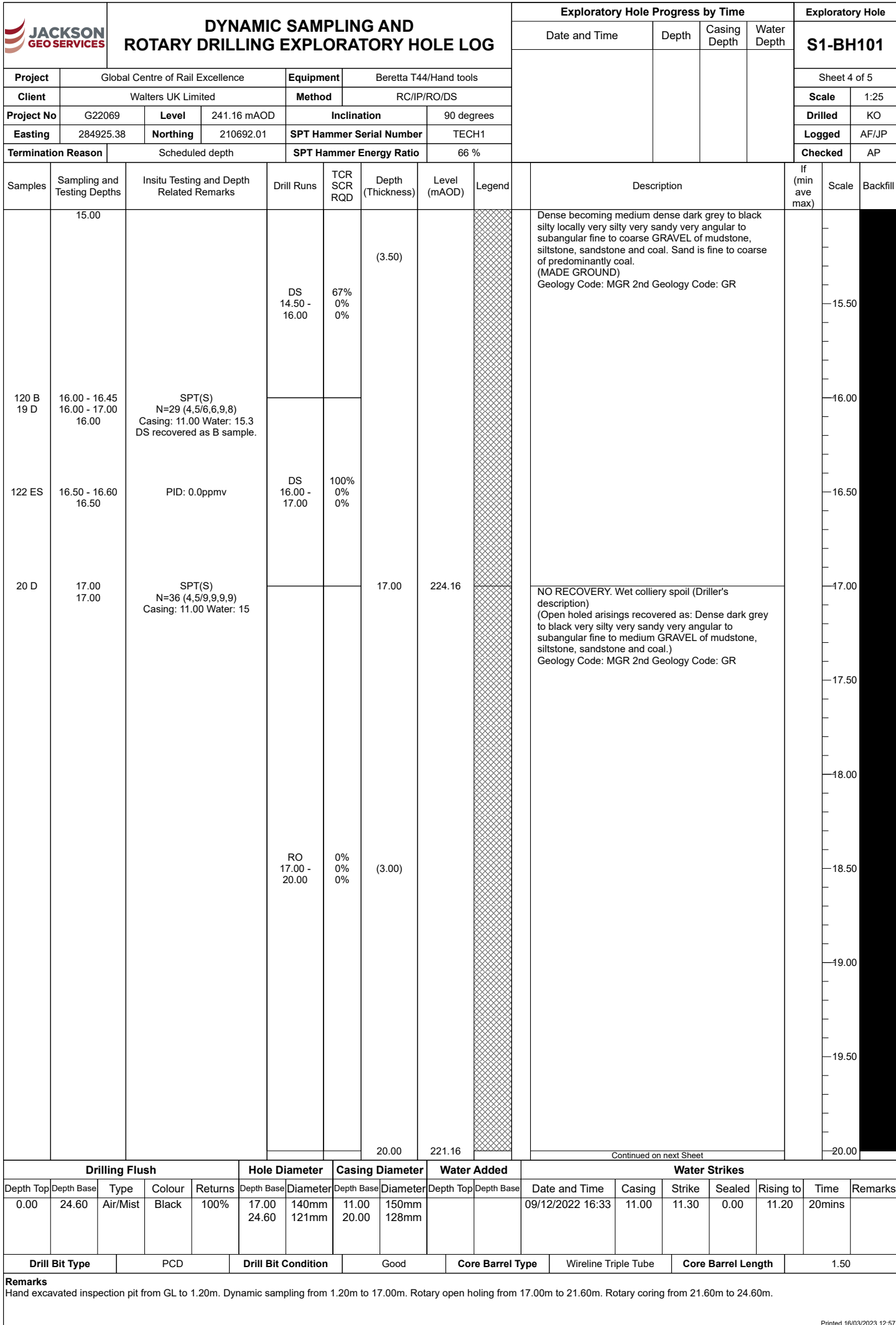
Signed: J. LOCK
Title: FITTER

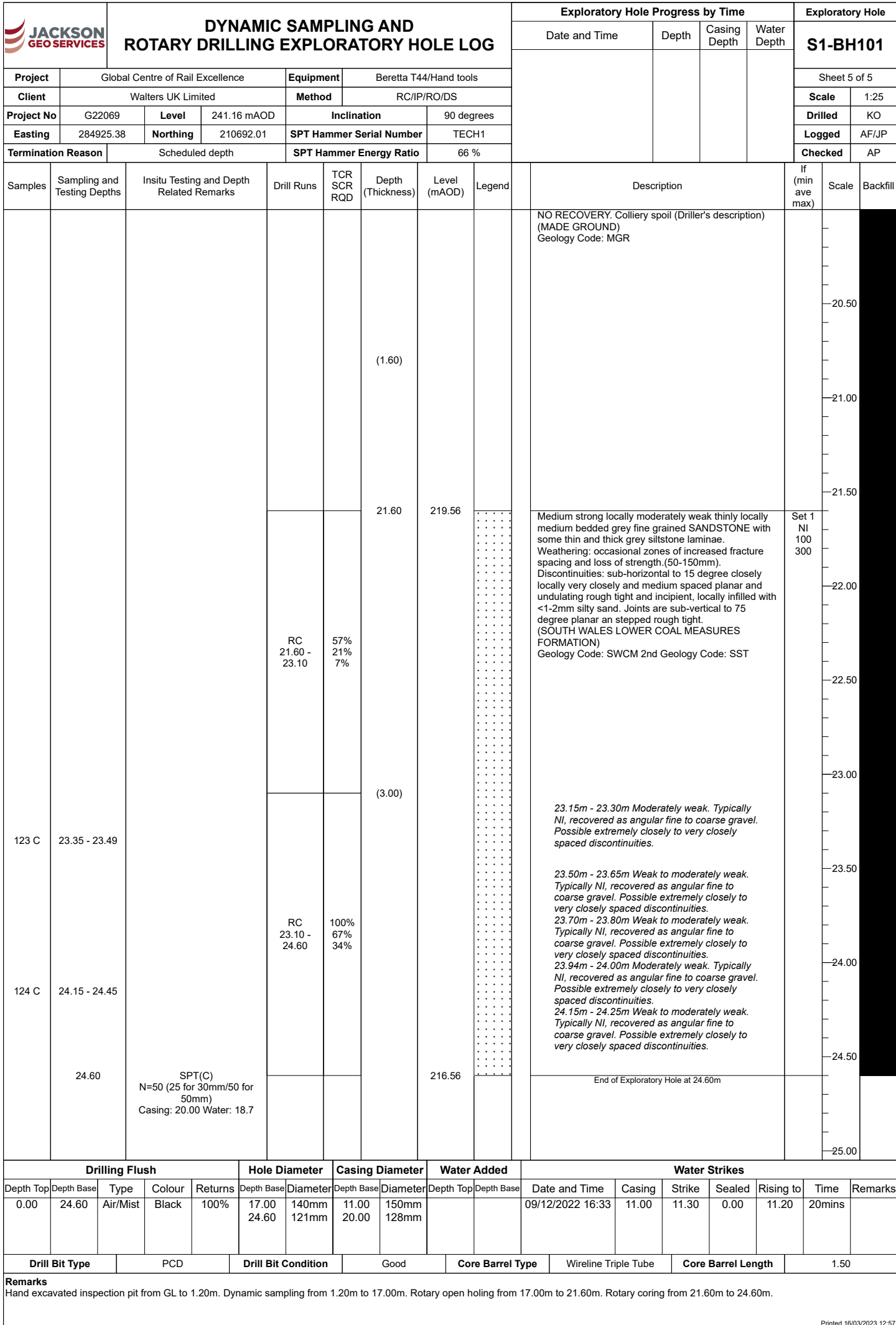
The recommended calibration interval is 12 months

