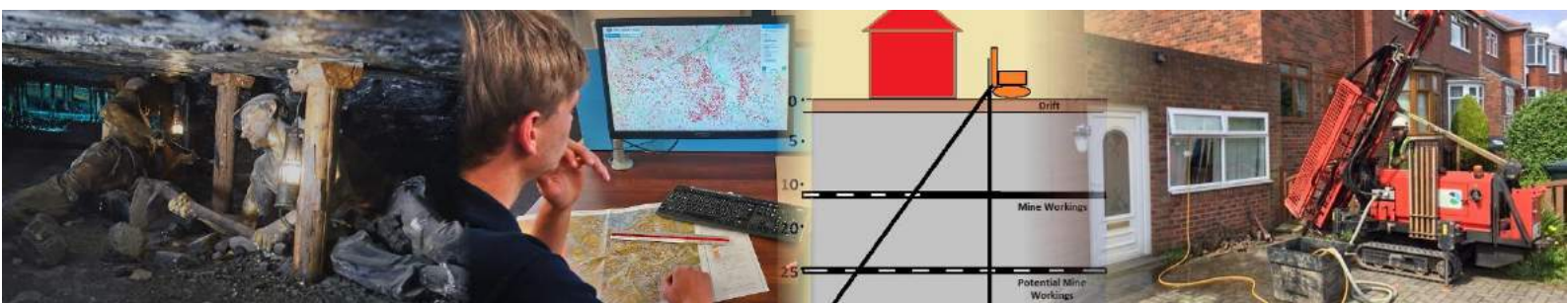




GEOLOGICAL
GEOTECHNICAL
GEOENVIRONMENTAL
CONSULTANCY
DRILLING & DATA ACQUISITION



GEOINVESTIGATE LIMITED

Coal Mining Risk Assessment (CMRA)

LOCATION	Plot 14, The Oaks, Cimla, Neath Port Talbot SA11 3RJ
ISSUE DATE	23 January 2023
FOR	Darkin Architects
CLIENT REF.	
OUR REF.	G22587

Prepared by

A handwritten signature in black ink that reads "f. morgan".

Fay Morgan MGeol (Hons) FGS
Senior Geoenvironmental Engineer

Checked by

A handwritten signature in black ink that appears to read "Ross Nicolson".

Ross Nicolson BSc (Hons) MSc (Eng) CEng MIMMM
Principal Geotechnical Engineer

1. CMRA INTRODUCTION & COAL MINING HAZARDS

1.1 Site Location and Description

The approximate centre of the site is at National Grid Reference 276637 E, 195911 N. Ground height is approximately 131mOD. The site lies to the west of The Oaks roadway. The boundary shown in RED on the Coal Authority (CA) report provided in Appendix A corresponds with the planning application area.

The site is currently an unoccupied undeveloped field bounded by The Oaks roadway to the east, an existing house/strip of undeveloped land to the north and a fence with housing beyond to the west and south. The site occupies a fairly steep slope, with a change in elevation of around 3.00m. It is proposed to erect a residential dwelling with associated soft landscaping, patio areas and driveways. A site image and development layout plan are provided in Appendix B.

1.2 Historical Development

A desk study of limited available historical OS maps shows in 1888 the site comprised undeveloped agricultural fields. There are old quarries noted approximately 100m to the north and northeast. An old coal pit is shown 120m to the west.

Further quarries and coal pits are marked within the surrounding area. The South Wales Mineral Railway trends west to east, 700m to the south of the site. The site remains generally unchanged until the construction of The Oaks housing estate. However, it is unclear from mapping when The Oaks was constructed.

1.3 Anticipated Geology

The location of the site is shown on the extract of British Geological Survey (BGS) 1:50,000 solid geology map (Sheet 247 Swansea, 2011), presented in Appendix C. The tentative elevation of the site relative to the vertical geology column is shown below the map. The drift horizon is not shown on the geology column but may be made up of a thin layer of Glacial Till as indicated by the BGS superficial map for the area. Bedrock is likely to lie at or near surface. Outcrop of the Westernmoor Coal (Wm) perhaps dipping northeast at 12 to 20 degs is present to the west of the site.

