

SLADEN ASSOCIATES

COAL MINING RISK ASSESSMENT Proposed New Classroom New Horizons Afoneitha Road, Penrycae Wrexham

**Prepared for
Garden Hideouts**

Date : January 2024

Job No : 23 2657

COAL MINING RISK ASSESSMENT
Proposed New Classroom
New Horizons
Afoneitha Road, Penycae
Wrexham

Prepared for: Garden Hideouts

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REPORT No 23 2657

**COAL MINING RISK ASSESSMENT
Proposed New Classroom
New Horizons
Afoneitha Road, Penycae
Wrexham**

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Afoneitha Road, Penycae
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1 INTRODUCTION

1.1 GENERAL

Garden Hideouts has instructed Sladen Associates to carry out a Coal Mining Risk Assessment for a proposed new classroom unit at the New Horizons facility at Afoneitha Road in Penycae.

The assessment included a study of publicly available documentary sources concerning site history, geology and mining activities in the area but included no intrusive investigation. This report presents the results of the assessment together with recommendations for precautions that should be taken as part of the site re-development.

The present report is concerned only with precautions related to potential mining legacy issues. Other geotechnical issues, such as assessment of bearing capacity of near surface soils, selection of foundation types, and potential geo-environmental issues, are not considered.

1.2 LOCATION AND PROPOSED DEVELOPMENT

The site lies a little way to the west of Afoneitha Road (the B5097 minor road) in Penycae, some 7 km southwest of Wrexham town centre at National Grid Reference 3286 3453, see Figures 1 and 2. The site is currently without built development, part of a landscaped area associated with the school. It is proposed to construct a new single-storey timber framed classroom unit on the site, the currently proposed layout is shown in Figure 3.

2 SOURCES OF INFORMATION

Sources of information consulted for the present study included the following:

- Coal Authority Report.
- Historical Ordnance Survey Mapping.
- Geological Mapping published by the British Geological Survey (BGS) at 1:10,000 and 1:50,000 scales.
- Logs of nearby boreholes held by the BGS.
- The Geology of the Country around Wrexham, Part 2. Memoirs of the Geological Survey. 1928.
- Online mapping published by the Coal Authority

3 THE SITE

3.1 HISTORY

Copies of selected relevant early historical Ordnance Survey (OS) maps are included in Appendix A, for reference.

At the time of the first Ordnance Survey in 1874, the route of Afoneitha Road was already present to the east but the study area was within a larger agricultural field and without built development. The Afon Eitha, flowing generally eastwards at this point, formed the southern field boundary. The wider surrounding area had clearly been subject to extensive previous mining activity, with a number of old shafts and spoil heaps to the north, west and east but there were no such features shown on the study area itself.

Little change is then shown on mapping until some time after the 1960's.

3.2 GEOLOGY

The site is shown on maps published by the British Geological Survey (BGS) to be underlain by solid strata of the Pennine Lower Coal Measures of Carboniferous Age. These comprise predominantly mudstones with some sandstones and some coal seams.

Strata dip to the southeast. The subcrop of the Red Coal is shown to pass close to or through the study area, such that that seam may be present at very shallow depth below the site. The anticipated downward sequence of the main mineral seams below the site area would be as follows:

Coal Seam	Approximate Depth Below Rockhead on Site (m)	Approximate Seam Thickness (m)
Red	Near subcrop	0.7
Fireclay Group (Stone, Half Yard and Firedamp Coals)	20	Variable
Nant	50	1.5 (2 or 3 leaves)
Ruabon Yard	60	0.9
Premier	75	1.0
Llwyneinion Half Yard	100	0.45

The bedrock in the site area is shown to be overlain by natural superficial deposits comprising glacial clay till. Based on nearby borehole logs held by the BGS, depth to bedrock in the area would be expected to be about 2.5 to 3.5 m.