		DYNAMIC SAMPLING AND ROTARY DRILLING EXPLORATORY HOLE LOG						Exploratory Hole Progress by Time				Exploratory Hole															
								Date and Time		Depth	Casing Depth	Water Depth	S1-BH101														
Project		Global Centre of Rail Excellence			Equipment		Beretta T44/Hand tools			Sheet 1 of 5																	
Client		Walters UK Limited			Method		RC/IP/RO/DS			Scale	1:25																
Project No		G22069	Level	241.16 mAOD	Inclination		90 degrees			Drilled	KO																
Easting		284925.38	Northing	210692.01	SPT Hammer Serial Number		TECH1			Logged	AF/JP																
Termination Reason		Scheduled depth			SPT Hammer Energy Ratio		66 %			Checked	AP																
Samples	Sampling and Testing Depths	Insitu Testing and Depth Related Remarks			Drill Runs	TCR SCR RQD	Depth (Thickness)	Level (mAOD)	Legend	Description	If (min ave max)	Scale	Backfill														
1 B	0.10 - 0.60	PID: 0.0ppmv					0.00			Black and dark grey sandy silty angular and subrounded fine to coarse GRAVEL of mudstone, siltstone, coal and rare fine and medium possible slag with low cobble content. Sand is fine to coarse. Cobbles are subangular of mudstone. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR																	
2 ES	0.30 - 0.40 0.30																										
3 ES	0.50 - 0.60 0.50																										
4 B	0.80 - 1.20	PID: 0.0ppmv					(1.20)																				
5 ES	1.00 - 1.10 1.00																										
101 D 6 D	1.20 - 1.65 1.20 - 2.00 1.20																										
SPT(S) N=47 (2,3/17,16,9,5) Casing: 0.00 Water: 0 DS recovered as D sample.					DS 1.20 - 2.00	12% 0% 0%	1.20	239.96		Dense becoming medium dense dark grey to black silty to very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and occasional coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR																	
														7 D	2.00 - 2.45 2.00												
														SPT(S) N=18 (6,2/3,5,5,5) Casing: 2.00 Water: 0					DS 2.00 - 3.00	30% 0% 0%							
102 ES	2.70 - 3.00 2.70																										
PID: 0.0ppmv																											
												103 D 8 D	3.00 - 3.45 3.00 - 4.00 3.00														
												SPT(S) N=20 (5,6/6,4,5,5) Casing: 3.00 Water: 0 DS recovered as D sample.					DS 3.00 - 4.00	20% 0% 0%	(3.80)								
104 B 9 D	4.00 - 4.45 4.00 - 5.00 4.00																										
SPT(S) N=24 (3,4/6,6,6,6) Casing: 3.00 Water: 0																											
												105 ES	4.50 - 4.70 4.50														
												PID: 0.0ppmv					DS 4.00 - 5.00	100% 0% 0%									
10 D	5.00 - 5.45																										
							5.00	236.16		Continued on next Sheet																	
Drilling Flush					Hole Diameter		Casing Diameter		Water Added		Water Strikes																
Depth Top	Depth Base	Type	Colour	Returns	Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Date and Time	Casing	Strike	Sealed	Rising to	Time	Remarks										
0.00	24.60	Air/Mist	Black	100%	17.00	140mm	11.00	150mm			09/12/2022 16:33	11.00	11.30	0.00	11.20	20mins											
Drill Bit Type		PCD			Drill Bit Condition		Good		Core Barrel Type		Wireline Triple Tube		Core Barrel Length		1.50												
Remarks																											
Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.																											
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		DYNAMIC SAMPLING AND ROTARY DRILLING EXPLORATORY HOLE LOG						Exploratory Hole Progress by Time				Exploratory Hole					
								Date and Time		Depth	Casing Depth	Water Depth	S1-BH101				
Project		Global Centre of Rail Excellence				Equipment		Beretta T44/Hand tools				Sheet 2 of 5					