Several BGS records providing information of drift/bedrock depth and the underlying coal geology are available for the general area surrounding the site on The Oaks. The closest, 25m to the southwest of the site, reference SS79NE138, shows 3.70m of Glacial Till (slightly gravelly clay) underlain by sandstone with shale beds (Hughes Beds) to 10m bgl. Other nearby boreholes along the street show similar drift depths, underlain by the same sandstone. Within BGS borehole ref SS79NE137, the Westernmoor seam is identified intact from 23.90m to 25.60m bgl. However, within BGS borehole ref SS79NE136 and SS79NE139, very soft strata accompanied by a loss of flush and a loosely filled cavity accompanied by a loss of air/poor returns were noted respectively at shallow depth.

Log SS79NE141, located uphill to the north of the site, records 1.90m of drift underlain by sandstone bedrock with the Westernmoor coal seam between 8.60 to 9.90m and a 'Part-filled cavity' beneath this from 12.00 to 13.20m. As the site is lower down the same hillside this coal horizon and any unrecorded mine working in it may lie within very shallow depth beneath the new building. It is speculated that the 'Partly-filled cavity' may be a mine adit/tunnel/level running into the hillside at this nearby location. Log 141 is included within in Appendix D.

The Westernmoor Coal is recorded as being up to 1.70m thick.

1.4 Mine Workings & Mine Shafts

The CA report, in Appendix A, states that no past recorded underground mining has taken place beneath the site.

However, the CA places the site into an area of probable unrecorded shallow workings. The CA define 'probable unrecorded shallow workings' as *"Areas where the Coal Authority believes there to be unrecorded coal working that exist at or close to the surface"* (i.e., less than 30m).

These probable unrecorded shallow workings are likely to relate to potential workings within the Westernmoor coal seam, highlighted at shallow depth within close proximity BGS borehole records. There is the possibility that this seam is worked beneath the site within very shallow depth i.e. < 10m.

Whether, if present, unrecorded workings in this seam impacts surface ground stability in the development area depends on drift/bedrock depth and mine working depth and rock cover thickness, all of which are uncertain on the site itself. If mine workings are present below the new development but a sufficient thickness of rock cover above them is present, the risk of surface ground instability will be reduced, and no further mitigation may be required with regard to ground stability. Drilling is required to establish this.

No open cast mines are noted by the CA within 500m of the site. Similarly, no faults, fissures or breaklines are recorded to intersect the site boundary though the BGS map shows geological faulting nearby to the east of the site.

1.5 Mine Gas

According to the CA report no mine gas incident or remediation has been recorded within 500m of the enquiry boundary and typically on the UK coalfields mine gas risk to surface development is low. Circumstances where gas risk increases include proximity (typically < 50m) to mine entries (adits and shafts), proximity to recorded mine gas incidents, where development is located above or adjacent to very shallow and shallow (< 30m bgl) unflooded mine workings or roadway tunnels, coal seams with a history of spontaneous combustion, natural or artificial pathways providing routes for gas migration eg permeable soil cover, pathways created by geological faults, mining induced breaklines/fractures, collapsed mine roof strata, mining subsidence, mining sinkholes/crown holes and unsealed boreholes.

This CMRA has indicated that conditions may exist at this site increasing mine gas risk namely the presence of possible unrecorded shallow mine workings. However, the risk may be less if shallow mine working is confirmed to be absent and because there has been no confirmed mine gas incident/remediation at this locality.

UK radon notes that the site is in an area where the maximum radon potential is 1 – 3%, meaning radon protection is unlikely to be required for the development.

2. RISK ASSESSMENT OF SITE-SPECIFIC COAL MINING ISSUES

The risk assessment methodology adopted in this section is based on CA publication RISK BASED APPROACH TO DEVELOPMENT MANAGEMENT - GUIDANCE FOR DEVELOPERS Version 3, 2014 and Version 4 - 2017. The template contained therein is broadly adopted in the table below with amendments made by Geoinvestigate Limited. The factual information it is based on, is derived mostly from the CA Consultants Coal Mining Report and additional desk study information including available historical maps, geological maps & memoirs, BGS boreholes, online articles etc. It is not an exhaustive desk study review. Therefore, if new information is released or found in the future, this CMRA may require updating.

The table overleaf provides advice on next step mitigation and the likely planning decision.

