

REF: 2392/PYC/LetRep/sdi

D.W.Roberts
Cefnyfedw
Penycae
Wrexham
L114 1UA

2nd November 2020

Dear Mr Roberts,

RE: 1 BRYN ISSA, PENYCAE – MINING INVESTIGATION

Introduction

It is proposed to redevelop an existing residential plot off Plas Bennion Road, Penycae, at National Grid Reference SJ 287 444, see Figure 1. The site is currently occupied by one unit of a semi-detached bungalow, with a short concrete driveway, detached garage, and garden area fronting onto Plas Bennion Road. A site plan is presented on Figure 2.

It is proposed to replace the existing bungalow with a new residential property. Exact details of the proposals have not been finalised at this stage, however, it is anticipated that the development will comprise a single residential unit of traditional construction. It is understood that new dwelling is to be constructed on the eastern section of the site, where access is available for borehole investigations. Foundation line loads not exceeding 75 kN/m run are anticipated, with floor slab loading unlikely to exceed 5 kN/m².

The Coal Authority have identified the site to be within a high-risk area for possible shallow abandoned mine workings. Consequently, GroundSolve Ltd (GSL) were appointed to undertake a mining desk study and site investigation in order to understand the mining risks, and to present a way forward for the site's development.

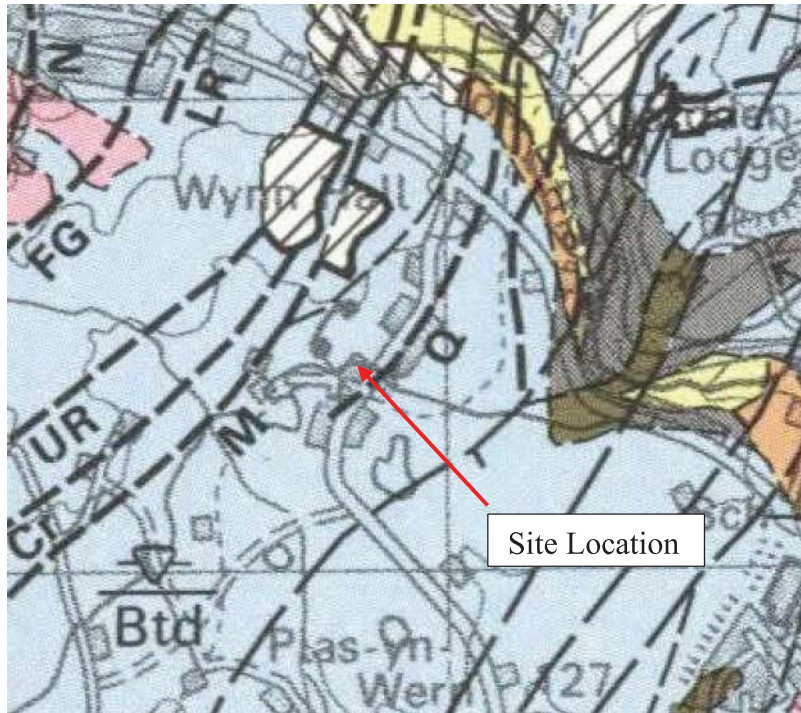
This report presents the findings of the site investigation and mining risk assessment to address the mining risks present at the site.

Geology

The geology of the site has been studied on the 1:50,000 scale BGS geology plan, Sheet 121, Wrexham, and the associated memoirs.

These show the site to be underlain by glacial till described as unstratified stony clays, with sands, gravels and cobbles.

The underlying solid geology is the Pennine Lower Coal Measures, comprising mudstones, siltstones and sandstones formed in the Carboniferous period.



Extract of Sheet 121 Wrexham

The Quaker coal seam is shown to outcrop immediately east of the site, with the Main Coal shown to outcrop some 200m to the west of the site. Both seams trend in a southwest to northeast direction, and dip gently towards the southeast. The Main Coal will therefore underlie the site area at shallow depth.