Client		Walters UK Limited				Method		RC/IP/RO/DS				Scale	1:25				
Project No		G22069		Level		241.16 mAOD		Inclination		90 degrees		Drilled	KO				
Easting		284925.38		Northing		210692.01		SPT Hammer Serial Number		TECH1		Logged	AF/JP				
Termination Reason		Scheduled depth				SPT Hammer Energy Ratio		66 %				Checked	AP				
Samples	Sampling and Testing Depths		Insitu Testing and Depth Related Remarks			Drill Runs	TCR SCR RQD	Depth (Thickness)	Level (mAOD)	Legend	Description		If (min ave max)	Scale	Backfill		
106 B 11 D	5.00		SPT(S) N=24 (3,4/5,5,8,6) Casing: 3.00 Water: 0			DS 5.00 - 6.00	0% 0% 0%	(1.00)	235.16		NO RECOVERY. Colliery spoil (Driller's description) (MADE GROUND) Geology Code: MGR			5.50			
	6.00 - 6.45 6.00 - 7.35 6.00		SPT(S) N=24 (3,5/6,6,8) Casing: 6.00 Water: 0								Medium dense and dense dark grey to black silty to very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR						
107 ES	6.50 - 6.70 6.50		PID: 0.0ppmv			DS 6.00 - 7.00	100% 0% 0%	(1.35)			Dark grey to black gravelly very silty fine to coarse SAND of predominantly coal and carbonaceous mudstone. Gravel is very angular fine of coal, carbonaceous mudstone and siltstone. (MADE GROUND) Geology Code: MGR 2nd Geology Code: SD			6.50			
12 D	7.00 - 7.45 7.00		SPT(S) N=32 (5,9/14,6,6,6) Casing: 6.00 Water: 0			DS 7.00 - 8.00	100% 0% 0%	(0.65)	233.81		Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR			7.00			
108 B	7.35 - 8.00		PID: 0.0ppmv								Dark grey to black gravelly very silty fine to coarse SAND of predominantly coal and carbonaceous mudstone. Gravel is very angular fine of coal, carbonaceous mudstone and siltstone. (MADE GROUND) Geology Code: MGR 2nd Geology Code: SD						
109 ES	7.50 - 7.70 7.50		PID: 0.0ppmv			DS 8.00 - 9.00	100% 0% 0%	(3.50)	233.16		Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR			7.50			
110 B 13 D	8.00 - 8.45 8.00 - 9.00 8.00		SPT(S) N=33 (5,6/8,8,8,9) Casing: 6.00 Water: 0								Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR						
111 ES	8.50 - 8.70 8.50		PID: 0.0ppmv			DS 9.00 - 10.00	100% 0% 0%	(3.50)			Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR			8.50			
112 B 14 D	9.00 - 10.00 9.00 - 9.45 9.00		SPT(S) N=19 (3,2/3,4,6,6) Casing: 9.00 Water: 0 DS recovered as B sample.								Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR						
113 ES	9.50 - 9.70 9.50		PID: 0.0ppmv			DS 9.00 - 10.00	100% 0% 0%	(3.50)			Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR			9.50			
114 B	10.00 - 10.45		PID: 0.0ppmv								Dense becoming medium dense dark grey to black silty locally very silty very sandy very angular to subangular fine to coarse GRAVEL of mudstone, siltstone, sandstone and coal. Sand is fine to coarse of predominantly coal. (MADE GROUND) Geology Code: MGR 2nd Geology Code: GR						
Continued on next Sheet																	
Drilling Flush					Hole Diameter		Casing Diameter		Water Added		Water Strikes						
Depth Top	Depth Base	Type	Colour	Returns	Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Date and Time	Casing	Strike	Sealed	Rising to	Time	Remarks
0.00	24.60	Air/Mist	Black	100%	17.00 24.60	140mm 121mm	11.00 20.00	150mm 128mm			09/12/2022 16:33	11.00	11.30	0.00	11.20	20mins	
Drill Bit Type		PCD		Drill Bit Condition		Good		Core Barrel Type		Wireline Triple Tube		Core Barrel Length		1.50			
Remarks Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.																	
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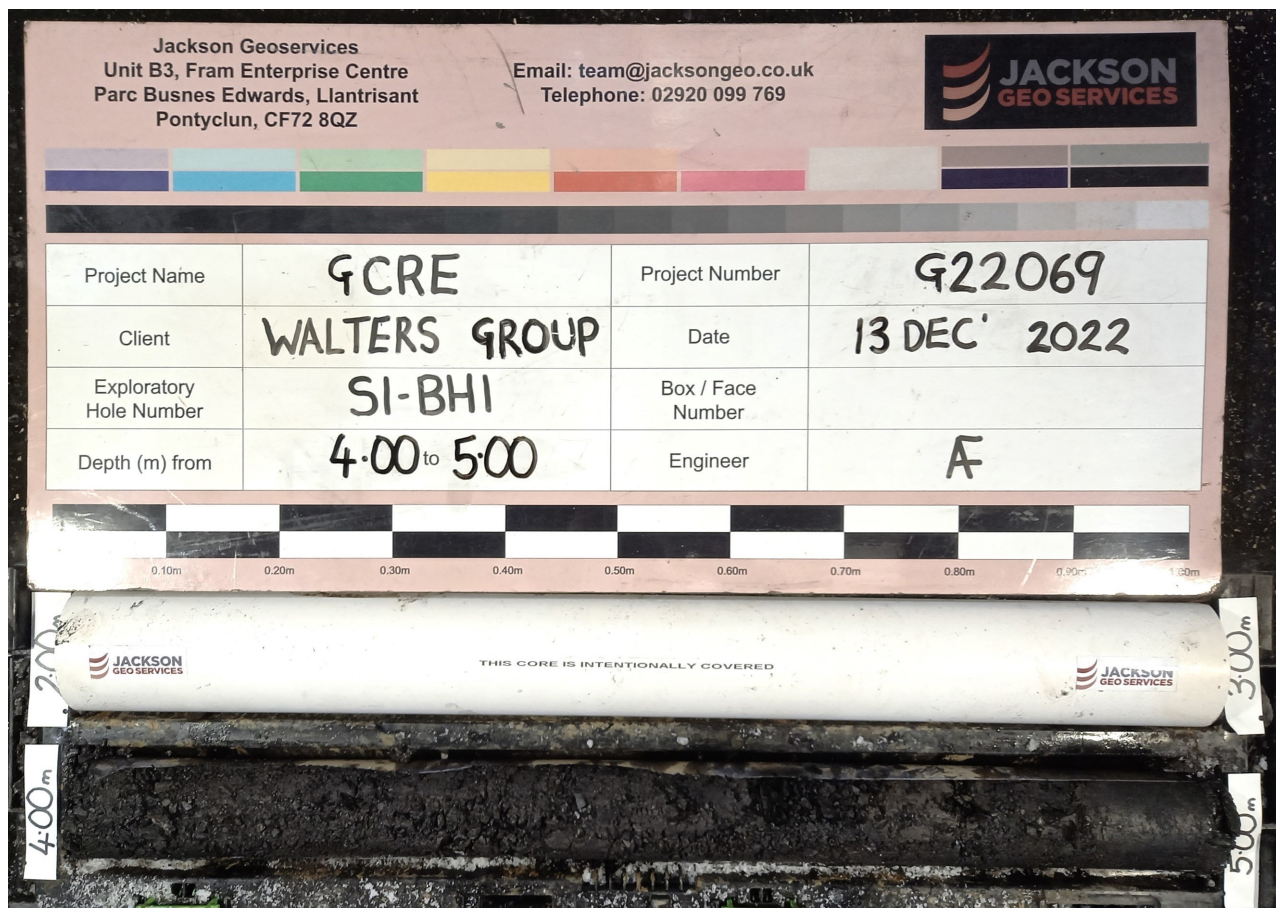