RISK ASSESSMENT & MITIGATION		
Coal Mining Issues/Hazards	Risk	Next Step Mitigation
Past underground coal mining	NONE	
Probable unrecorded shallow workings	M	Drilling investigation to enable further assessment.
Outcrop	NONE	
Spine roadways at shallow depth	NONE	
Mine entries within 50m	NONE	Nearest is 93.50m to the west of the site.
Geological faults, fissures and breaklines	NONE	
Opencast mines	NONE	
Mine gas	M	Drilling investigation to enable further assessment & adopt gas protection measures if required.
Coal mining subsidence claims within 50m	NONE	
Site investigations within 50m	NONE	
Likely Planning Decision	Yes/No	Reason
Is planning permission likely to be given with respect to coal mining legacy issues CONDITIONAL upon carrying out further intrusive investigation leading to possible building design mitigation at a future date but before construction begins?	Yes	Yes. The site is NOT impacted by a known mine entry proximity hazard. Furthermore, the site-specific ground stability and mine gas risks, identified in this CMRA, arising from possible shallow mine workings, geological faulting and mine gas require further assessment, but can be mitigated by routine engineering solutions.

Assessed risk level – High, Medium Low. NONE, N/A Not Applicable/not relevant

MGRA – specialist mine gas risk assessment required.

3. CMRA OUTCOME & RECOMMENDATIONS

This CMRA has indicated that 1 level of unrecorded mine workings may perhaps occur within very shallow or shallow depth below the proposed new buildings with the potential (if present) to significantly impact surface ground stability in the development area. In our opinion drilling investigation is required to further assess this risk.

In Geoinvestigate's opinion, 2-3 rotary open boreholes should be made at the site to depths up to 30m but not necessarily reaching 30m to establish bedrock depth and mine working depth (if any).

Gas monitoring MUST be carried out during drilling and may enable further assessment of the mine gas risk.

With regard to mine gas risk should coal seams and mine working be found to underlie the site within shallow depth carry out longer term gas monitoring in specially installed gas wells to further assess the ground gas risk.

Alternatively, if longer term gas monitoring is to be avoided the installation of precautionary gas protection measures may be considered in the design of the new buildings in line with "Characteristic Situation 2" (CS2) based upon the CIRIA 665 (revised) report – "Assessing the risks posed by hazardous ground gases to buildings". However, agreement will be required from the Local Planning Authority for this alternative proposal.

A Coal Authority Permit needs to be obtained (ahead of) further intrusive exploratory drilling. As per the table below Water Drill Flush to be used when drilling. The permit application must state **WATER ONLY DRILL FLUSH** for the safety of the public and drill crew.

Risks for Different Drilling Scenarios					
Air flush	Mist flush	Foam flush	Water flush	Mud flush	Additional controls
HIGH	HIGH / MED'M	HIGH / MED'M	LOW	LOW	- Monitoring at rig and other open holes. - Seal boreholes

Boreholes must be sealed on completion.

In summary this CMRA has identified increased risk to the proposed development from possible shallow mine and mine gas. Intrusive investigation is required to further assess these risks. However, as the risks can be mitigated by routine engineering solutions planning permission should not in our opinion be withheld with respect to coal mining legacy issues providing further intrusive investigation is carried out at a future date and the granting of permission conditioned accordingly.

WHAT TO DO NEXT? Obtain quotes for the intrusive site investigation works. The cost of the SI works should be a **“lump sum” fixed price**. Geoinvestigate can provide advice and assistance with helping you find suitable site investigation & drilling contractors. Call us on 01642 713779 or email enquiries@geoinvestigate.co.uk.

Appendices:

- A. CA Consultants Coal Mining Report issued 16th January 2023 ref. 51003333709001
- B. Site Image & Proposed Development Plan
- C. Geology Map Extracts
- D. BGS Borehole Log

