Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
1. Are there any recorded coal mine entries within the site or within 20m of the site boundary?	• Catastrophic collapse of mine entry leading to ground instability or voids at the ground surface. • Settlement of the ground surface above/adjacent to the mine entry. • Generation of crown holes at the ground surface. • Mines gas emissions	**No.**	N/A	N/A
2. Is the proposed development in the likely zone of influence of past deep underground mining?	• Ground subsidence. • Ground instability.	**No.**	N/A	N/A
3. Is the proposed development in the likely zone of influence of any present underground mine workings?	• Ground subsidence. • Ground instability, loss of ground, generation of crown holes.	**Active Mining:** There are no active underground mines in the locality. **Future Mining:** Reserves are available but are unlikely to be worked in the foreseeable future.	N/A	N/A

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
4. Is the proposed development within the likely zone of influence of recorded underground workings at shallow depth (depths of less than 30m)?	• Ground subsidence. • Ground instability, loss of ground, generation of crown holes. • Catastrophic collapse of mine entry leading to ground instability or voids at the ground surface. • Settlement of the ground surface above/adjacent to the mine entry. • Mine gas emissions	**No.**	N/A	N/A
5. Is there a possibility of unrecorded shallow mine workings and/or mine entries?	• Ground subsidence. • Ground instability, loss of ground, generation of crown holes. • Catastrophic collapse of mine entry leading to ground instability or voids at the ground surface. • Settlement of the ground surface above/adjacent to the mine entry. • Mine gas emissions	**Yes:** The Coal Authority (CA – now Mining Remediation Authority, MRA) Consultants Mining Report indicates that there is the potential for unrecorded shallow mine workings to be present underlying the site. Inspection of the Mining Remediation Authority Interactive Map Viewer indicates that the area of potential shallow mine workings is constrained to the area surrounding the northern site boundary. Review of the published geological mapping (sheet ST67SW) shows that two coal seams are proven to subcrop to the	Ground subsidence associated with past shallow underground mining can result in localised ground instability and damage to properties, the environment, harm to human health, injury or death of site users, site employees, maintenance operatives or construction workers using the site.	**Shallow Mine Workings:** On the basis of the information currently available, it is considered that the Upper & Lower Millgrit coal seams are not anticipated to present a potential risk to the proposed development. In the absence of any coal likely to be present at influencing depths beneath the site, it is concluded that no mitigation measures are considered to be necessary. **Mine Entries:** Whilst the likelihood of encountering unrecorded mine entries at the Site is reduced where there are no shallow deposits of coal, the potential exists for unrecorded mine entries to be located beneath the site, and construction work should proceed cautiously, recognising that unstable entries could be present. Should any anomalous ground conditions be encountered during the course of the

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
		north of the site. These seams are recorded to be the Upper and Lower Millgrit seams which are shown to subcrop approximately in excess of 150m to the north of the site. The published geological mapping indicates that the geological strata in the area is reported to dip to the south at an approximate inclination of 30°, therefore based upon the distance of the seam subcrop from the development site, it is anticipated that the above-mentioned coal seams would be present at a depth in excess of 100m below the site. On the basis of this information, it is considered that these seams would be present at sufficient depths so as not to present a risk to the proposed development. The published geological mapping records the Salridge Coal to overly the Upper Millgrit Coal, but this seam is conjectured to subcrop a significant distance to the south of the Site and to dip to the south, away from the Site. The Salridge Coal is therefore not anticipated to be present beneath the Site.		development works then specialist advice should be sought regarding further investigation and remedial works.

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
		Unrecorded mine entries may also exist on or within influencing distance of the development area.		
6. Is there a record of mine gas emissions within the site boundary?	• Mixtures of noxious explosive gases reaching the ground surface via superficial deposits, faulted/broken strata or poorly filled mine entries and entering structures, confined spaces etc., when an explosive or asphyxiating hazard may be generated.	**No:** The Coal Authority has no record of any gas emissions requiring action within the site. Whilst it is noted that the CA/MRA do not report any instances of mine gas emissions, within, or within 500m distance of the site, this does not mean that the risk does not exist.	Any mine gases have the potential to accumulate within enclosed spaces and can present an explosive or asphyxiating hazard.	Consideration should be given to undertaking a programme of ground gas monitoring at the site in order to establish the ground gas setting. It is possible that this may be a requirement for the Contaminated Land Officer of the relevant Local Authority. Subject to the findings of the ground gas monitoring, it is recommended that a ground gas risk assessment is completed, and if applicable gas protection measures may need to be incorporated into the new built development.
7. Is the proposed development in an area for which the Coal Authority is determining or has granted a licence to remove coal by underground methods?	• Ground subsidence. • Ground instability.	**No**	N/A	N/A

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
8. Are there known faults or other lines of weakness (eg. fissures) due to mining at the site?	• Ground subsidence. • Mixtures of noxious of explosive gases reaching the ground surface via faulted/broken strata and entering buildings, structures, confined spaces etc, when an explosive or asphyxiating hazard may be generated. • Stepped rockhead profiles where there has been subsidence across faults, impacting settlement. Of proposed structures.	**No**	N/A	N/A
9. Has the site been subject to remedial works by, or on behalf of, the Coal Authority under its surface hazard call out procedures?	• Indication of past and potential future subsidence issues on site.	**No.**	N/A	N/A
10. Is the proposed development within the	• Potential of a ground gas source and/or migration	**No**.	N/A	N/A

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ				
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
boundary of a surface mining/opencast site from which minerals have been removed by surface mining/opencast methods?	pathway. Potential settlement problems.			
11. Is the proposed development within 200m of a surface mining/opencast site from which minerals are being removed?	• Development constraints associated with environment/noise/dust	**No.**	N/A	N/A

Coal Mining Risk Assessment – Proposed Residential Development, former Bull Inn, Bristol. BS5 8BQ
Sources of information: Coal Authority - Consultants Coal Mining Report Ref 51003461981001 (attached) Wardell Armstrong LLP archive records Site Location Plan, reference 7327/00, dated 5 February 2024 Topographical Survey Plan, reference 1801-01, dated September 2024 Geotechnical Report, reference 19180, prepared by Herts & Essex Site Investigations, dated 8 October 2024. Mining Remediation Authority Datasets available under the Open Government Licence v3.0. British Geological Survey 1:10,000 Mapping Sheet ST67SW
Assessment of Cumulative Impact of Mining Issues: This risk assessment has identified the principal risks to the site to be the potential presence of unrecorded mine entries and mine gases. A review of the published geological mapping for the site indicates that two coal seams (Upper & Lower Millgrit) are both proven to subcrop in excess of 150m north of the site. The geological strata is reported to dip towards the south at a relatively steep inclination of 30°. Based upon this information, it is estimated that the above-mentioned coal seams would be present at depths in excess of c.100m below the site and therefore it is considered that at this depth they would not present a potential ground stability risk to the proposed development. As a result, no mitigation is considered to be necessary. The next coal seam stratigraphically above the Upper Millgrit Coal is conjectured to be at subcrop a significant distance to the south of the Site and is not anticipated to be present beneath the Site. Nonetheless, whilst the likelihood of unrecorded mine entries being present at the Site is low, there does remain the potential risk of unrecorded mine entries being present within, or within influencing distance of the development site. Should such an anomalous feature consistent with the presence of a mine entry be encountered in the course of the construction work, then work should cease, and specialist advice sought. Whilst the CA have no record of mine gas emissions within 500m distance of the site, this does not necessarily mean that the presence of mine gases do not exist. The proposed development is likely to be considered sensitive to an accumulation of mine gases and it is recommended that prior to development works starting a programme of ground gas monitoring is undertaken. It is likely that the programme frequency and duration would need to be confirmed with the Contaminated Land Officer of the relevant Local Authority, and subject to the findings gas protection measures may need to be implemented within the new built development. N/A = Not Applicable

Prepared by:	[redacted]	**E Gault, Engineering Geologist**
Approved by:		**C Smith, Technical Director**

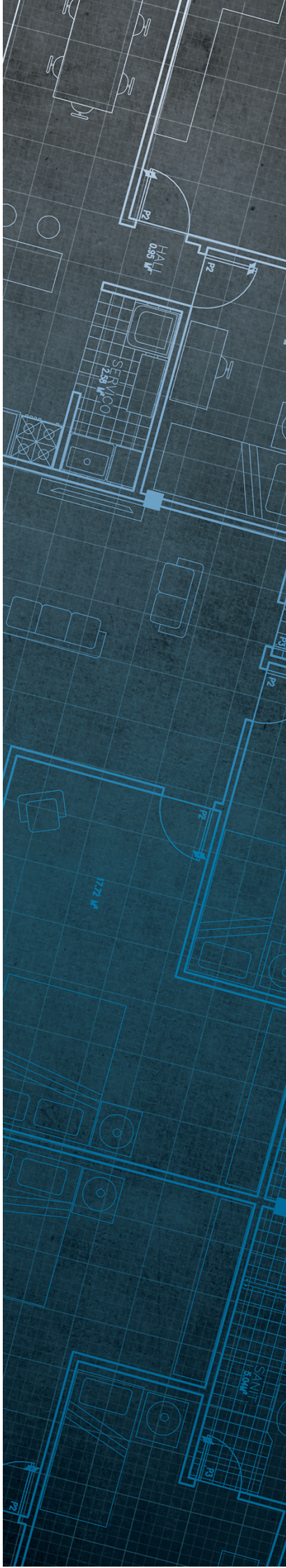
The Coal Authority

Consultants

Coal Mining Report

The Bull Inn
333 Crews Hole Road
St George
Bristol
Bristol City
BS5 8BQ

Date of enquiry:	**8 November 2024**
Date enquiry received:	**8 November 2024**
Issue date:	**8 November 2024**
Our reference:	**51003461981001**
Your reference:	**NL05100/ST34195**