		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holeing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.		Exploratory Hole S1-BH101
Project	Global Centre of Rail Excellence	Easting	284925.38	Equipment	Beretta T44/Hand tools	Sheet 1 of 4
Client	Walters UK Limited	Northing	210692.01	Method	RC/IP/RO/DS	
Project No	G22069	Level	241.16 mAOD	Termination Reason	Scheduled depth	

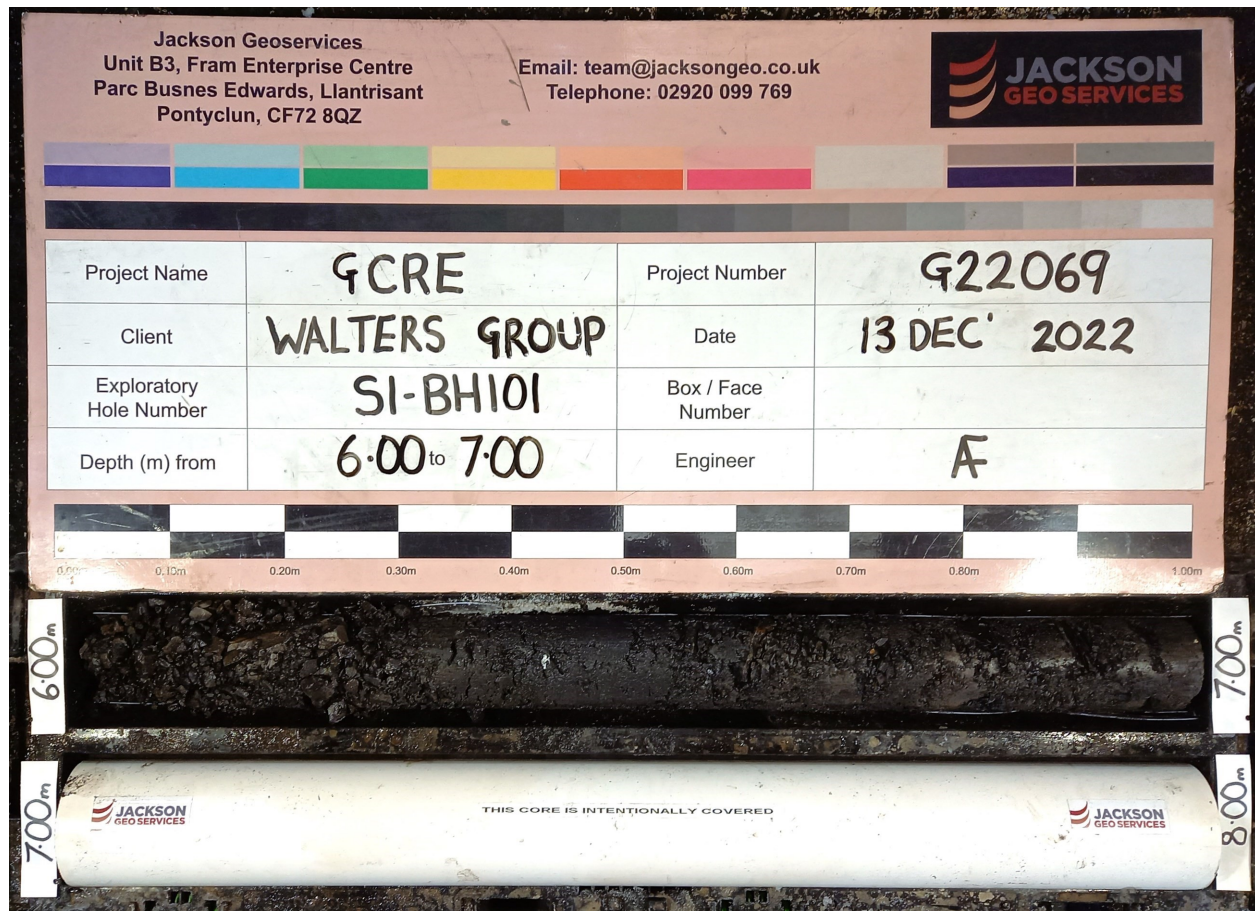