APPENDIX A

COAL AUTHORITY REPORT

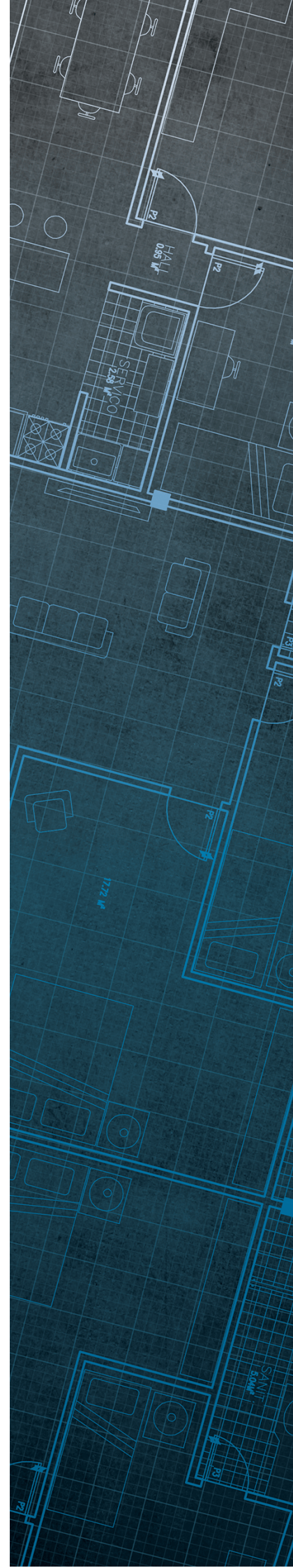


The Coal
Authority

Consultants Coal Mining Report

Plot 14 The Oaks
Cimla
Neath Port Talbot
SA11 3RJ

Date of enquiry:	16 January 2023
Date enquiry received:	16 January 2023
Issue date:	16 January 2023
Our reference:	51003333709001
Your reference:	G22587



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

GEOINVESTIGATE

Enquiry address

Plot 14 The Oaks
Cimla
Neath Port Talbot
SA11 3RJ

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

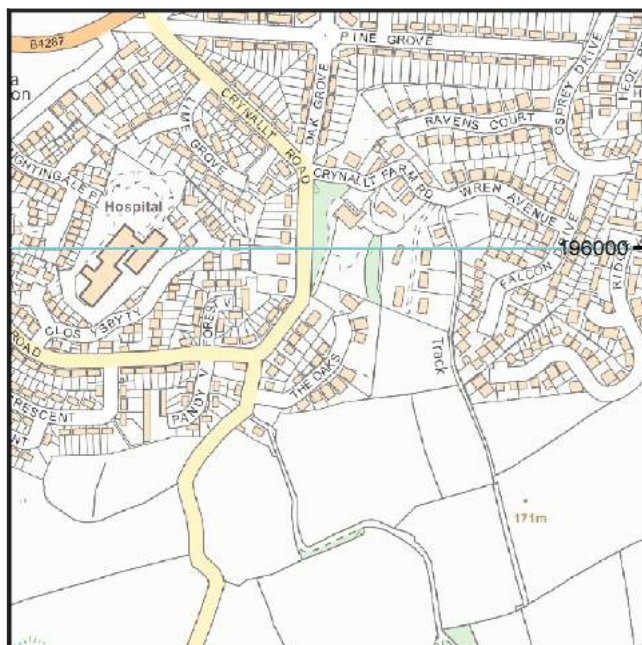
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2018. All rights reserved.

Ordnance Survey Licence number: 100020315

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

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	276195-005	276526 195899		Coal	