Experience of the Main Coal in this area confirms that it is generally around 2m thick.

Mining

A Coal Consultant's Mining Report was obtained for the site from the Coal Authority, a copy of which is presented in Appendix A.

The report states that:

- The site is in an area with no past underground mining recorded;
- There are probable unrecorded shallow workings underlying the site;
- The Main coal seam outcrops 17.9m west of the site;
- There are 5 mine entries recorded near the site boundary:
 - None of the entries are recorded within the site boundary;
 - Shaft 328344-052 (northwest of the site area) was infilled to an unknown specification in September 1956;
 - No treatment details are provided for the remaining shafts;
- The Coal Authority have not received a damage notice or claim for the subject property, or any property within 50m of the site boundary;
- The site is not in an area where notice to withdraw support has been given.

Reference 1 confirms that the Main Coal outcrop passes "south-westward, by the north end of the Plas-Bennion Cottages". It also records that the thickness of drift conceals the positions of the coal seams

underlying the Main. However, a seam recorded as the “Brassy” is recorded as cropping within a surface digging to the south of the Delph Pits, southwest of the site.

The geological mapping also indicates open cast mining some 400m north of the site, of the Main, Crown, and Upper Red seams.

The site will therefore be underlain at shallow depth by the Main coal seam. The Main coal was a highly productive coal seam across the Wrexham coalfield, and therefore, there is a high potential for it to have been worked.

Site Investigation

Prior to the site investigation being undertaken, permission to investigate the potential for mine workings was applied for from the Coal Authority, which can be found in Appendix B. This report will also be submitted to the Coal Authority.

The investigation was subsequently undertaken by DMW Drilling, under the supervision of an engineering geologist from GSL. It comprised:

- Two rotary openhole boreholes, drilled to depths of 26.0m and 30.0m.

The boreholes were drilled within the eastern half of the site, in the garden areas where access was available, coinciding with where the new dwelling is proposed to be constructed. This was to confirm the depth to the Main coal and to investigate the potential for shallow workings.

The borehole locations are presented on Figure 2, and the borehole logs presented in Appendix C.

Ground Conditions

The boreholes encountered a layer of made ground (clay with cobbles of brick, to a maximum depth of 1.5m), overlying superficial deposits of Glacial Till to depths of 9.0m and 9.2m. This was underlain by weathered bedrock, initially recovered as brown sand and gravel, before becoming more intact below 11.5m and 11.6m depth. The bedrock then comprised grey mudstone, becoming a brown sandstone below 19.5m/19.0m depth.

Borehole 1 encountered a void between 24.5m and 26.0m, where all flush returns were lost and no significant resistance to drilling was detected. Hard drilling returned at 26m, although due to the flush loss the geology could not be confirmed. The drill bit proved difficult to extract from within the void, suggesting that the void was loosely backfilled, and the borehole was therefore terminated at 26m depth.

Borehole BH2 did not encounter any signs of workings, backfilled workings, or the presence of coal, to a maximum depth of 30m.

A summary of the ground conditions can be found in the table below:

BH No.	Made Ground (m)	Superficial Deposits (m)	Rock (m)	Workings (m)	Rock Cover (m)
1	0.00-1.30	1.30-9.00	9.00-24.50	24.50-26.00	15.5
2	0.00-1.50	1.50-9.20	9.20-30.00	-	N/A

Mining Risk Assessment

When assessing the risk of shallow mining to a development several issues need to be considered, such as the type of working, depth to workings etc.

There are generally two types of mining, partial and total extraction. Methods of partial extraction are nearly all variations of, “Pillar and Stall” techniques, with pillars of coal being left to support the roof of the mine. Extraction ratios of between 30 to 75% were typical, depending on geological conditions and depths. However, it was common practice to work pillars on withdrawal from the mine, so higher extraction ratios may have been possible.