S1-BH101 2.00 m to 3.00 m

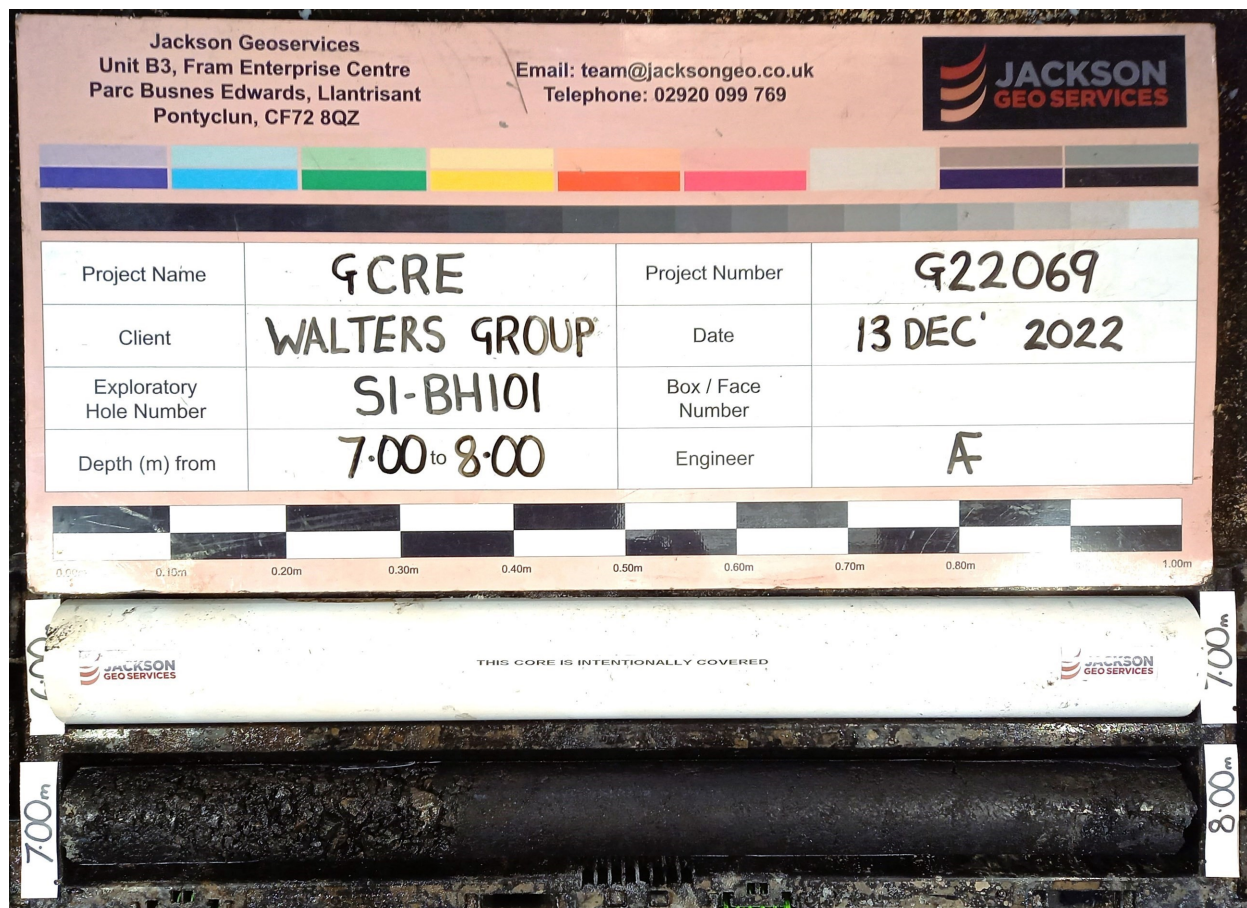


S1-BH101 4.00 m to 5.00 m

		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.		Exploratory Hole S1-BH101
Project	Global Centre of Rail Excellence	Easting	284925.38	Equipment	Beretta T44/Hand tools	Sheet 2 of 4
Client	Walters UK Limited	Northing	210692.01	Method	RC/IP/RO/DS	
Project No	G22069	Level	241.16 mAOD	Termination Reason	Scheduled depth	