Abandoned mine plan catalogue numbers

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

3273	PO0	SWR2654
4355		

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

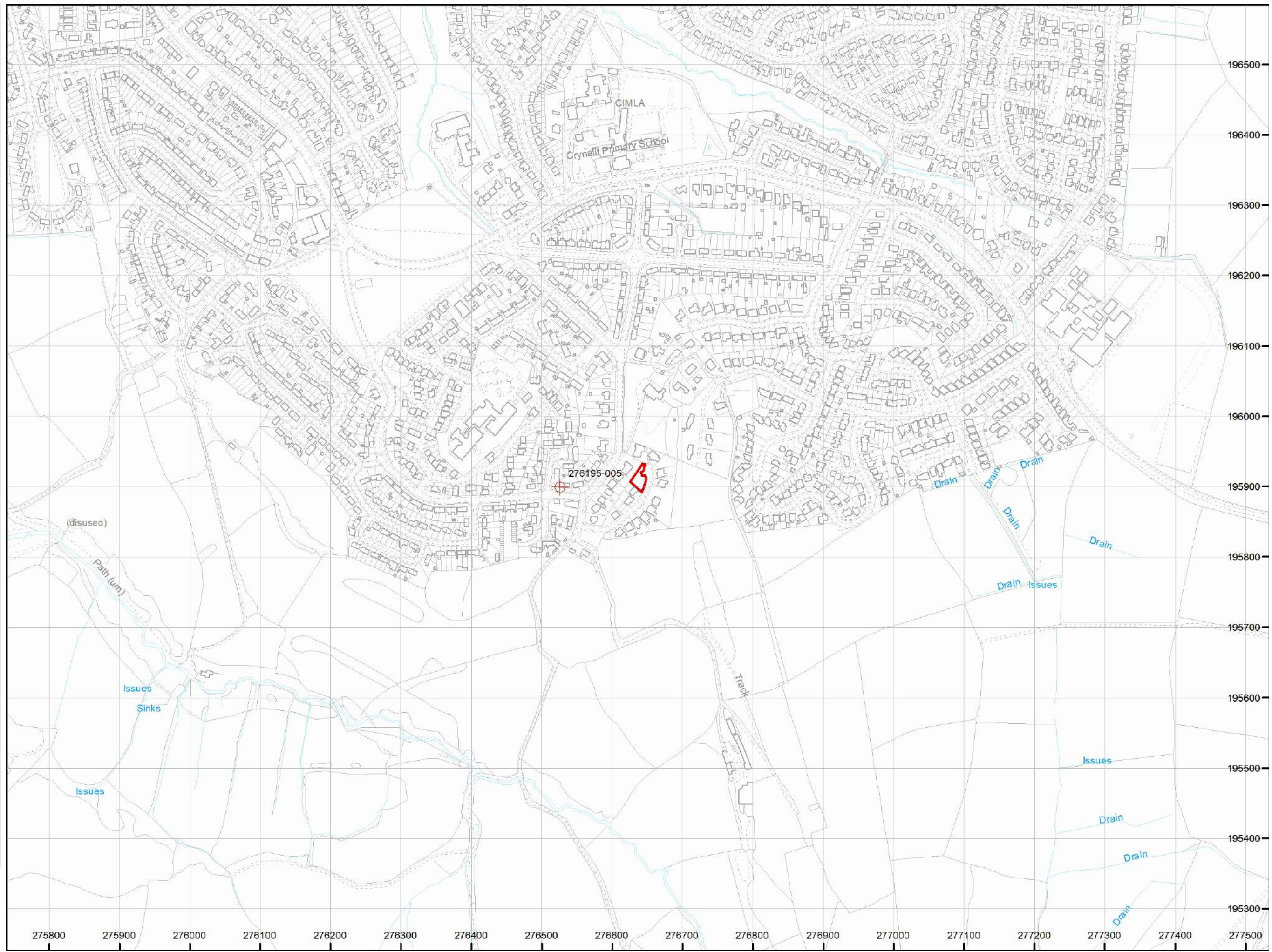
Key

Approximate position of the enquiry boundary shown 