Total extraction is achieved by long wall workings and also by various pillar and stall techniques, where the pillars were removed in a second phase of mining, normally on retreat from the mine.

It is important to know the method of mining employed, as total extraction methods normally result in total collapse of the workings, with the exception of the main roadways. While partial abstraction techniques leave voids in the mine, which can become unstable and migrate to surface. These take the form of “crown holes” at surface, which are generally circular and can be several metres in diameter.

Due to the age of the potential mining within the Main coal beneath the site, and the proximity to the outcrop, it must be assumed that it would vary between Bell Pits close to outcrop and Pillar and Stall techniques further away from outcrop. As backfilled workings were encountered within one of the boreholes at a depth of 24m, bell pitting within the site boundary is considered unlikely.

Potential for voids may therefore exist at shallow depth beneath the site, anticipated to result from pillar and stall workings and access roadways.

No detailed research into mining subsidence in North Wales has been undertaken. However, extensive research has been carried out in South Wales, where similar pillar and stall mining has taken place, this research revealed:

- Almost all incidents are “crown holes” in form, delayed general subsidence is very rare,
- About 75% of subsidence incidents are caused by the collapse of mine entrances or workings close to outcrop,
- Mine entrances present the greatest risk and account for over 50% of recorded incidents,
- The recorded rate of occurrence is very low.

The remaining subsidence incidents were analysed for their migration ratio (H/T), where H is the thickness of rock above the workings and T is the typical seam/void thickness, taken here as 2m,

the height of a typical roadway. Of these 75% of the incidents had an H/T ratio of less than 2 (4m rock cover), with 90% of incidents having an H/T ratio of less than 6 (12m rock cover). The majority of the remaining incidents were related to special events, probably relating to collapses on main roadways, which would have continually been cleared by miners leading to bigger residual voidage.

There is also strong evidence from data gathered from grouting contracts, opencast sites and site investigations that migration of voids above workings generally extends to a limited height above the original void. Records of over 10,000 drill and grout boreholes were collected, in almost every case, the record of broken ground, workings or voids, occurred at or immediately above the anticipated elevation of the worked horizon.

From the above it can be concluded that the majority of residual voids have already collapsed to a stable profile. Otherwise, voids would be encountered at a wide range of depths as they progress to the surface.

To assess the risk from shallow abandoned mining the following risk-based approach is followed, where risk (R) may be defined as: -

$$R = F \times C$$

Where F is the frequency of an undesirable event and C is the consequences of it happening.

The assessment of risk due to mining subsidence is a twofold process, involving first the assessment of probability of a subsidence event happening, i.e. the subsidence potential; secondly the consequences resulting from that event. For a crown hole to occur, the following must coincide at any one point:

- There must be a potential for mining (PM),
- There must be workings under the site (PW),
- A void must remain in the workings (PV),
- The void must be unstable and able to migrate to surface (PI),
- The thickness of rock overburden must be insufficient to choke the collapse feature before hitting rock head (PR),
- The thickness of drift must be insufficient to prevent the void reaching the surface (PD).

PM Potential for Mining

The Main coal seam underlies the site at shallow depth. No significant seams are anticipated above this seam before the Quaker, which outcrops to the east and therefore cannot underlie the development area.

PW Working Present

Backfilled workings have been identified in BH1, at a depth of between 24.5m and 26.0m. No other signs of workings or traces of coal were encountered during the investigation.

PV Voids Remain

A void was encountered in one of the two boreholes, which appears to have been loosely backfilled based on the driller's feedback and difficulty in removing the drill bit from within the workings.

PI Voids become unstable

The potential for voids to become unstable has to be considered. The workings are overlain by intact sandstone, and have been loosely backfilled, both of which would help mitigate against complete collapse of the workings. However, there is the potential for the voids to become unstable and begin migrating upwards at the site.