Consultants

Coal Mining Report

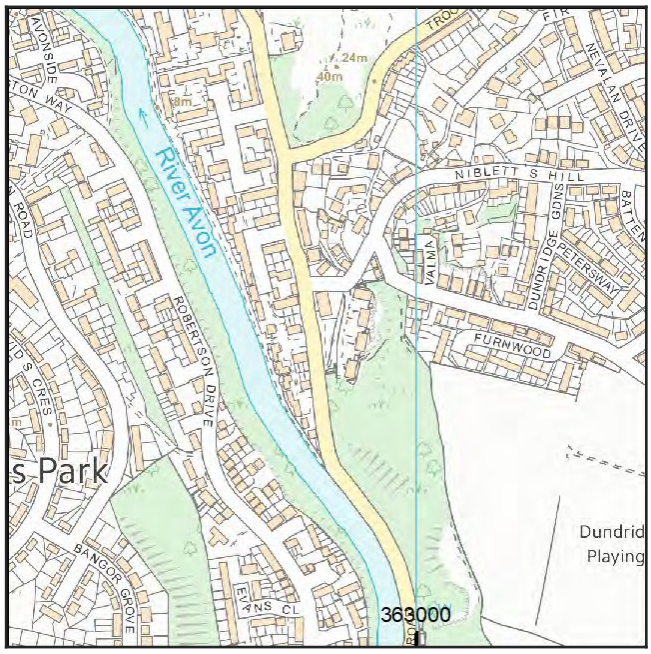
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

Wardell Armstrong LLP

Enquiry address

The Bull Inn
333 Crews Hole Road
St George
Bristol
Bristol City
BS5 8BQ



Approximate position of property

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining
No past mining recorded.

Probable unrecorded shallow workings
Yes.

Spine roadways at shallow depth
No spine roadway recorded at shallow depth.

Mine entries
None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers
The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

17639		

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops
No outcrops recorded.

Geological faults, fissures and breaklines
No faults, fissures or breaklines recorded.

Opencast mines
None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips
None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence
The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The Coal Authority

Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

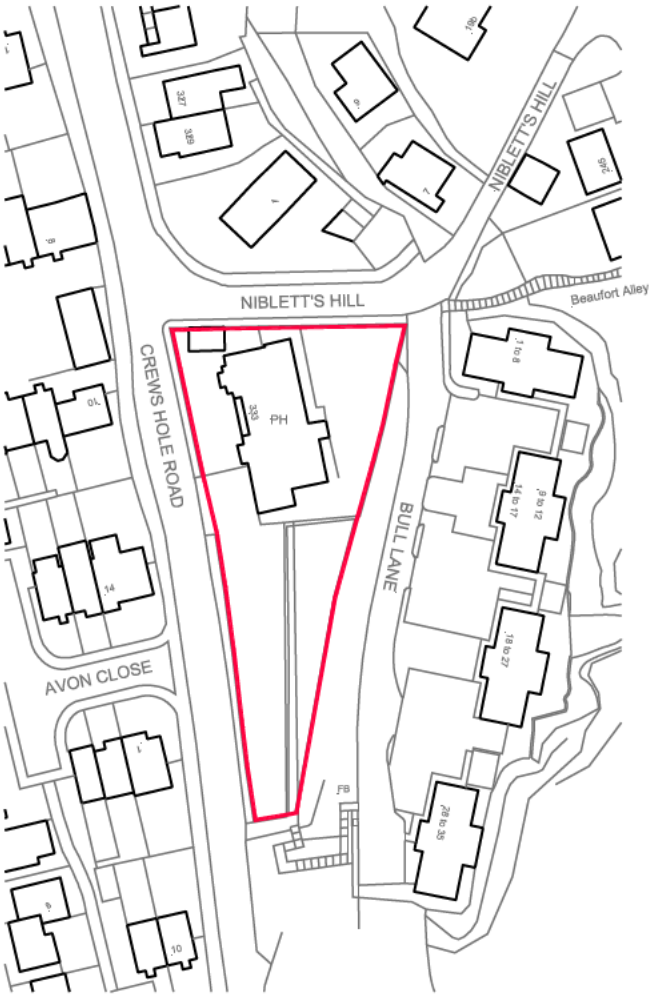
Key

Approximate position of the enquiry boundary shown

How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

1:1250 0m 25m 50m

1:1 0mm 10 20 30 40 50



on behalf of: CaldecotteGroup

site area: 0.178 hectares/0.439 acres

issued for: PLANNING

project:
Bull
Bristol
drawing:
Location Plan

project number: 7327

north:

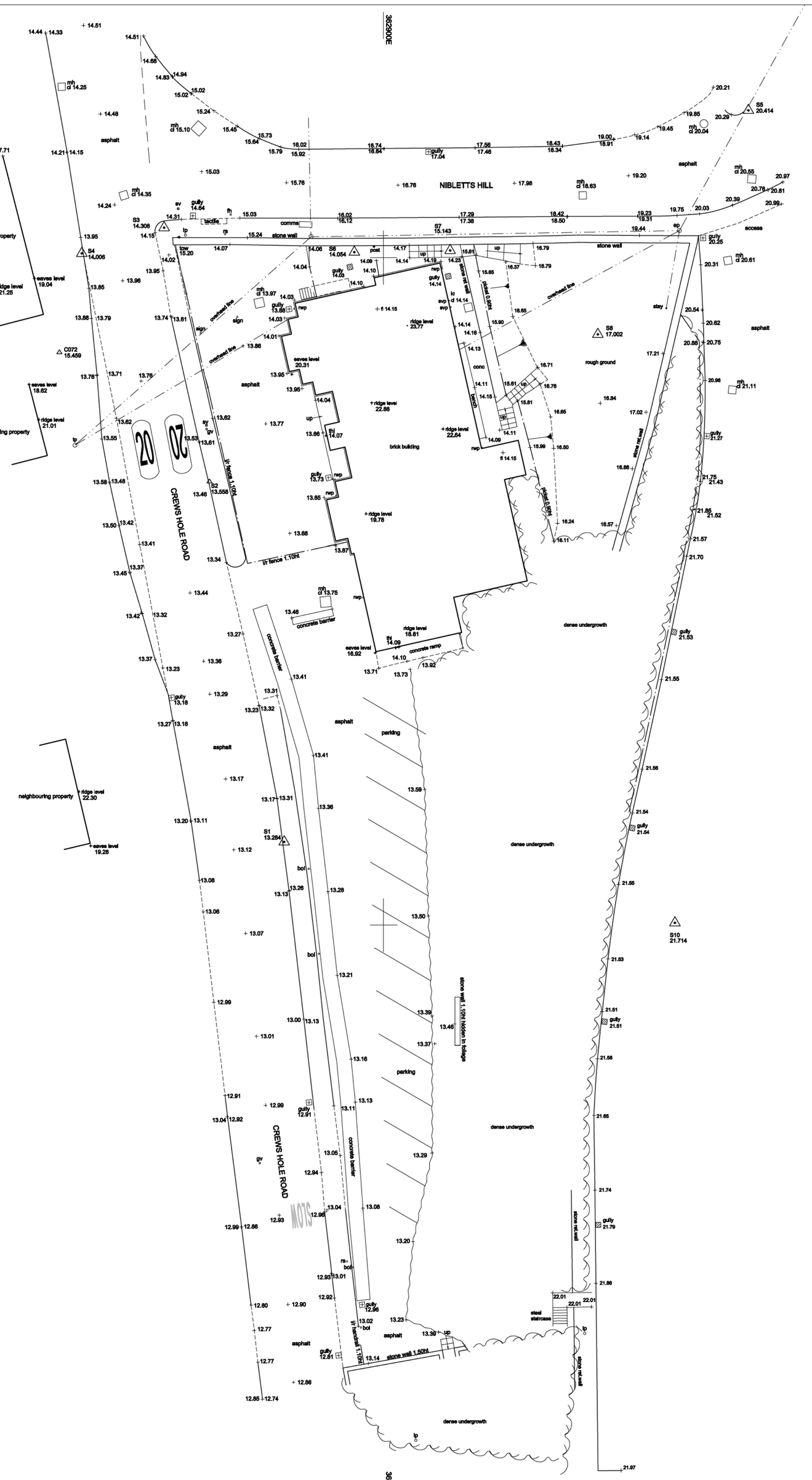
drawing number: 00

revision:

scale: 1:1250 | paper size: A4 | drawn by: SA | date: 05/02/24 | checked: | date: XX/XX/XX

sursham tompkins est 1961
architectural services & project management
cottage farm ■ sywell ■ northampton ■ NN6 0BJ
t: 01604 64 65 66 ■ f: 01604 64 63 62 ■ e: info@surshamtompkins.co.uk
w: www.surshamtompkins.co.uk

FILE LOCATION - c:\users\sharonallison.azuread\sursham tompkins\projects - documents\7327 cc, bull, bristol\02 drawings\07 surveys & os maps\00 location plan.dwg



ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
GRID COORDINATES ARE ORDNANCE SURVEY OSGB36 GRID DERIVED FROM GPS TRANSFORMATION. (NO SCALE FACTOR APPLIED)

PLOT SCALE ACCURACY OF 1:200.

TREE SPECIES TO BE CONFIRMED BY AN SPECIALIST IF ESSENTIAL TO THE SURVEY.

SERVICE COVERS UNDER SRUCTURES/VEHICLES OR ONES THAT ARE BURIED MAY BE OMITTED FROM THE SURVEY. PIPE DETAILS SURVEYED FROM SURFACE ONLY. BROKEN COVERS AND COVERS WITHIN BUSY HIGHWAYS WILL NOT BE LIFTED.