Disused mine shaft 

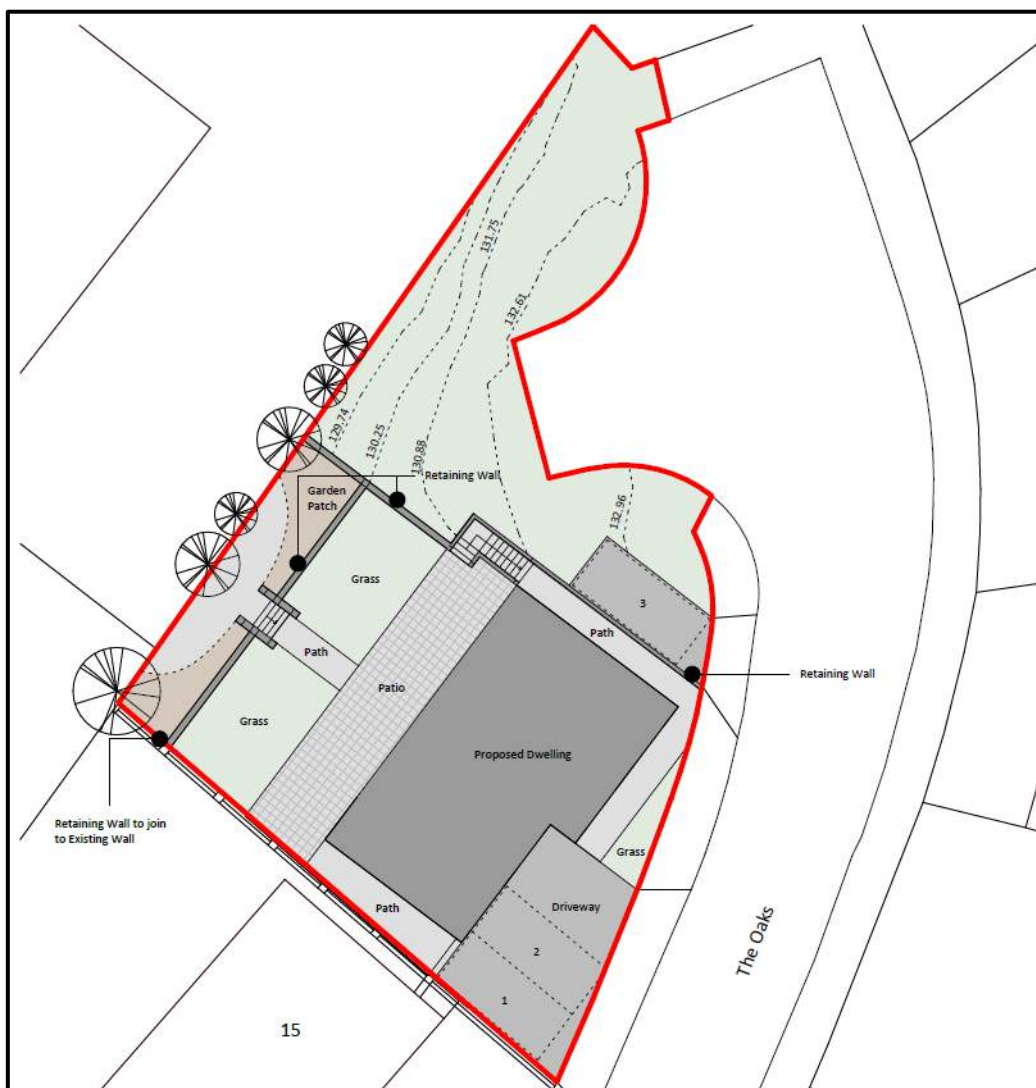
How to contact us

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



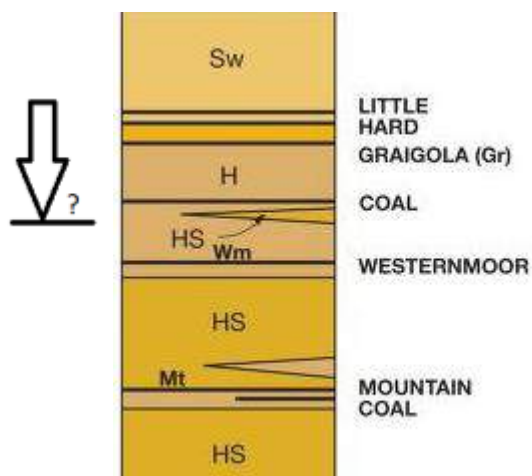
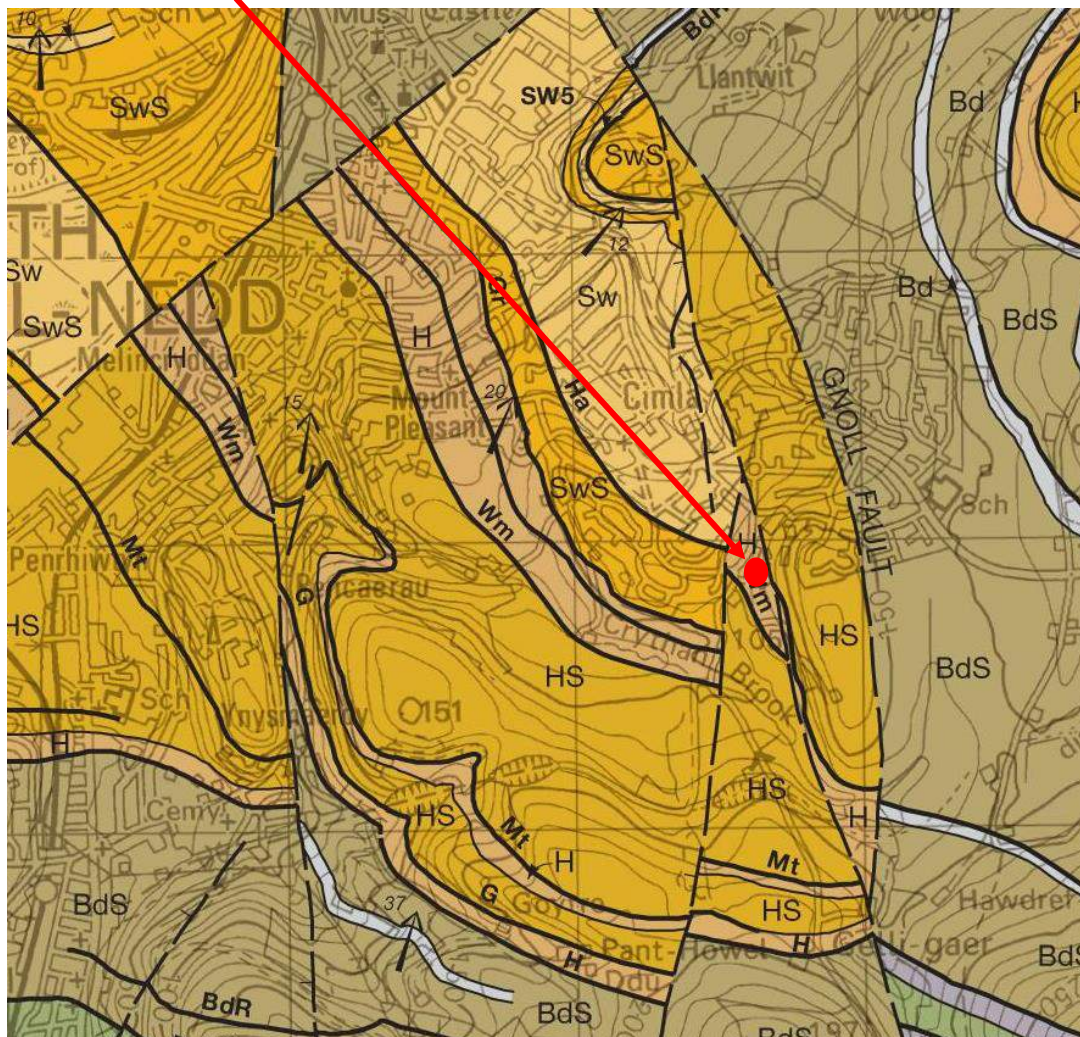
APPENDIX B