S1-BH101 6.00 m to 7.00 m

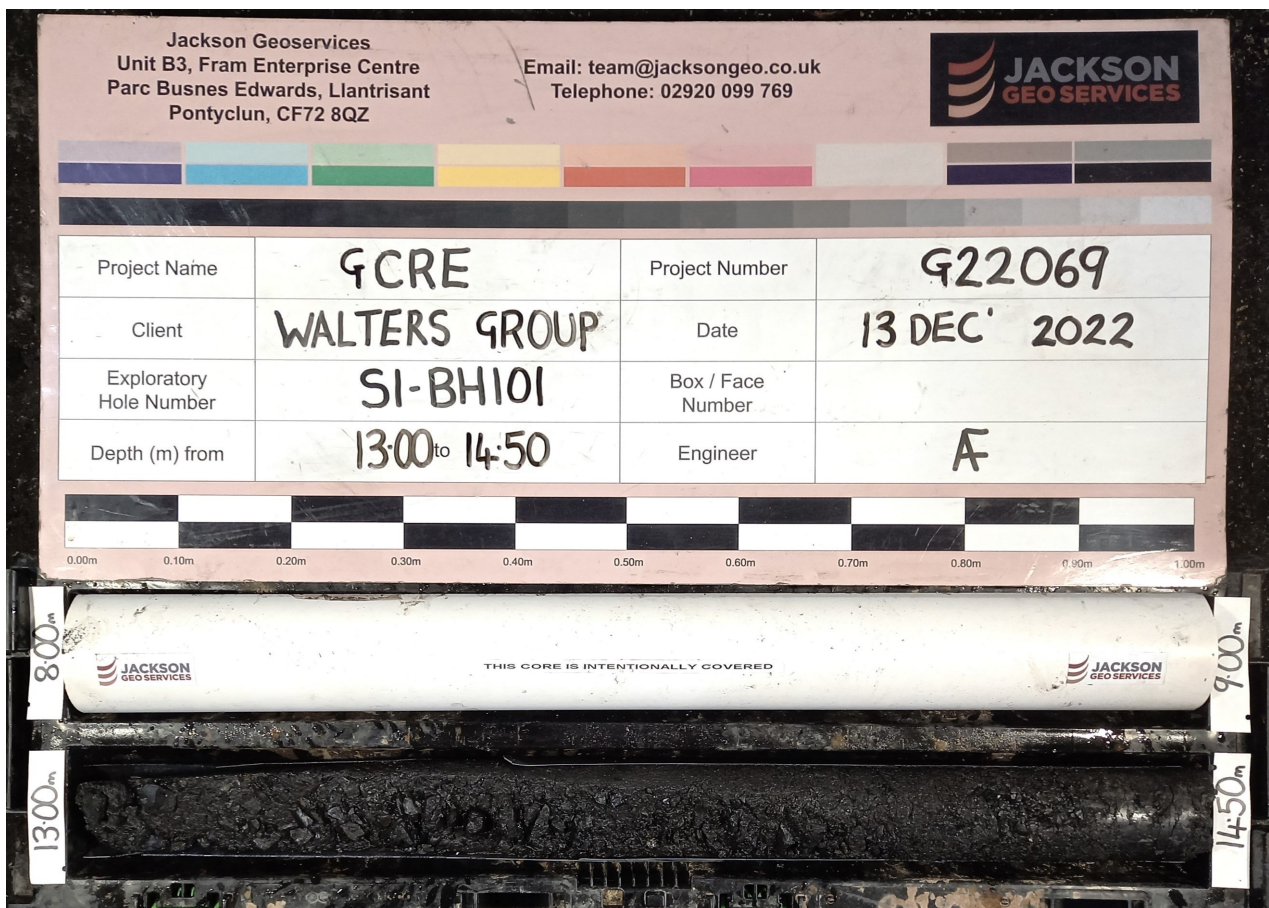


S1-BH101 7.00 m to 8.00 m

		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.		Exploratory Hole S1-BH101
Project	Global Centre of Rail Excellence	Easting	284925.38	Equipment	Beretta T44/Hand tools	Sheet 3 of 4
Client	Walters UK Limited	Northing	210692.01	Method	RC/IP/RO/DS	
Project No	G22069	Level	241.16 mAOD	Termination Reason	Scheduled depth	



S1-BH101 8.00 m to 9.00 m



S1-BH101 13.00 m to 14.50 m

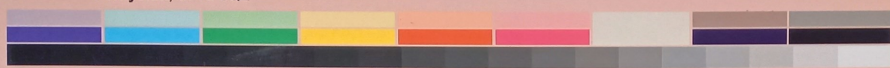
		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m. Dynamic sampling from 1.20m to 17.00m. Rotary open holing from 17.00m to 21.60m. Rotary coring from 21.60m to 24.60m.		Exploratory Hole S1-BH101
Project	Global Centre of Rail Excellence	Easting	284925.38	Equipment	Beretta T44/Hand tools	Sheet 4 of 4
Client	Walters UK Limited	Northing	210692.01	Method	RC/IP/RO/DS	
Project No	G22069	Level	241.16 mAOD	Termination Reason	Scheduled depth	

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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	20 DEC' 2022
Exploratory Hole Number	S1-BH101	Box / Face Number	
Depth (m) from	21.60 to 23.10	Engineer	A





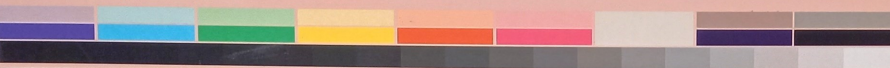
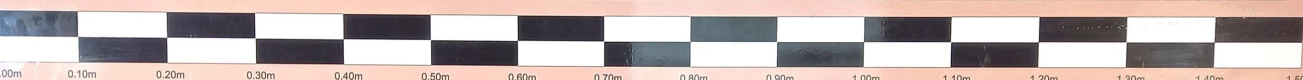

S1-BH101 21.60 m to 23.10 m

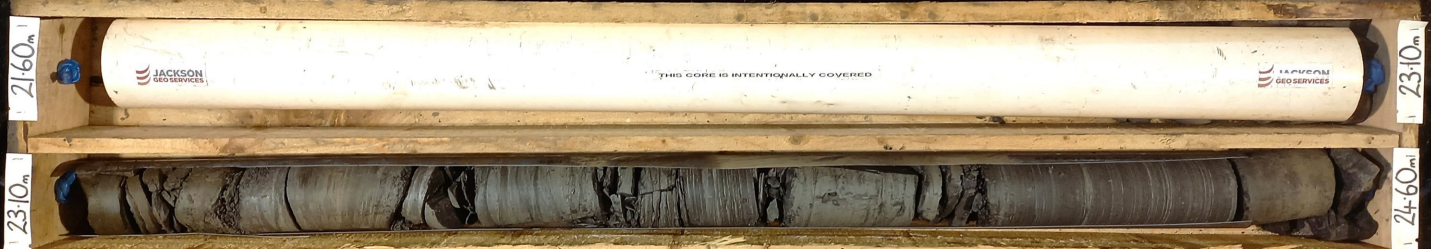
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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	20 DEC' 2022
Exploratory Hole Number	S1-BH101	Box / Face Number	
Depth (m) from	23.10 to 24.60	Engineer	A