OVERHEAD CABLE POSITIONS/HEIGHTS SHOULD BE TREATED AS APPROXIMATE AND ARE LIABLE TO SEASONABLE CHANGE.

TEXT KEY >

av - air valve	p & r fence - post & rail fence
bt - telecom	re - rodding eye
catv - cable television	rs - road sign
c/b fence - closeboard fence	rwp - rain water pipe
c/box - control box	sl - spot light
cl - cover level	sv - stop valve
cr - cable riser	svp - soil vent pipe
dp - depth	tbm - temporary bench mark
ep - electric pole	thl - threshold level
er - earthing rod	tl - service light
fh - fire hydrant	toc - top of cap
fl - floor level	top - top of pipe
fs - fire switch	tot - top of tank
g - gully	tp - telecom pole
gv - gas valve	u/s - underside
ht - height	ut - unable to lift
ic - inspection cover	vp - vent pipe
il - invert level	w/c - water filled chamber
lp - lamp post	wm - water meter
mh - manhole	wo - wash out
mkr - marker	wp - waste pipe

STATION SCHEDULE

ID	EASTINGS	NORTHINGS	LEVEL	TYPE
S1	362892.550	172656.242	13.284	PK Nail
S2	362886.949	172683.229	13.558	PK Nail
S3	362883.551	172702.250	14.308	PK Nail
S4	362877.381	172700.326	14.006	PK Nail
S5	362927.344	172711.036	20.414	PK Nail

PROJECT			
THE BULL INN, BRISTOL, BS5 8BQ.			
DRAWING TITLE			
TOPOGRAPHICAL SURVEY			
CLIENT			
CALDECOTTE CONSULTANTS			
SURVEY DATE	SHEET SIZE	SURVEYOR	CHECKED
SEPT 2024	A1	GB	PDS
DRAWING NUMBER		SCALE	
1801-01		1:200	

CRYFIELD SURVEYS LTD
Email: admin@cryfieldsurveys.co.uk Tel: 01926 935144
6 Rural Innovation Centre, Stoneleigh Park, Kenilworth, CV8 2LG.

GEOTECHNICAL REPORT

Site Address:	The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ
Report Date:	8th October 2024
Project No.:	19180
Prepared for:	Caldecotte Group 15 London House, Swinfen's Yard, Stony Stratford, MK11 1SY

CONTENTS

APPENDICES

SUMMARY

ADDRESS: The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

SOILS PROFILE

Location	DEPTH	MADE GROUND	NATURAL GROUND
BH1	GL – 0.20m bgl	Tarmac	
	0.20m bgl – 0.60m bgl	Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete	
	0.60m bgl – 1.20m bgl	Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone	
	1.20m bgl – 1.90m bgl	Loose dark brown / black silty slightly claybound SAND with brick fragments	
	1.90m bgl – 3.00m bgl		Loose dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill
BH2	GL – 0.20m bgl	Tarmac	
	0.20m bgl – 0.50m bgl	Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete	
	0.50m bgl – 1.00m bgl	Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone	
	1.00m bgl – 1.90m bgl	Loose brown / black silty / sandy CLAY with tarmac fragments	
	1.90m bgl – 3.00m bgl		Soft orange very silty / sandy CLAY with dark reddy brown coarse laminated SANDSTONE
BH3	GL – 0.20m bgl	Loose black silty TOPSOIL with brick & concrete fragments	
	0.20m bgl – 0.50m bgl	Loose brick & concrete fragments	
	0.50m bgl – 1.20m bgl	Loose brown / grey / white silty claybound SAND & GRAVEL with concrete / brick / chalk / sandstone	
	1.20m bgl – 1.90m bgl	Loose brown / black silty / sandy CLAY with tarmac fragments	
	1.90m bgl – 3.00m bgl		Loose - medium dense dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill

BH4	GL – 0.20m bgl	Loose black silty TOPSOIL with brick & concrete fragments	
	0.20m bgl – 1.20m bgl		Medium dense orange very silty / sandy CLAY with dark reddy brown coarse laminated SANDSTONE
	1.20m bgl – 2.50m bgl		Medium dense dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill
SA1	GL – 0.40m bgl	Loose black silty TOPSOIL with brick & concrete fragments	
	0.40m bgl – 2.10m bgl		Loose - medium dense dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill

ROOT SYSTEM OVERVIEW

Location	Depth Recorded	Identification (If completed)
BH1	None Encountered	-
BH2	None Encountered	-
BH3	Roots encountered to 1.20m bgl	-
BH4	Roots encountered to 2.00m bgl	-
SA1	Roots encountered to 0.60m bgl	-

GROUNDWATER OVERVIEW

Location	Depth Water Struck	Depth of Standing Water	Rate of Inflow
BH1	DRY	-	-
BH2	DRY	-	-
BH3	DRY	-	-
BH4	DRY	-	-
SA1	DRY	-	-

SOIL ANALYSIS: Cohesive Soils

Strength:	Hand Penetrometer tests 42 - 72 kN/m²	
Casagrande Plasticity Classification:	Low	
Plasticity Index:	9 - 13%	
NHBC Shrinkability Classification:	Nil - Low	
Significant Desiccation:	BH2	No significant desiccation present
Sulphate Content:	DS-1/AC-1s	

SOIL ANALYSIS: Granular Soils

SPT N-Values :	0 – 50+
Fines Content:	SAND & GRAVEL geology < 35% fines

1. Introduction

1.1 All site investigation works have been undertaken in accordance with BS5930:2015+A1:2020, (Code of Practice for Ground Investigations).

1.2 In accordance with your instructions, we visited the above site on the 24th of September 2024.

1.3 The comments and opinions expressed are based purely on the soil and groundwater conditions identified within this report and the subsequent laboratory testing.

1.4 Some special condition may be present on site that, to date, has not been encountered within the scope of the site investigation works completed and therefore may not have been considered within the report. The findings of this report are based on the soil and groundwater sampling completed at the locations tested.

1.5 Unless otherwise stated, all groundwater recordings relate to short term observations and do not consider fluctuations in elevation due to seasonal, tidal, or other effects. It is possible that fluctuations in the groundwater elevation may have an impact on the proposed design and as such, it is recommended that long term monitoring is undertaken to obtain accurate information relevant to the proposed design in terms of the ground water elevation.

2. Description of Site

2.1 The site is formed by a two storey structure surrounded by hard landscaping.

2.2 The site is shown within the British Geological Survey Online Geology Viewer (Scale 1:50 000, Solid & Drift), which shows that the site situated with an area of Mangotsfield Member - Mudstone, siltstone and sandstone.

3. Fieldwork

3.1 In order to assess the site, the following site investigation works were implemented.

- 4 No Dynamic Competitor Rig boreholes were sunk to a maximum depth of 3.00m bgl.
- A single BRE365 soakaway test.
- Geotechnical Laboratory Testing.
- Chemical testing for 'muck away'.

3.2 The location of these works is indicated on the site plan-forming Appendix 1.

3.3 The various strata encountered were noted and are recorded on the excavation logs forming Appendix 2.

3.4 Full ranges of samples were recovered as noted and retained for subsequent laboratory testing.

4. Laboratory Testing

4.1 Laboratory testing has been undertaken in accordance with BS 1377-2:2022, (Methods for Tests for Soils for Civil Engineering Purposes), the results of which are enclosed.

4.2 Selected samples were recovered to determine their Atterberg Limits, Particle Size Distribution Testing, Hand Penetrometer Testing, Soluble Sulphate value and pH.

4.3 The results of this laboratory testing are enclosed and form Appendix 3.

5. Fieldwork Results

5.1 Based on the borehole logs which can be found forming Appendix 2 a reviewed of the geology within the site is as follows: -

Table 1 Geological Profile

Location	DEPTH	MADE GROUND	NATURAL GROUND
BH1	GL – 0.20m bgl	Tarmac	
	0.20m bgl – 0.60m bgl	Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete	
	0.60m bgl – 1.20m bgl	Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone	
	1.20m bgl – 1.90m bgl	Loose dark brown / black silty slightly claybound SAND with brick fragments	
	1.90m bgl – 3.00m bgl		Loose dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill
BH2	GL – 0.20m bgl	Tarmac	
	0.20m bgl – 0.50m bgl	Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete	
	0.50m bgl – 1.00m bgl	Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone	

	1.00m bgl – 1.90m bgl	Loose brown / black silty / sandy CLAY with tarmac fragments	
	1.90m bgl – 3.00m bgl		Soft orange very silty / sandy CLAY with dark reddy brown coarse laminated SANDSTONE
BH3	GL – 0.20m bgl	Loose black silty TOPSOIL with brick & concrete fragments	
	0.20m bgl – 0.50m bgl	Loose brick & concrete fragments	
	0.50m bgl – 1.20m bgl	Loose brown / grey / white silty claybound SAND & GRAVEL with concrete / brick / chalk / sandstone	
	1.20m bgl – 1.90m bgl	Loose brown / black silty / sandy CLAY with tarmac fragments	
	1.90m bgl – 3.00m bgl		Loose - medium dense dark reddy brown coarse laminated SANDSTONE within a course slightly claybound SAND infill

Table 2 Groundwater Overview

Location	Depth Water Struck	Depth of Standing Water	Rate of Inflow
BH1	DRY	-	-
BH2	DRY	-	-
BH3	DRY	-	-
BH4	DRY	-	-
SA1	DRY	-	-

5.2 Groundwater records, unless otherwise stated, are based on short-term observations, and do not allow for or consider seasonal or other fluctuations, global warming, or periods of excessive wet or dry weather. All groundwater records are noted at the time of the drilling works and any other subsequent groundwater readings taken which, if present, are shown. Should the development be reliant on groundwater impacting on either below ground excavations, basements or short- or long-term excavations, HESI would recommend the installation of standpipes to depths relevant to any proposed excavation works and a period of either short- or long-term monitoring. This can be completed on request.