PR Rock cover insufficient to prevent migration of void

A void height of 1.5m was encountered in BH1, overlain by 12.5m of intact bedrock (H/T ratio = 8.3). Using the commonly-adopted rule of 10x void height of rock cover being required to protect against collapse of the workings, 15m of rock would be required. There is therefore insufficient rock to completely mitigate against ground movements resulting from collapse of the workings.

However, as discussed above, 90% of recorded collapses in the South Wales Coalfield occurred when the H/T ratio was 6 or less, so the risk is considered to be low in this case.

PD Drift cover insufficient to prevent migration to surface

Around 11m of weathered rock and superficial deposits are present above intact rockhead, which would further mitigate against migration of any voids.

Discussion & Conclusions

Based on the findings of the boreholes and the mining risk assessment presented above, the overall risk to the proposed development from mine workings is considered to be low.

Backfilled workings were encountered between 24.5m and 26.0m in one of the two boreholes, which are considered to be within the Main Coal. These are overlain by 12.5m of intact bedrock, and 12m of superficial deposits/shallow made ground, which would also contribute a mitigating effect against migration of voids.

It is therefore recommended that the low risk of potential ground movement due to shallow mining is addressed by constructing the new building on a reinforced concrete raft foundation. The raft should be designed to be capable of spanning a 3.0m wide void and cantilevering 1.5m at the corners.

The edge beams of the raft should extend at least 0.75m below ground level. The underlying ground at this depth should be investigated, to ensure it will be capable of carrying the loads of the structure, particularly if this depth means that the edge beams would be founded within made ground/disturbed glacial till.

The raft would give confidence that any future minor ground movements that may occur would prevent differential settlements from significantly affecting the new structure. There would then be no requirement to grout the underlying workings, or carry out any further mining investigation works.

We trust this is satisfactory. Should you have any queries, please call Stefan Imiolczyk on 01244 661361.