3.3 MINING

The site is in an area where underground mineral abstraction has occurred in the past. Although the Coal Authority (Appendix B), have records of workings in only one seam below the site, the potential for unrecorded workings is high and relatively shallow workings below rockhead could be present in the main coal seams identified above. The recorded workings are noted to be in the 'Wall and Bench' Coal at 72 m depth. It is assumed that this actually relates to the Premier Coal, the name 'Wall and Bench' was also sometimes used in relation to the Stone Coal. Note also that the Coal Authority Report does not show the outcrop of the Red Coal, which is mapped by the BGS as passing close to the study area.

Any unrecorded workings would likely pre-date about 1870, when it became a legal requirement to keep records of underground workings.

The Coal Authority has no record of mine entries on or within 20 m of the site area, the closest being some 50 m to the northwest.

4 SITE SPECIFIC RISK ASSESSMENT

4.1 KNOWN AND POTENTIAL HAZARDS

There are no recorded shallow underground mineral workings in the site area, the shallowest recorded workings being at 72 m depth. However, there is a relatively high potential for unrecorded shallow workings to be present. Any ground movements associated with unrecorded workings in the seams deeper than about 20 m below rockhead should have stopped by now. However, any workings in the Red Coal and possibly the Fireclay Group seams, may be at such a depth that some voids could remain in the workings even long after abandonment.

There are no known mine entries on or within 20 m of the site but the possibility of old unrecorded mine entries (shafts or adits) on site cannot be completely discounted given the anticipated presence of potentially worked seams at shallow depth.

The property does not lie within 300 m of any opencast mine sites.

The Coal Authority is not aware of any evidence of damage arising in the area due to geological faults or other lines of weakness that have been affected by coal mining.

Shallow potentially exploited mineral seams may be present below the site and mine gas should be considered as a potential hazard in risk assessment. The Coal Authority has no record of such emissions in the area.

There are no recorded claims for mining subsidence related damage within 50 m of the site.

4.2 ASSOCIATED RISKS

4.2.1 SUBSIDENCE RISKS

There is a relatively high potential that unrecorded workings may be present at shallow depth below rockhead. Any such shallow workings may still contain significant voids and may be associated with some potential for ongoing subsidence. Accordingly, the risk that differential subsidence would be sufficient to cause structural damage to conventional near surface structures is judged to be moderate if no special precautions are taken.

There is no record of mine entries within 20 m of the site but some potential for unrecorded mine entries in the area. Abandoned mine entries can potentially include large voids, for example where timber staging within a shaft has prevented fill materials from falling to the base of the shaft. Subsequent collapse of any overlying fill can lead to a void at the surface, which could be a significant hazard to users of the immediate area. Collapse of shaft lining materials can potentially result in subsidence over an area larger than the original shaft diameter and which could potentially cause damage to nearby structures. However, given the relatively rare nature of collapse of unrecorded mine entries, associated risks are judged to be low.

Local differential subsidence due to fault or other discontinuity activation by mining would be expected to occur during or shortly after the mining operations. Given the time since any shallow workings would have been undertaken below the site, the risk of fault reactivation by mining subsidence related to past mining is judged to be very low. The potential for new deep mining in this area is considered to be very low.

4.2.2 MINE GAS RISKS

The proposed non-residential structure would not be highly sensitive to ground gas emissions. There is expected to be a shallow water table in the area, as evidenced by the proximity to the Afon Eitha. Any mined seams would likely lie below the water table such that any former workings would be saturated, with associated low potential for gas generation and build-up of oxygen depleted gas. The shallow water table would also result in saturated ground that would have very low conductivity in relation to advective gas flow. Accordingly, risks associated with mine gas to the presently proposed development are judged to be low.