5.3 Roots were encountered within the boreholes based on examination of the soil samples across the site as shown below and recorded within the attached sample logs in Appendix 2.

Table 3 Root Depths

Location	Depth Recorded	Identification (If completed)
BH1	None Encountered	-
BH2	None Encountered	-
BH3	Roots encountered to 1.20m bgl	-
BH4	Roots encountered to 2.00m bgl	-
SA1	Roots encountered to 0.60m bgl	-

6. Results

6.1 By inspection of the borehole logs and from a visual assessment of the samples recovered, a scheme of laboratory testing has been undertaken. The results are enclosed within Appendix 3 and prove the following:

6.2 Hand Penetrometer tests have been undertaken disturbed samples recovered from the site works. From the information gathered, it is recorded that allowable bearing capacity values of between 42 - 72 kN/m² were achieved.

6.3 SPT N-Values have been completed within the boreholes undertaken upon the site, as shown within the borehole logs forming Appendix 2 of this report. The SPT N-Values recorded were between 0 - 50+. This would indicate an approximate allowable bearing capacity of between 0 kN/m² to 150+ kN/m² would be recognized. If groundwater is present within close proximity to the proposed founding depths, any allowable bearing capacity identified as a result of calculations undertaken as a result of the site investigation should be halved.

6.4 Atterberg Limits tests proved the clay soils to be of Low plasticity, (PI= 9 - 13 %), which indicates a Nil - Low susceptibility to movement associated with moisture content change.

6.5 A measurement of the potential desiccation has been completed using Driscoll's Method of Desiccation Analysis which uses a comparison of moisture content profiles measures against the liquid limit measured in the Atterberg Limits test. This assumes as to the state of the soil moisture content against the state of the soil in its liquid state to assess desiccation. Driscoll makes a comparison that the soils would likely be in a state of slight desiccation if the moisture content of the soil was less than 0.5 multiplied by the liquid limit state of the soil, (slight desiccation being a level of desiccation at which overburden pressure may influence), and significant desiccation if the moisture content of the soil was less than 0.4 multiplied by the liquid limit, (significant desiccation being a level which would be un-natural to reduce to and therefore influenced by surrounding trees or vegetation). This is a mathematical representation of the state of the clay and does not consider overburden pressure which may form a factor in this calculation.

6.6 Utilizing this method of assessment, it can be seen that no obvious signs of desiccation have been recorded within the site. This does not suggest that the existing tree presence has not impacted the underlying clay soils across the site at some locations where the proposed development is to take place, just that where we have drilled boreholes and tested has not revealed any obvious signs of desiccation.

6.7 Included within the laboratory testing was sulphate analysis, which can determine the use of sulphate resisting cement within the foundation design for the development. The results are enclosed and prove the classification in accordance with ACEC to be DS- 1 /AC-1S.

6.8 Particle Size Distribution Testing has been completed on the made ground at the site in order to assess the granular content of the soils. Based on the information gained, we can confirm that the soils tested contained less than 35% fines and as such, can be considered non shrinkable when subjected to moisture content change.

6.9 In order to assess the permeability rates for the subsoil, a BRE365 Soakaway test was undertaken. From this, calculations of the permeability rates were recorded which can confirm that the permeability rate of the subsoil is recorded as between 1.3×10^{-5} m/sec & 2.4×10^{-5} m/sec.

6.10 In addition to the above, a sample was sent for chemical analysis with the results of this testing being found within the attached appendices and should be passed on to the intended recipient of the material so they can make their own assessment of the material.

7. Conclusion

7.1 In conclusion we would recommend that a deep borehole be undertaken in order to detail the underlying geology at depth so short-bored piles can be designed. This is due to the existing depth of the MADE GROUND and underlying poor strength.

7.2 A suspended floor should be incorporated within the proposed design for the structures.

7.3 All foundations should be designed by a suitably qualified structural engineer in terms of the proposed project and all aspects of the ground, groundwater, loadings of the proposed structure etc. Should any elements of this report be unclear, consultation with ourselves should be sought to clarify any elements prior to a final design being made. The final decision in terms of foundation options should be made by a structural engineer with full working knowledge of the site and site conditions.

I hope the foregoing is sufficient for your requirements, although please do not hesitate to contact us should require any further information regarding the above.

D A Hudd
Senior Contract Engineer

Managing Director

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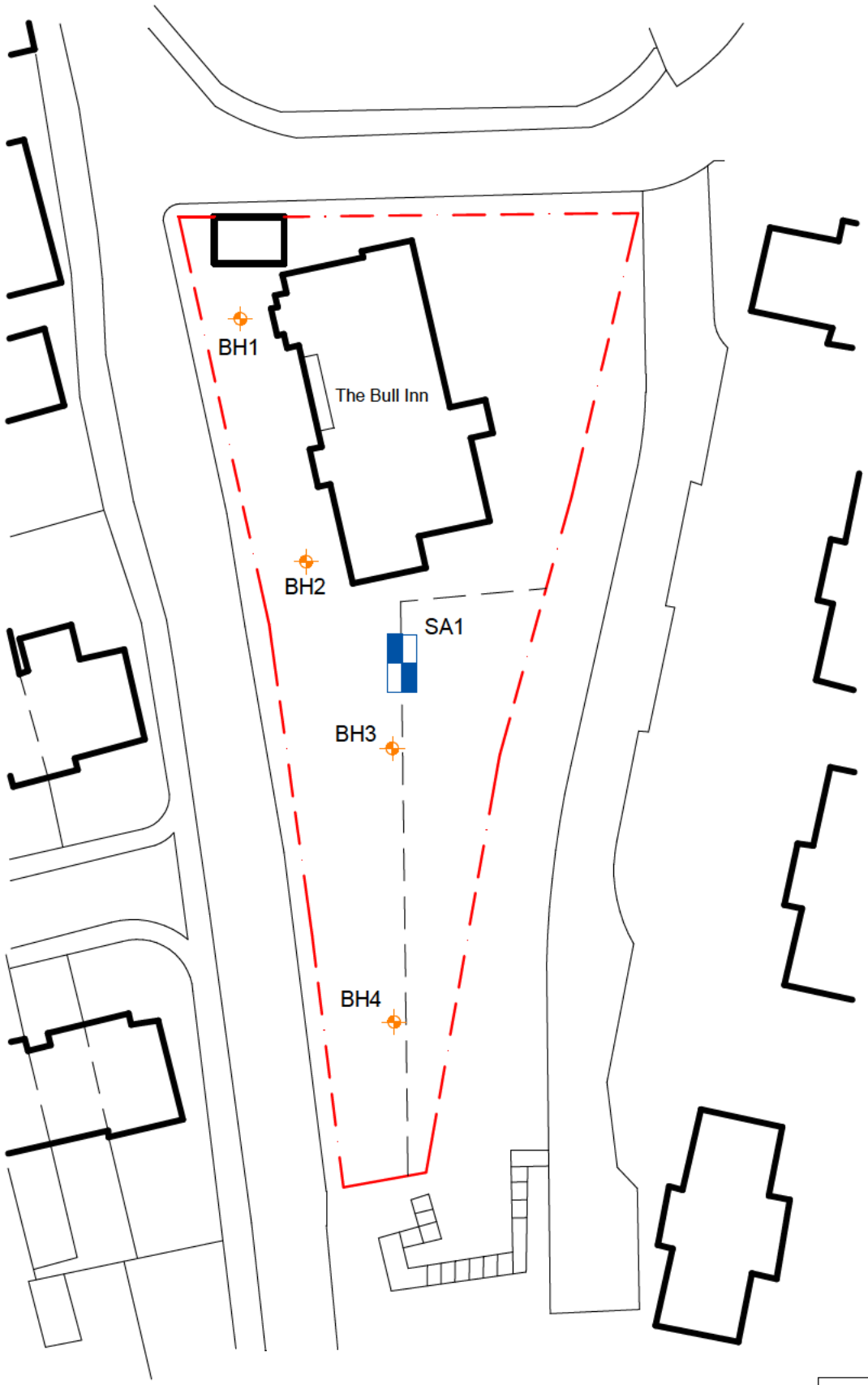
Appendix No	1
Sheet No	1
Job No	19180
Date	Oct 2024

The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Site Plan



Not to Scale

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Appendix No 2
Sheet No 1
Job No 19180
Date Oct 2024

The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Borehole One

Description of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples No	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
Tarmac		0.20	0.20		1	U	G.L. - 1.00				
Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete - MADE GROUND		0.60	0.40								
Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone - MADE GROUND		1.20	0.60		2	U	1.00 - 2.00	N=2			1.00
Loose dark brown / black silty slightly claybound SAND with brick fragments - MADE GROUND		1.90	0.70								
Loose dark reddy brown coarse laminated SANDSTONE within a coarse slightly claybound SAND infill		3.00			3	U	2.00 - 3.00	N=4			
Borehole Completed at 3.00m bgl No Roots Encountered					3	N	3.00	N=7			

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Vane Test, (kN.m²)

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Appendix No 2
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Date Oct 2024

The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Borehole Two

Description of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples No	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
Tarmac		0.20	0.20		1	U	G.L. - 1.00				
Compact black / grey silty claybound GRAVEL with tarmac / brick & concrete - MADE GROUND		0.50	0.30								
Loose mottled red / grey silty / sandy CLAY with brick / concrete / sandstone - MADE GROUND		1.00	0.50		2	U	1.00 - 2.00	N=0			1.00
Loose brown / black silty / sandy CLAY with tarmac fragments - MADE GROUND		1.90	0.90		3	U	2.00 - 3.00	N=5			
Soft orange very silty / sandy CLAY with dark reddy brown coarse laminated SANDSTONE		3.00			3	N	3.00	N=9			
Borehole Completed at 3.00m bgl No Roots Encountered											