S1-BH101 23.10 m to 24.60 m



Exploratory Hole Progress by Time				Exploratory Hole	
Date and Time	Depth	Casing Depth	Water Depth	S1-BH102	
11/11/2022 13:33	0.00				
11/11/2022 15:10	1.00	1.00	0.20	Sheet 1 of 6	
14/11/2022 08:57	1.00	1.00	0.60	Scale	1:25
14/11/2022 16:00	10.00	10.00	0.90	Drilled	KO
15/11/2022 07:30	10.00	10.00	0.90	Logged	JP/AF
15/11/2022 16:00	17.00	14.00	0.90	Checked	AP
16/11/2022 08:05	17.00	14.00	0.90		
16/11/2022 16:00	27.00	14.00	0.90		

Drilling Flush					Hole Diameter		Casing Diameter		Water Added		Water Strikes						
Depth Top	Depth Base	Type	Colour	Returns	Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Date and Time	Casing	Strike	Sealed	Rising to	Time	Remarks
7.00	30.00	Air/Mist	Black	100%	30.00	104mm	14.00	168mm			11/11/2022 13:48 14/11/2022 13:38	0.00 7.00	0.60 7.00		0.45 0.90	20mins 20mins	
Drill Bit Type		PCD			Drill Bit Condition		Good		Core Barrel Type		Conventional Triple Tube		Core Barrel Length			1.50	

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Exploratory Hole Progress by Time				Exploratory Hole	
Date and Time	Depth	Casing Depth	Water Depth	S1-BH102	
17/11/2022 08:00	27.00	14.00	0.90		
17/11/2022 10:00	30.00	14.00	0.90	Sheet 2 of 6	
				Scale	1:25
				Drilled	KO
				Logged	JP/AF
				Checked	AP

Drilling Flush					Hole Diameter		Casing Diameter		Water Added		Water Strikes						
Depth Top	Depth Base	Type	Colour	Returns	Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Date and Time	Casing	Strike	Sealed	Rising to	Time	Remarks
7.00	30.00	Air/Mist	Black	100%	30.00	104mm	14.00	168mm			11/11/2022 13:48 14/11/2022 13:38	0.00 7.00	0.60 7.00		0.45 0.90	20mins 20mins	
Drill Bit Type		PCD			Drill Bit Condition		Good		Core Barrel Type		Conventional Triple Tube		Core Barrel Length			1.50	

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Exploratory Hole Progress by Time				Exploratory Hole	
Date and Time	Depth	Casing Depth	Water Depth	S1-BH102	
				Sheet 4 of 6	
				Scale	1:25
				Drilled	KO
				Logged	JP/AF
				Checked	AP

Drilling Flush					Hole Diameter		Casing Diameter		Water Added		Water Strikes						
Depth Top	Depth Base	Type	Colour	Returns	Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Date and Time	Casing	Strike	Sealed	Rising to	Time	Remarks
7.00	30.00	Air/Mist	Black	100%	30.00	104mm	14.00	168mm			11/11/2022 13:48 14/11/2022 13:38	0.00 7.00	0.60 7.00		0.45 0.90	20mins 20mins	
Drill Bit Type		PCD			Drill Bit Condition		Good		Core Barrel Type		Conventional Triple Tube		Core Barrel Length			1.50	

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EXPLORATORY HOLE PHOTOGRAPHS

Remarks

Hand excavated inspection pit from GL to 1.20m depth.
Dynamic sampling from 1.20m to 7.00m depth. Rotary coring
from 7.00m to 30.00m depth.

Exploratory Hole

S1-BH102

Project	Global Centre of Rail Excellence	Easting	284544.49	Equipment	Insulated Hand Tools/Beretta T44	Sheet 1 of 11
Client	Walters UK Limited	Northing	210695.40	Method	IP/RC/WLS	
Project No	G22069	Level	230.73 mAOD	Termination Reason	Scheduled depth	

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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	14 NOV' 2022
Exploratory Hole Number	SI-BH102	Box / Face Number	
Depth (m) from	3.00 to 4.00	Engineer	AF

3.00m

4.00m

4.00m

3.00m

THIS CORE IS INTENTIONALLY COVERED

S1-BH102 3.00 m to 4.00 m

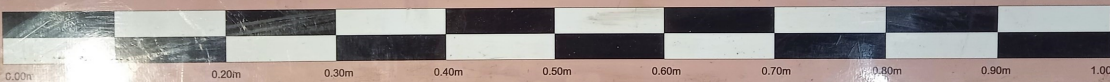
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Pontyclun, CF72 8QZ

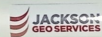
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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	14 NOV' 2022
Exploratory Hole Number	SI-BH102	Box / Face Number	
Depth (m) from	4.00 to 5.00	Engineer	AF





THIS CORE IS INTENTIONALLY COVERED





3.00m

4.00m

4.00m

5.00m

S1-BH102 4.00 m to 5.00 m

		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m depth. Dynamic sampling from 1.20m to 7.00m depth. Rotary coring from 7.00m to 30.00m depth.		Exploratory Hole S1-BH102
Project	Global Centre of Rail Excellence	Easting	284544.49	Equipment	Insulated Hand Tools/Beretta T44	Sheet 2 of 11
Client	Walters UK Limited	Northing	210695.40	Method	IP/RC/WLS	
Project No	G22069	Level	230.73 mAOD	Termination Reason	Scheduled depth	



S1-BH102 7.50 m to 8.00 m



S1-BH102 8.50 m to 9.00 m

		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m depth. Dynamic sampling from 1.20m to 7.00m depth. Rotary coring from 7.00m to 30.00m depth.		Exploratory Hole S1-BH102
Project	Global Centre of Rail Excellence	Easting	284544.49	Equipment	Insulated Hand Tools/Beretta T44	Sheet 3 of 11
Client	Walters UK Limited	Northing	210695.40	Method	IP/RC/WLS	
Project No	G22069	Level	230.73 mAOD	Termination Reason	Scheduled depth	