SITE IMAGE & PROPOSED DEVELOPMENT



APPENDIX C GEOLOGY MAP EXTRACTS

Site Location



Applied Geology						SITE	PROPOSED RESIDENTIAL DEVELOPMENT AT BMLCH ROAD, CIMLA, NEATH SS79NE, 14d							HOLE No.			
PROJECT REFERENCE \ 30071B/SR115						CONTRACTOR I.H. DRILLING LTD.				CLIENT COACH HOUSE PROPERTIES LTD.							
DRILLING DATA										PROGRESS SS76672 95939							BURF 1 of 1
DEPTH	METHOD	BLU TYPE	FOUL CHAM	CORE DATA	CASING DEPTH	SIZE	DATE	TIME	WELL DEPTH	CASING DEPTH	DEPTH TO WATER	ELEVATION					
13.20	OPEN HOLE ROTARY PERCUSSIVE	ROCK HAMMER	90 mm	-	-	-	17.1.90	am	13.20	-	-	NH					
												NH					
RUN (FLUSH) %	TCR (SCR) %	SCR %	MAX MIN CL	RQD %	F.L.	DISCONTINUITIES	DEPTH	DESCRIPTION & REMARKS				REDUCED LEVEL	LEGEND				
							1.90	Brown sandy with some gravel (Glacial Till)									
							3.50	Brown SANDSTONE, weathered (HUGHES BEDS)									
							7.50	Grey SANDSTONE (HUGHES BEDS)									
							7.60	COAL (WESTERNMOOR SEAM)									
							8.60	Grey SANDSTONE									
							9.90	COAL with shale bands (WESTERNMOOR SEAM)									
							12.00	Dark grey and black SANDSTONE and SHALE bands (HUGHES BEDS)									
							13.20	Part-filled CAVITY									
							14.00	Firm strata, Poor returns									
								End of Drillhole									
REMARKS							GROUNDWATER BEHAVIOUR					LOGGED BY					
NR: Not Recorded							DEPTH	BEHAVIOUR		SEALED	PROJECT NO.						
							GL - 1.90	Damp			30071B						