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | ▼ - Water Struck | D - Disturbed Sample | ▽ - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Vane Test, (kN.m²)

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The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Borehole Three

Description of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples No	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
Loose black silty TOPSOIL with brick & concrete fragments - MADE GROUND		0.20	0.20		1	U	G.L. - 1.00				
Loose brick & concrete fragments - MADE GROUND		0.50	0.30								
Loose brown / grey / white silty claybound SAND & GRAVEL with concrete / brick / chalk / sandstone - MADE GROUND		1.20	0.70		2	U	1.00 - 2.00	N=4			1.00
Loose brown / black silty / sandy CLAY with tarmac fragments - MADE GROUND		1.90	0.70								
Loose - medium dense dark reddy brown coarse laminated SANDSTONE within a coarse slightly claybound SAND infill		3.00			3	U	2.00 - 3.00	N=7			
Borehole Completed at 3.00m bgl Roots Encountered to 1.20m bgl					3	N	3.00	N=50+			

1.0
2.0
3.0
4.0
5.0

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Vane Test, (kN.m²)

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The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Borehole Four

Description of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples No	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
Loose black silty TOPSOIL with brick & concrete fragments - MADE GROUND		0.20	0.20		1	U	G.L. - 1.00				
Medium dense orange very silty / sandy CLAY with dark reddy brown coarse laminated SANDSTONE		1.20	1.00		2	U	1.00 - 2.00	N=13			1.00
Medium dense dark reddy brown coarse laminated SANDSTONE within a coarse slightly claybound SAND infill		2.50			3	U	2.00 - 3.00	N=18			
					3	N	3.00	N=50+			
Borehole Refused at 2.50m bgl Roots Encountered to 2.00m bgl											

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Vane Test, (kN.m²)

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The Bull Inn, 333 Crew's Hole Road, Bristol, BS5 8BQ

Soakaway One

Description of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples No	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
Loose black silty TOPSOIL with brick & concrete fragments - MADE GROUND		0.40	0.40								
Loose - medium dense dark reddy brown coarse laminated SANDSTONE within a coarse slightly claybound SAND infill		2.10									
Borehole Completed at 2.10m bgl Roots encountered to 0.60m bgl											

1.0
2.0
3.0
4.0
5.0

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Vane Test, (kN.m²)

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APPENDIX	3
SHEET	1
JOB NUMBER	19181
DATE	Oct-24

LOCATION The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ

ATTERBERG LIMITS TEST DATA

Excavation Location Number	Depth (m)	Sample	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Group Symbol	Ammended Plasticity Index (%)	Desiccation Profile	Percentage Retained on 425 Micron Sieve (%)
BH1	1.00	U2								
BH1	1.50	U2								
BH1	2.00	U3								
BH1	2.50	U3								
BH1	3.00	U3								
BH2	1.00	U2								
BH2	1.50	U2								
BH2	2.00	U3	23	29	15	14	CL	13	No	4
BH2	2.50	U3	23							
BH2	3.00	U3	19	24	14	10	ML/CL	9	No	7
BH3	1.00	U2								
BH3	1.50	U2								
BH3	2.00	U3								
BH3	2.50	U3								
BH3	3.00	U3								
BH4	1.00	U2								
BH4	1.50	U2								
BH4	2.00	U3								
BH4	2.50	U3								

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APPENDIX	3
SHEET	2
JOB NUMBER	19181
DATE	Oct-24

LOCATION The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ

HAND PENETROMETER STRENGTH TEST RESULTS

Excavation Location Number	Depth (m)	Sample	Natural Moisture Content (%)	Hand Penotrometer (Undrained)	Estimated Allowable Bearing Capacity (kN/m²)	Notes
BH1	1.00	U2				
BH1	1.50	U2				
BH1	2.00	U3				
BH1	2.50	U3				
BH1	3.00	U3				
BH2	1.00	U2				
BH2	1.50	U2				
BH2	2.00	U3	23	30	60	
BH2	2.50	U3	23	21	42	
BH2	3.00	U3	19	36	72	
BH3	1.00	U2				
BH3	1.50	U2				
BH3	2.00	U3				
BH3	2.50	U3				
BH3	3.00	U3				
BH4	1.00	U2				
BH4	1.50	U2				
BH4	2.00	U3				
BH4	2.50	U3				

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APPENDIX	3
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LOCATION The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ

SULPHATE ANALYSIS

Excavation Location Number	Depth (m)	Sample	Concentrations of Soluble Sulphate			Classification	pH
			Soil		Groundwater		
			Total SO4 (%)	SO4 in 2:1 Water:soil (g/l)			
BH1	1.00	U2		0.06		DS-1 / AC-1s	7.42
BH3	1.50	U2		0.04		DS-1 / AC-1s	7.36

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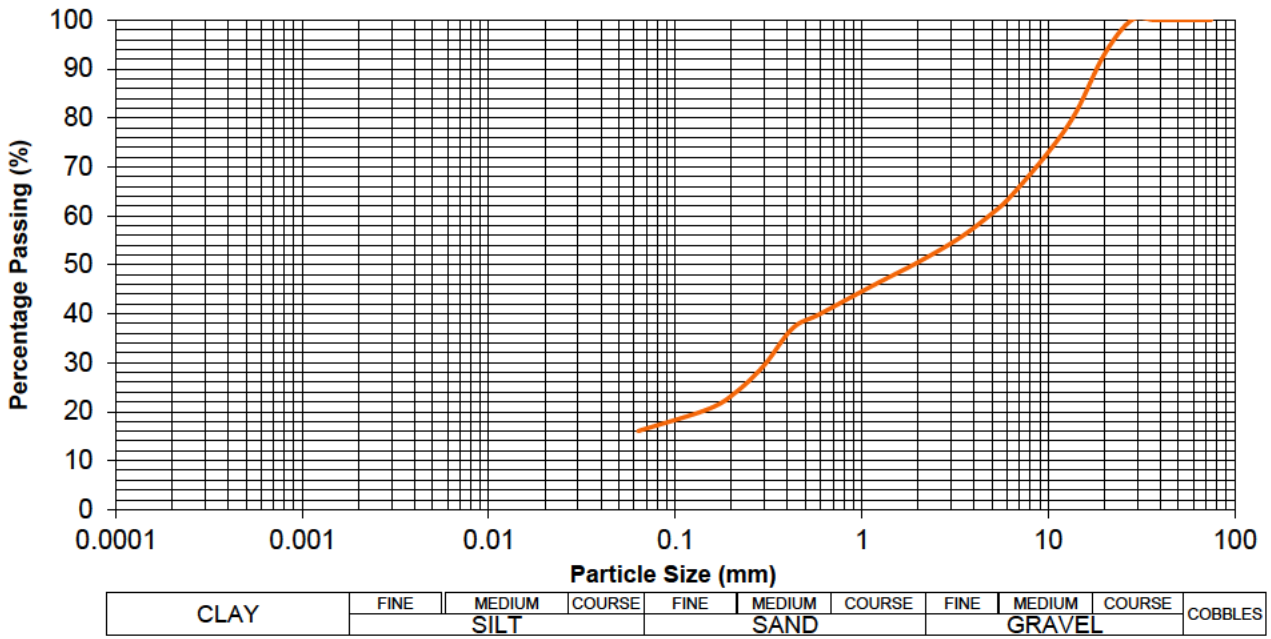
LOCATION **The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ**

Location : **BH1** Depth : **2.00 m** Sample No: **U3** Initial Mass: 200 g

Sieve Size (mm)	Weight Retained (g)	Percent Retained (%)	Total Passing (%)
75		0	100
63		0	100
50		0	100
37.50		0	100
28.00		0	100
20.00	14	7	93
14.00	24	12	81
10.00	16	8	73
6.30	18	9	64
5.00	7	4	61
3.35	10	5	56
2.00	10	5	51
1.180	9	5	46
0.600	12	6	40
0.425	6	3	37
0.300	15	8	30
0.212	11	6	24
0.150	7	4	21
0.063	9	5	16