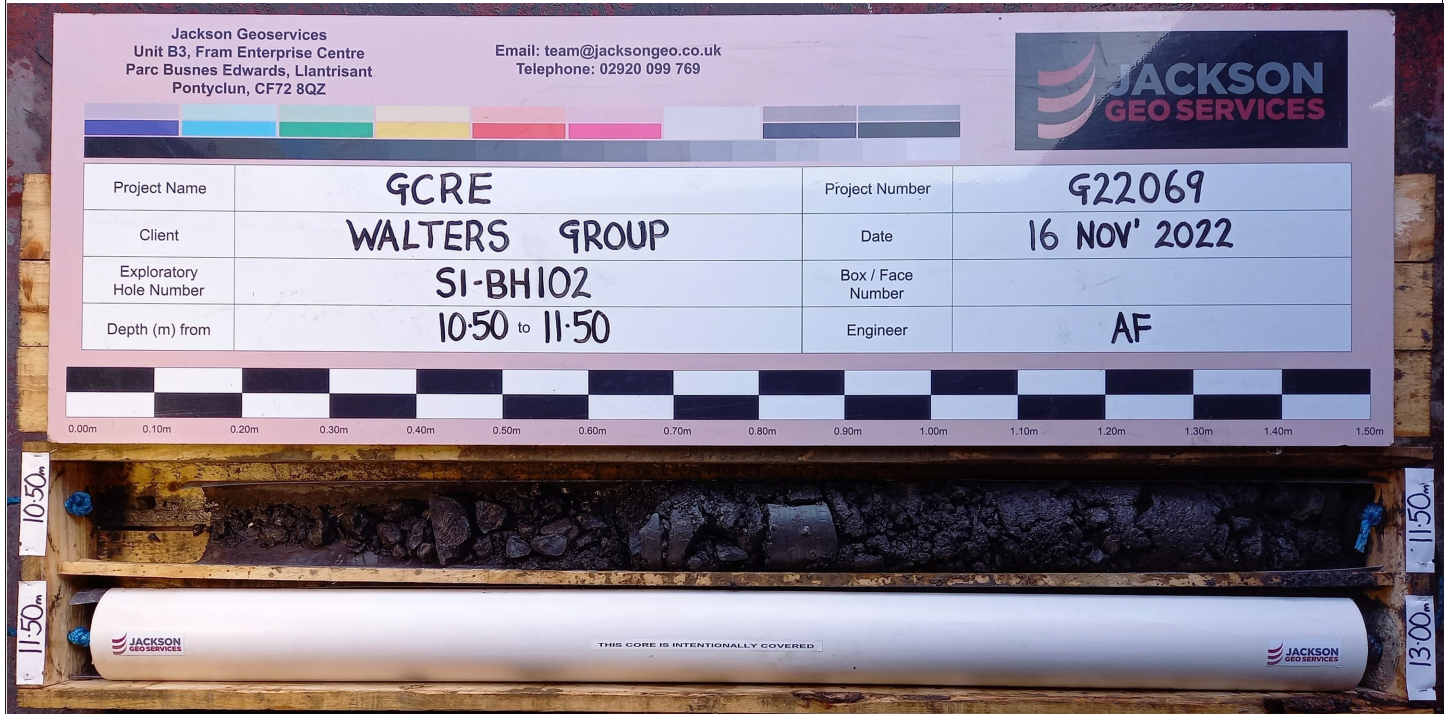


S1-BH102 9.00 m to 9.50 m



S1-BH102 10.00 m to 10.50 m

		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m depth. Dynamic sampling from 1.20m to 7.00m depth. Rotary coring from 7.00m to 30.00m depth.		Exploratory Hole S1-BH102
Project	Global Centre of Rail Excellence	Easting	284544.49	Equipment	Insulated Hand Tools/Beretta T44	Sheet 4 of 11
Client	Walters UK Limited	Northing	210695.40	Method	IP/RC/WLS	
Project No	G22069	Level	230.73 mAOD	Termination Reason	Scheduled depth	



S1-BH102 10.50 m to 11.50 m



S1-BH102 11.50 m to 13.00 m

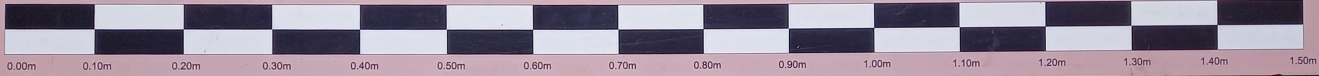
		EXPLORATORY HOLE PHOTOGRAPHS		Remarks Hand excavated inspection pit from GL to 1.20m depth. Dynamic sampling from 1.20m to 7.00m depth. Rotary coring from 7.00m to 30.00m depth.		Exploratory Hole S1-BH102
Project	Global Centre of Rail Excellence	Easting	284544.49	Equipment	Insulated Hand Tools/Beretta T44	Sheet 5 of 11
Client	Walters UK Limited	Northing	210695.40	Method	IP/RC/WLS	
Project No	G22069	Level	230.73 mAOD	Termination Reason	Scheduled depth	

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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	17 NOV' 2022
Exploratory Hole Number	SI-BH102	Box / Face Number	
Depth (m) from	13.00 to 13.50	Engineer	AF





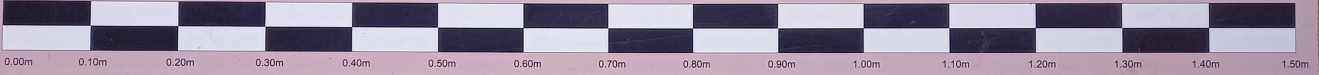
S1-BH102 13.00 m to 13.50 m

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Project Name	GCRE	Project Number	G22069
Client	WALTERS GROUP	Date	17 NOV' 2022
Exploratory Hole Number	SI-BH102	Box / Face Number	
Depth (m) from	13.50 to 14.50	Engineer	AF





S1-BH102 13.50 m to 14.50 m