4.2.3 RISK SUMMARY

Based on a consideration of the anticipated depths, thicknesses and potential age of workings associated with the main mineral seams below the site, the following presents a summary of assessed risks related to the mining legacy:

Hazard	Potential Consequence	Resultant Risk of Future Surface Ground Movements/Gas Emissions Sufficient to Cause Significant Damage or of Explosion or Significant Risk to Site Users
Possible unrecorded shallow workings.	Differential subsidence due to void migration or collapse/consolidation of old workings	Moderate
Unrecorded Mine Entries	Collapse resulting in damage or harm	Low
Faults and Fissures	Local differential subsidence	Very Low
Mine Gas	Emissions leading to explosion or acute health effect.	Low
Coal Exposed in Foundation Excavations	Spontaneous Combustion	Low

4.3 POTENTIAL IMPACT ON DEVELOPMENT

Shallow abandoned mine workings can be associated with voids in the ground that can remain for many years after mine abandonment. Such voids can be associated with a potential for future surface ground movements, which could lead to structural or cosmetic damage.

Based on this assessment, some precautions are recommended to mitigate risks associated with potential mining legacy issues.

5 PROPOSED MITIGATION STRATEGY

It is recommended that two rotary probe boreholes be put down in the general vicinity of the proposed new structure on site to investigate the potential for very shallow workings. The probe holes should be taken down to 30 m depth. Should no evidence of potential shallow workings be found, a third confirmatory borehole should be drilled. Should evidence of significant voids remaining in very shallow workings be found, the potential risk to the proposed structure should be assessed by a suitably qualified engineer. If considered necessary, some remedial precautions may be required. These could comprise a programme of drilling and grout stabilisation, undertaken below the foundations of the new structure and/or reinforcement of foundations.

The possibility of old un-recorded mine entries being present on site cannot be ruled out. Care should be taken during ground works to observe conditions encountered. Any local areas of unusually deep made ground or other evidence of potential mine entries, such as brick or timber lining materials, should be investigated. If any unrecorded mine entries are encountered, following further risk assessment, the potential need for some further precautions, such as drilling and stabilisation of the entry and re-location of the structure, should be assessed by a suitably qualified engineer.

Any coal exposed in foundation excavations should be blinded with compacted clay or concrete.

Unless more detailed gas monitoring and risk assessment are undertaken, the new structure should be provided with basic gas exclusion measures. These could comprise either suspended ground floor slabs with passive venting below and a continuous polyethylene membrane (2000 gauge) within the floor slab and through walls or a continuous concrete raft type foundation, with integral continuous polyethylene membrane.

Any mine investigation or stabilisation works should be undertaken with the permission of the Coal Authority.

6 CONCLUSIONS

There are no known shallow workings below the site but a high likelihood of unrecorded shallow workings. The depths to mineral seams, of potential economic interest for underground mining, in relation to seam thicknesses and potential age of workings are such that the risk of subsidence sufficient to cause structural damage associated with underground workings is moderate. A programme of rotary probe drilling has been recommended to provide site-specific data concerning the depth and condition of shallow mineral seams. Depending on the results of that work, some drilling and grout stabilisation of shallow mine workings may possibly be required.

Unless more detailed risk assessment based on site monitoring is undertaken, basic gas exclusion measures should be provided for the new structure.

Subject to the need for the precautions identified above, the present study has shown no reason why mining conditions would preclude safe development of the site for the proposed usage.

Report Prepared by:

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FIGURES



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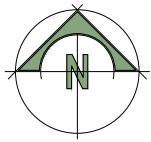
SITE LOCATION PLAN

**SLADEN
ASSOCIATES**

Report No
23-2657

Project
Site at Afoneitha Road
Pen Y Cae
Wrexham

Figure
1



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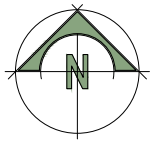
SITE LAYOUT PLAN