PARTICLE SIZE DISTRIBUTION



Fines (%) = **16** Sands (%) = **35** Gravels (%) = **50** Cobbles (%) = **0**

British Standard Sieve Test 5930:2015 as Per Test 7a

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Appendix No.	3
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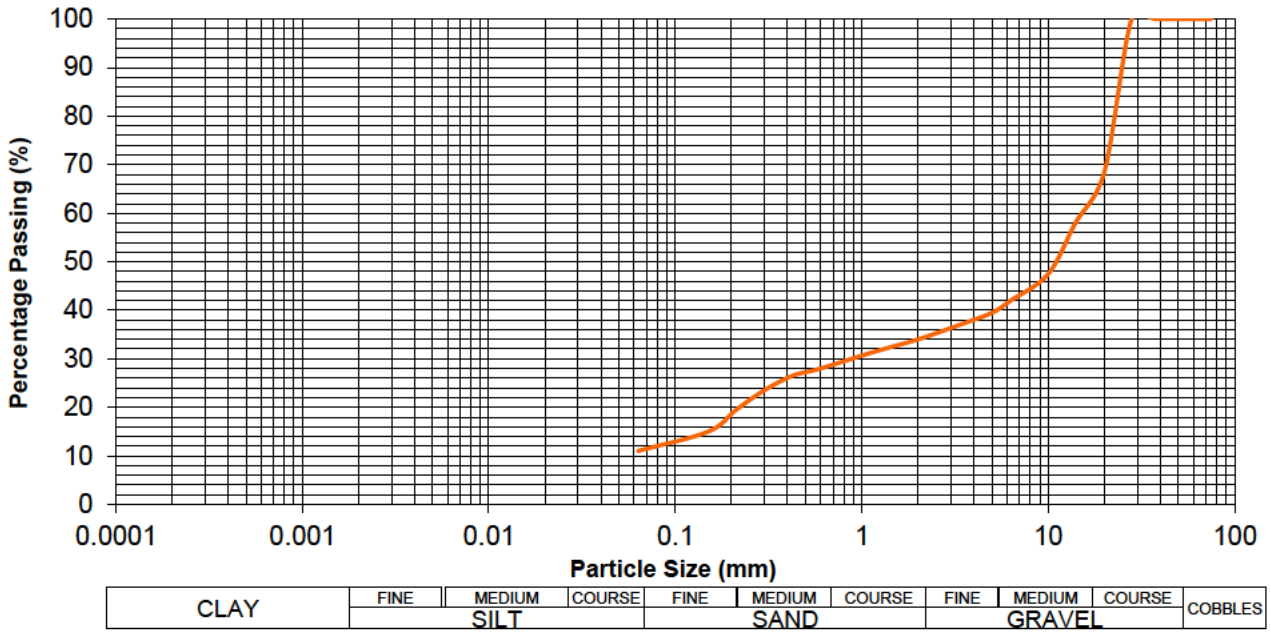
LOCATION **The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ**

Location : **BH1** Depth : **3.00 m** Sample No: **U3** Initial Mass: 200 g

Sieve Size (mm)	Weight Retained (g)	Percent Retained (%)	Total Passing (%)
75		0	100
63		0	100
50		0	100
37.50		0	100
28.00		0	100
20.00	63	32	69
14.00	21	11	58
10.00	21	11	48
6.30	11	6	42
5.00	5	3	40
3.35	5	3	37
2.00	6	3	34
1.180	5	3	32
0.600	7	4	28
0.425	3	2	27
0.300	6	3	24
0.212	8	4	20
0.150	9	5	15
0.063	8	4	11

PARTICLE SIZE DISTRIBUTION



Fines (%) = **11** Sands (%) = **23** Gravels (%) = **66** Cobbles (%) = **0**

British Standard Sieve Test 5930:2015 as Per Test 7a

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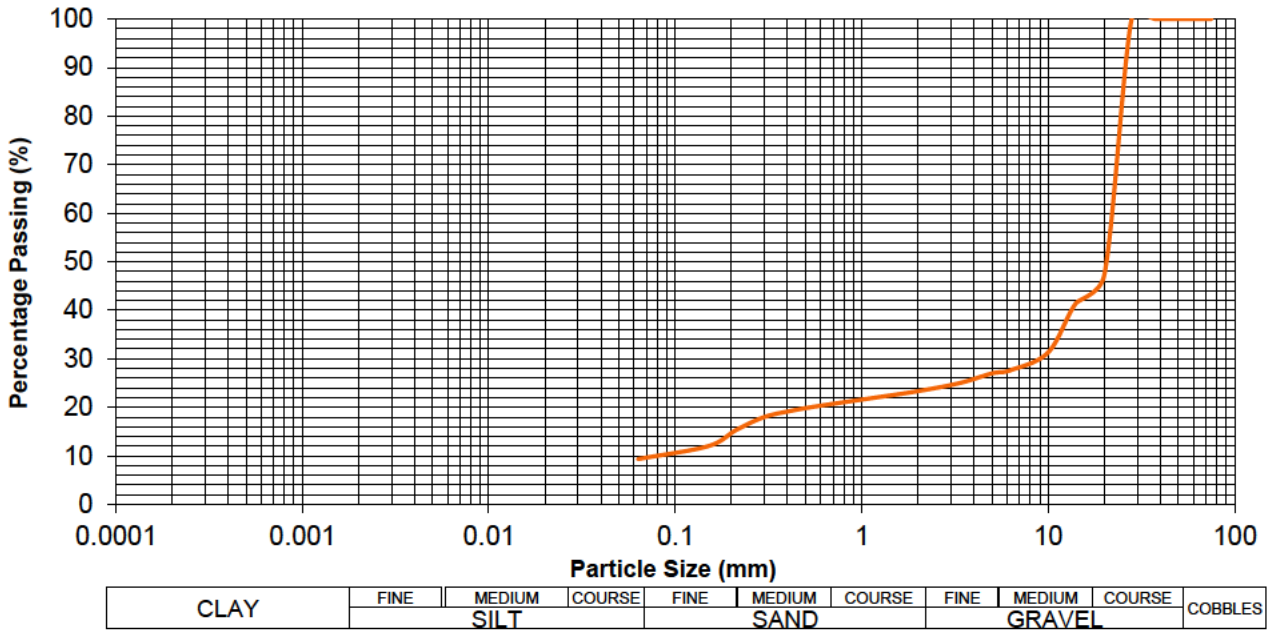
Appendix No.	3
Sheet No.	6
Job No.	19181
Date	Oct-24

LOCATION **The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ**

Location : **BH3** Depth : **2.50 m** Sample No: **U3** Initial Mass: 300 g

Sieve Size (mm)	Weight Retained (g)	Percent Retained (%)	Total Passing (%)
75		0	100
63		0	100
50		0	100
37.50		0	100
28.00		0	100
20.00	158	53	47
14.00	18	6	41
10.00	30	10	31
6.30	11	4	28
5.00	2	1	27
3.35	6	2	25
2.00	5	2	23
1.180	4	1	22
0.600	5	2	20
0.425	3	1	19
0.300	4	1	18
0.212	8	3	15
0.150	10	3	12
0.063	8	3	9

PARTICLE SIZE DISTRIBUTION



Fines (%) = **9** Sands (%) = **14** Gravels (%) = **77** Cobbles (%) = **0**

British Standard Sieve Test 5930:2015 as Per Test 7a

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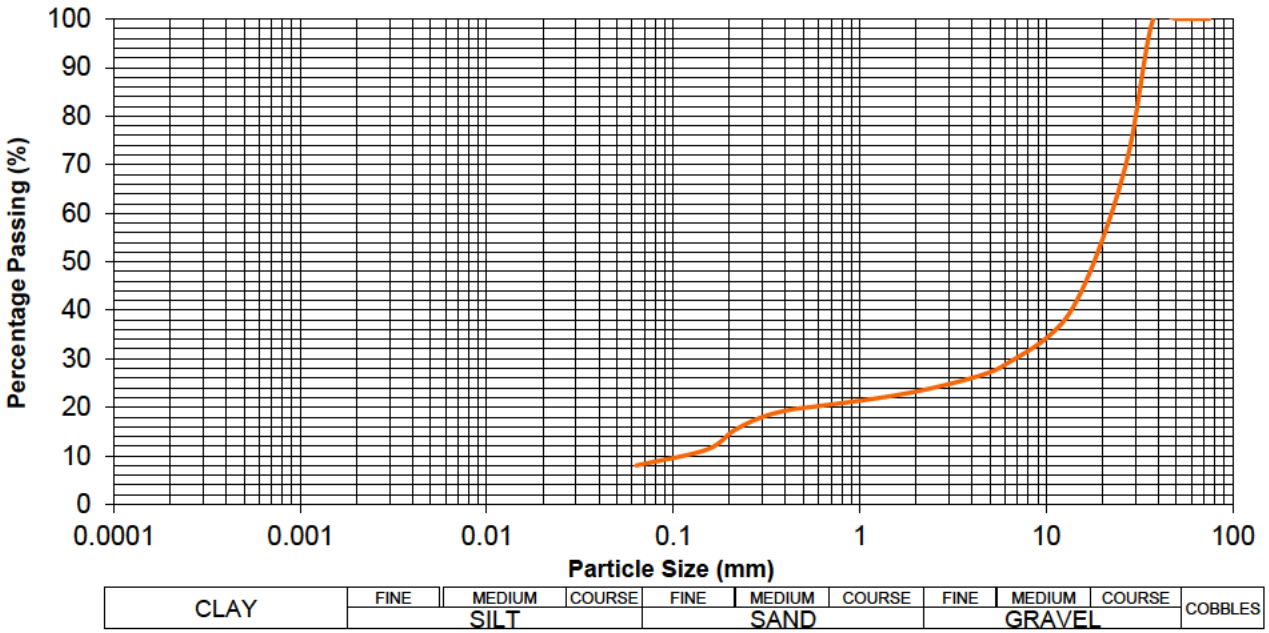
Appendix No.	3
Sheet No.	7
Job No.	19181
Date	Oct-24

LOCATION **The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ**

Location : **BH4** Depth : **1.00 m** Sample No: **U2** Initial Mass: 400 g

Sieve Size (mm)	Weight Retained (g)	Percent Retained (%)	Total Passing (%)
75		0	100
63		0	100
50		0	100
37.50		0	100
28.00	107	27	73
20.00	75	19	55
14.00	55	14	41
10.00	26	7	34
6.30	20	5	29
5.00	8	2	27
3.35	8	2	25
2.00	8	2	23
1.180	6	2	22
0.600	6	2	20
0.425	3	1	20
0.300	6	2	18
0.212	11	3	15
0.150	16	4	11
0.063	13	3	8