Yours sincerely,



Stefan D Imiolczyk

FIGURES



OS LICENSE No. 100030802

SCALE 1:25,000 @ A4

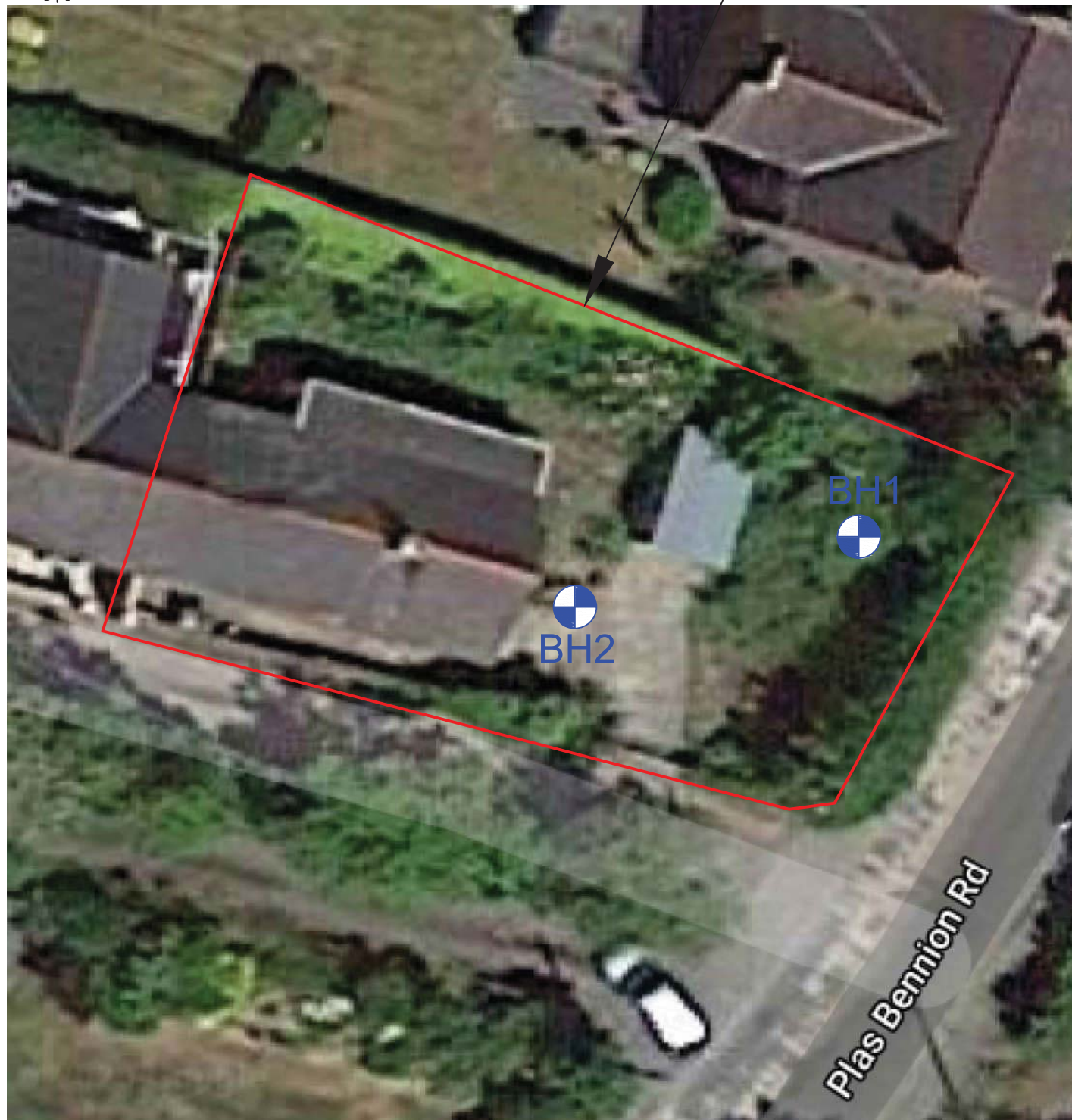
Figure Title

SITE LOCATION

FIGURE 1



Approximate site boundary



SCALE 1:200 @ A4

Figure Title
SITE PLAN & BOREHOLE
LOCATIONS

FIGURE 2

APPENDIX A

Consultant's Coal Mining Report



The Coal
Authority

Consultants Coal Mining Report

Plas Bennion Road, Penycae
Wrexham

Date of enquiry:	27 October 2020
Date enquiry received:	27 October 2020
Issue date:	27 October 2020

Our reference:	51002326394001
Your reference:	2392/sdi



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

Stefan Imiolczyk

Enquiry address

Plas Bennion Road, Penycae
Wrexham

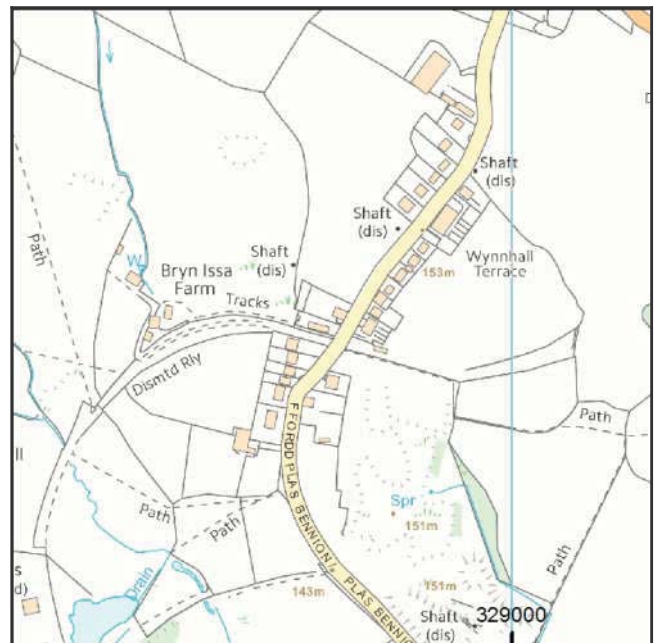
How to contact us

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	328344-052	328769 344465	The shaft was filled to an unknown specification during September 1956.	Coal	
Shaft	328344-379	328860 344344		Coal	
Shaft	328344-389	328848 344413		Coal	
Shaft	328344-546	328815 344361		Coal	
Shaft	328344-547	328743 344357		Coal	