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Report No
23-2657

Project
Site at Afoneitha Road
Pen Y Cae
Wrexham

Figure
2



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PROPOSED SITE LAYOUT PLAN

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Figure
3

APPENDIX A HISTORICAL MAPS



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THE SITE AREA IN 1900

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Figure
A2



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THE SITE AREA IN 1914

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Figure
A3



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THE SITE AREA IN 1938

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Figure
A4



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THE SITE AREA IN 1953

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Figure
A5



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THE SITE AREA IN 1963

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23-2570

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Figure
A6

APPENDIX B
COAL AUTHORITY REPORT



The Coal
Authority

Consultants Coal Mining Report

SITE AT Afoneitha Road
Pen Y Cae
Wrexham
Wrexham
LL14 2PF

Date of enquiry:	12 January 2024
Date enquiry received:	12 January 2024
Issue date:	12 January 2024

Our reference:	51003398874001
Your reference:	24-2657



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

SLADEN PARTNERSHIP LTD

Enquiry address

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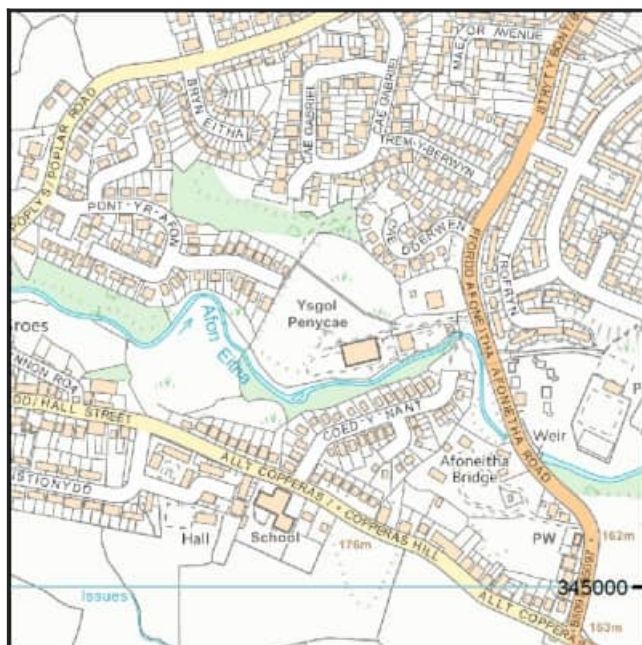
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	WALL AND BENCH	Coal	380X	72	Beneath Property	6.0	South-East	110	1863

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	328345-111	328539 345221	Shaft presumed filled to an unknown specification. An extensive search by trenching was carried out on the 15.5.1973 with no trace of the shaft being found. The area searched extended from the stream to 12m North of the supposed position plus 9m East and West of the supposed position.	Coal	
Shaft	328345-112	328530 345177		Coal	
Shaft	328345-113	328677 345271	The shaft was located in May 1973 and found to be filled with Colliery waste to an unknown specification. The shaft was concrete plugged at Rockhead and covered with Hardstop during October 1973. Level of top of cap 30.80m A.O.D.	Coal	
Shaft	328345-374	328538 345303	This entry was searched for by excavating an area 20m x 11m in 1984 by NKC Geotech Ltd but was not located. The absence of colliery spoil material led the consultant involved to believe that the circle shown on the mine plan to be either a pond or a depression.	Coal	
Shaft	328345-384	328666 345324	The shaft was located in May 1973 and found to be filled with Colliery waste to an unknown specification. The shaft fill was grouted with 8.0 tonnes of PFA:Sulphate resisting cement at a ratio of 10:1. Due to the depth of rockhead the concrete plug was placed within the area of overburden and covered with Hardstop during October 1973. Level of top of cap 37.06m A.O.D.	Coal	
Shaft	328345-592	328681 345321	The shaft was found to be filled to an unknown specification in 1986 by NKC Geotech Ltd.	Coal	

Abandoned mine plan catalogue numbers

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

14895	16713	PO0
R289	14882	14896
14885	NW1418	14880

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
STONE	Coal	Yes	27.3	North-West	47

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

The following potential risks have been identified and as part of your risk assessment should be investigated further.

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.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

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.