PARTICLE SIZE DISTRIBUTION



Fines (%) = **8** Sands (%) = **15** Gravels (%) = **77** Cobbles (%) = **0**

British Standard Sieve Test 5930:2015 as Per Test 7a

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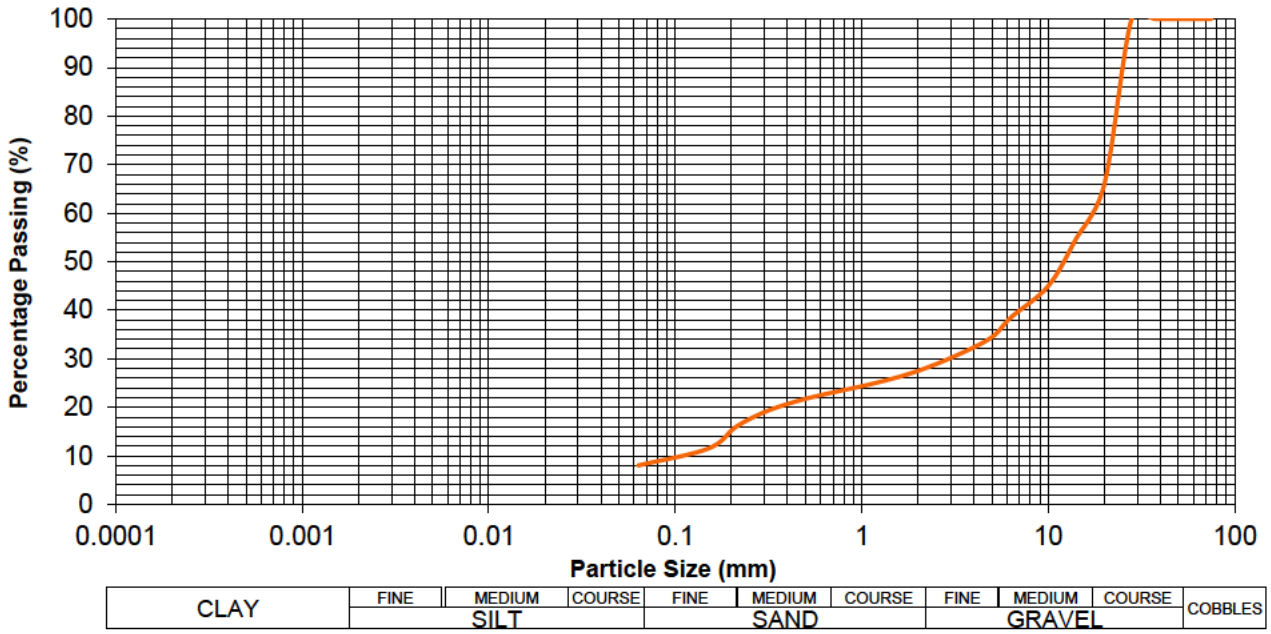
Appendix No.	3
Sheet No.	8
Job No.	19181
Date	Oct-24

LOCATION **The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ**

Location : **BH4** Depth : **2.00 m** Sample No: **U3** Initial Mass: 200 g

Sieve Size (mm)	Weight Retained (g)	Percent Retained (%)	Total Passing (%)
75		0	100
63		0	100
50		0	100
37.50		0	100
28.00		0	100
20.00	68	34	66
14.00	23	12	55
10.00	19	10	45
6.30	13	7	39
5.00	8	4	35
3.35	7	4	31
2.00	7	4	28
1.180	5	3	25
0.600	5	3	23
0.425	3	2	21
0.300	4	2	19
0.212	6	3	16
0.150	9	5	12
0.063	7	4	8

PARTICLE SIZE DISTRIBUTION



Fines (%) = **8** Sands (%) = **20** Gravels (%) = **73** Cobbles (%) = **0**

British Standard Sieve Test 5930:2015 as Per Test 7a

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Appendix No. : 4
Sheet No. : 1
Job No. : 19180
Date : Oct-24

Soakaway No.: SA1 **Site Address:** The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ **Fill No.:** One

B.R.E 365 - Soil Infiltration Rate

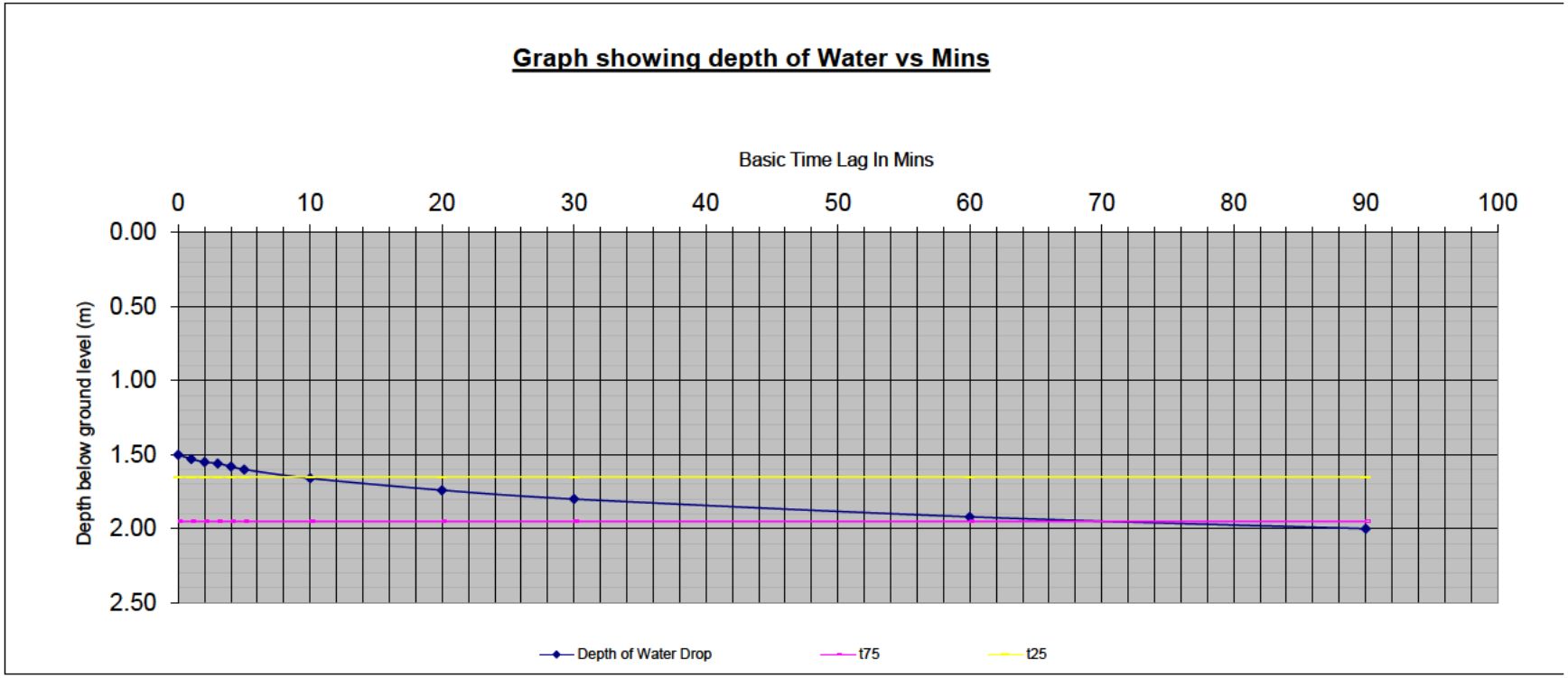
Depth of Test Hole		2.10 m
Dimensions of Test Hole	Width	0.60 m
	Length	1.60 m
Depth to Top of Water at Start of Test		1.50 m
Depth to discharge Drain		1.00 m

75%	0.15
25%	0.45
V75%-25%	0.29
ap50	3.38
tp75-25	61

Soil Infiltration Rate is ***2.3E-05 m/s***

Start Time (Mins)	Depth of Water Drop (m)	Depth of Water (m)
0	0.000	0.600
1	0.030	0.570
2	0.050	0.550
3	0.060	0.540
4	0.080	0.520
5	0.100	0.500
10	0.160	0.440
20	0.240	0.360
30	0.300	0.300
60	0.420	0.180
90	0.500	0.100

Value to Note time at (m)	Time Equals (Mins)		
1.95	70	=	t75
1.65	9	=	t25



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Appendix No. : 4
Sheet No. : 2
Job No. : 19180
Date : Oct-24

Soakaway No.: SA1 **Site Address:** The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ **Fill No.:** Two

B.R.E 365 - Soil Infiltration Rate

Depth of Test Hole		2.10 m
Dimensions of Test Hole	Width	0.60 m
	Length	1.60 m
Depth to Top of Water at Start of Test		1.50 m
Depth to discharge Drain		1.00 m