Abandoned mine plan catalogue numbers

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

NW1503	16713	NW86
17512	NW1404	0
PO0	14893	

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
MAIN	Coal	Yes	17.9	West	347

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

Please refer to the "Summary of findings" map (on separate sheet) for details of any opencast areas 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.

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.

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.

This page left intentionally blank

VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	27 October 2020
Issued to	STEFAN IMIOLCZYK 1 BRYN ISSA PENYCAE WREXHAM
Property search for	PLAS BENNION ROAD, PENYCAE WREXHAM
Reference number	51002326394001
Date of issue	27 October 2020
Cost	£112.13
VAT @ 20%	£22.43
Total received	£134.56
VAT registration	598 5850 68

Key



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

APPENDIX B

Coal Authority Permit



The Coal
Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 20652

Name and Address of Permit Holder:

*D W Roberts
Cefnyfedw
Penycae
Wrexham
LL14 1UA*

Site Location:

*1 Bryn Isa
Plas Bennion Road
Penycae
Wrexham
LL14 1TP*

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Investigation by two boreholes to c.30m bgl

within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of 12 months from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Water flush*
- *Gas Monitoring CO, CH₄, CO₂, O₂, H₂S at borehole and rig*
- *Appropriate borehole sealing without delay and to withstand site level changes*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*

Signed: _____ *Darren Hurst* _____ Granted Date: _____ *04 September 2020* _____

For and on behalf of The Coal Authority

Nominated Representative: Darren Hurst, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG

Tel: 01623 637450; E-Mail: permissions@coal.gov.uk



The Coal
Authority

Granted Permit Boundary

Permit Ref: 20652

Permit Boundary:



These maps are reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of Her Majesty's Stationary Office. © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. The Coal Authority. Licence No: 100020315. [216]

APPENDIX C

Borehole Logs

BOREHOLE LOG

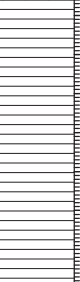
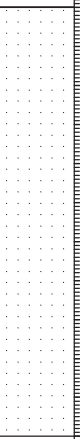
Project Plas Bennion Road, Penycae				BOREHOLE No BH1	
Job No 2392	Date	Ground Level (m)	Co-Ordinates ()		
Contractor DMW Drilling Ltd				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
<									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Loss of flush at 24.50m. Cased to 12.00m. No groundwater encountered.
All dimensions in metres Scale 1:193.75			Client DW Roberts			Method/ Plant Used			Logged By SDI		

BOREHOLE LOG

Project Plas Bennion Road, Penycae				BOREHOLE No BH2	
Job No 2392	Date	Ground Level (m)	Co-Ordinates ()		
Contractor DMW Drilling Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						(1.50) 1.50	Brown CLAY with cobbles of brick and concrete. (MADE GROUND)		
						(7.70) 9.20	Brownish grey CLAY with boulders of mudstone and sandstone. (GLACIAL TILL)		
						(2.40) 11.60	Brown SAND and GRAVEL of mudstone, siltstone and sandstone. (WEATHERED BEDROCK)		
						(7.40) 19.00	Grey MUDSTONE. (PENNINE COAL MEASURES)		
						(11.00) 30.00	Brown SANDSTONE. (PENNINE COAL MEASURES)		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Cased to 12.00m. No groundwater encountered.
All dimensions in metres Scale 1:193.75			Client DW Roberts			Method/ Plant Used			Logged By SDI		