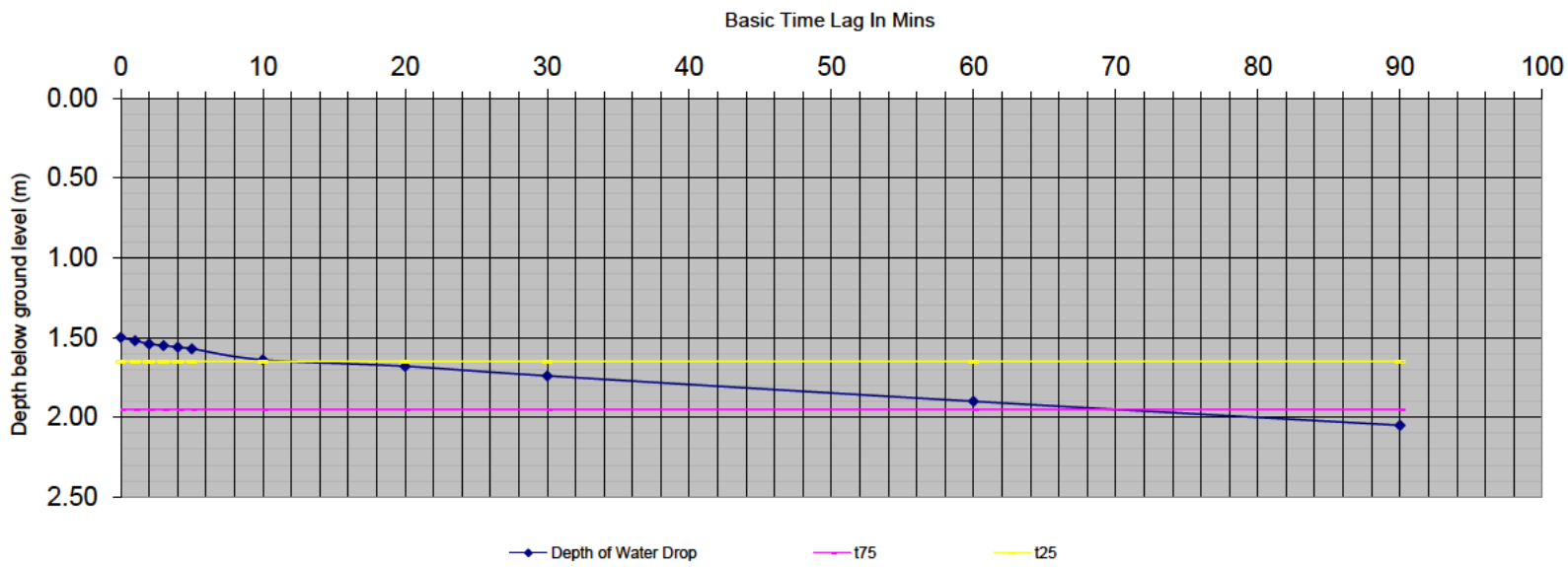
75%	0.15
25%	0.45
V75%-25%	0.29
ap50	3.38
tp75-25	59

Soil Infiltration Rate is ***2.4E-05 m/s***

Start Time (Mins)	Depth of Water Drop (m)	Depth of Water (m)
0	0.000	0.600
1	0.020	0.580
2	0.040	0.560
3	0.050	0.550
4	0.060	0.540
5	0.070	0.530
10	0.140	0.460
20	0.180	0.420
30	0.240	0.360
60	0.400	0.200
90	0.550	0.050

Value to Note time at (m)	Time Equals (Mins)		
1.95	70	=	t75
1.65	11	=	t25

Graph showing depth of Water vs Mins



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Appendix No. : 4
Sheet No. : 3
Job No. : 19180
Date : Oct-24

Soakaway No.: SA1 **Site Address:** The Bull Inn, 333 Crew's Hole Road, Bristol. BS5 8BQ **Fill No.:** Three

B.R.E 365 - Soil Infiltration Rate

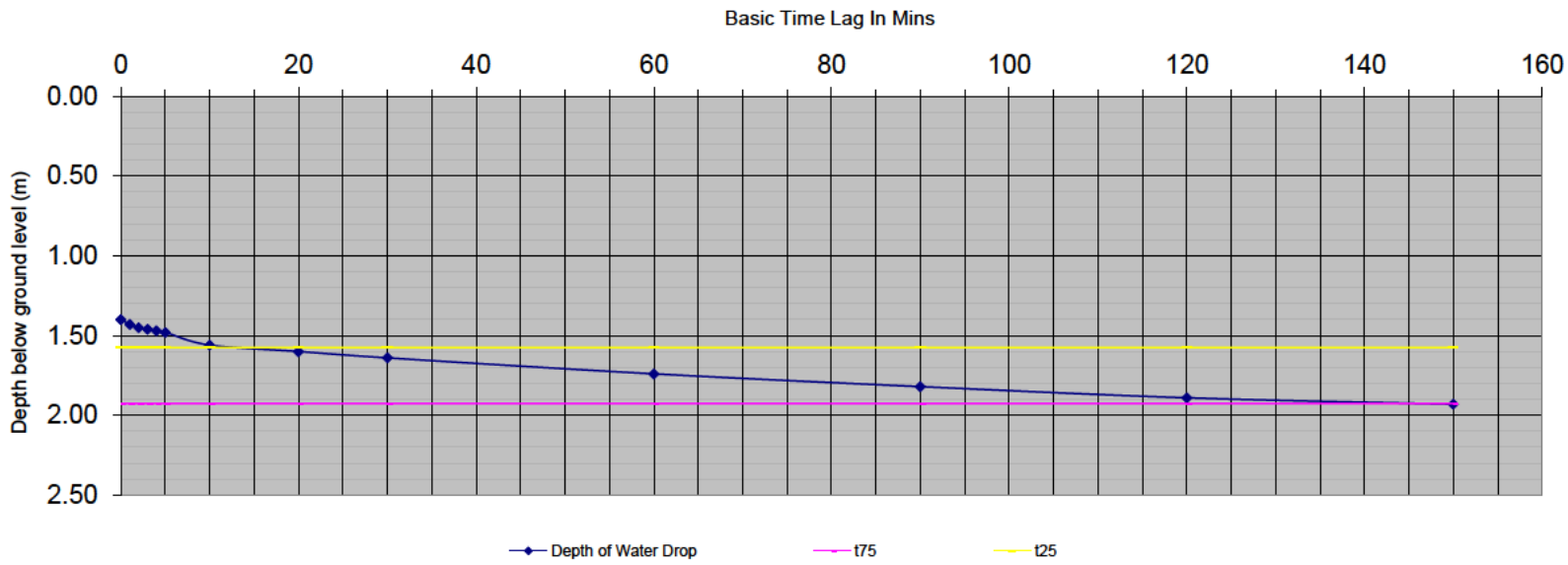
Depth of Test Hole		2.10 m
Dimensions of Test Hole	Width	0.60 m
	Length	1.60 m
Depth to Top of Water at Start of Test		1.40 m
Depth to discharge Drain		1.00 m

75%	0.18
25%	0.53
V75%-25%	0.34
ap50	3.38
tp75-25	132

Soil Infiltration Rate is *1.3E-05 m/s*

Start Time (Mins)	Depth of Water Drop (m)	Depth of Water (m)	Value to Note time at (m)	Time Equals (Mins)		
0	0.000	0.700	1.93	145	=	t75
1	0.030	0.670	1.58	13	=	t25
2	0.050	0.650				
3	0.060	0.640				
4	0.070	0.630				
5	0.080	0.620				
10	0.160	0.540				
20	0.200	0.500				
30	0.240	0.460				
60	0.340	0.360				
90	0.420	0.280				
120	0.490	0.210				
150	0.530	0.170				

Graph showing depth of Water vs Mins



eurofins | Chemtest
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Tel: 01638 606070
Email: info@chemtest.com

Interim Report

Report No.:	24-31427-0
Initial Date of Issue:	
Re-Issue Details:	
Client	Herts & Essex Site Investigations
Client Address:	Unit J8 Peek Business Park Woodside Bishops Stortford Hertfordshire CM23 5RG
Contact(s):	Chris Gray Dafydd Hudd Rebecca Chamberlain
Project	19180 The Bull Inn

Quotation No.:		**Date Received:**	30-Sep-2024
Order No.:		**Date Instructed:**	30-Sep-2024
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	04-Oct-2024
Date Approved:			
Approved By:			

Details:
For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Please note that the interim data available has passed our Quality Control Criteria but has not been verified by an approved signatory and may be subject to amendment on approval. Chemtest cannot therefore be held responsible for decisions made on interim data sets but only for the data submitted on a final report containing an approval date and signature.

Results - Soil

Project: 19180 The Bull Inn

Client: Herts & Essex Site Investigations			**Chemtest Job No.:**			24-31427
Quotation No.:			**Chemtest Sample ID.:**			1873532
			Sample Location:			SA1
			Sample Type:			SOIL
			Top Depth (m):			0.20
			Date Sampled:			24-Sep-2024
			Asbestos Lab:			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type		U	2192		N/A	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected
Moisture		N	2030	%	0.020	14
Soil Colour		N	2040		N/A	Black
Other Material		N	2040		N/A	Stones
Soil Texture		N	2040		N/A	Loam
pH at 20C		M	2010		4.0	8.3
Arsenic		M	2455	mg/kg	0.5	25
Barium		M	2455	mg/kg	0.5	180
Cadmium		M	2455	mg/kg	0.10	0.34
Chromium		M	2455	mg/kg	0.5	22
Molybdenum		M	2455	mg/kg	0.5	1.7
Antimony		N	2455	mg/kg	2.0	< 2.0
Copper		M	2455	mg/kg	0.50	89
Mercury		M	2455	mg/kg	0.05	To Follow
Nickel		M	2455	mg/kg	0.50	28
Lead		M	2455	mg/kg	0.50	95
Selenium		M	2455	mg/kg	0.25	1.7
Zinc		M	2455	mg/kg	0.50	130
Chromium (Trivalent)		N	2490	mg/kg	1.0	22
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	< 3.0
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	< 5.0
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05

Results - Soil

Project: 19180 The Bull Inn

Client: Herts & Essex Site Investigations				**Chemtest Job No.:**		24-31427
Quotation No.:				**Chemtest Sample ID.:**		1873532
				Sample Location:		SA1
				Sample Type:		SOIL
				Top Depth (m):		0.20
				Date Sampled:		24-Sep-2024
				Asbestos Lab:		DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	3.2
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	< 1.0
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	< 5.0
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	< 10
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	< 10
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	< 10
Benzene		M	2760	µg/kg	1.0	< 1.0
Toluene		M	2760	µg/kg	1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0	< 1.0
Naphthalene		M	2800	mg/kg	0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	0.20
Anthracene		M	2800	mg/kg	0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	0.29
Pyrene		M	2800	mg/kg	0.10	0.28
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	< 2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com