

Report No. BC/MB/08.09.01.

MINING RISK ASSESSMENT:

**Land South of Winchfawr Park,
Heolgerrig, Merthyr Tydfil.**

Prepared for:

Mr R. Murray.

By:



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Mining Risk Assessment: Land South of Winchfawr Park, Heolgerrig, Merthyr Tydfil.

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Drawing No:		Scale:
<i>BC/MB/08.09.01.01.</i>	<i>General Location Plan.</i>	<i>1:50,000.</i>
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<i>BC/MB/08.09.01.04.</i>	<i>Extract from Mine Records Plan. Six Feet Seam.</i>	<i>1:2,500.</i>
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Copy of The Coal Authority's Report, reference no. 00009185-05.

Mining Risk Assessment: Land South of Winchfawr Park, Heolgerrig, Merthyr Tydfil.

1 Introduction

This report has been prepared on behalf of our client:

*Mr R. Murray,
2 Dan-y-Onen,
Heolgerrig,
Merthyr Tydfil,
CF48 1TS*

and relates to a parcel of land lying to the south of Winchfawr Park in Heolgerrig, Merthyr Tydfil where a new residential development is proposed. This report discusses the geology and mining history of the Site and the immediately surrounding area as they may affect the construction of the proposed dwellings and thereby assesses the mining risk to the proposed development. Recommendations are made for exploratory boreholes, trenching and other techniques to identify the precise location of disused mine entries and to examine in greater detail and, where appropriate, stabilise shallow mine workings that underlie the Site.

The following sources of data were used in the compilation of this report:

- i) Research of published geological records;*
- ii) Research of mining records held at The Coal Authority's archive in Mansfield;*
- iii) The findings of The Coal Authority's report, reference no. 00009185-05*
- iv) The findings of the 'Geotechnical and Geo-Environmental Report: Proposed Residential Development, Heol Gerrig, Merthyr Tydfil', reference no 8966, published by Terra Firma (Wales) Ltd. and*
- v) the archive records of Blandford Consulting.*

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The findings of this report are necessarily based upon the data used in its compilation and may be amended in the future in the light of additional material information. The report must only be used in its entirety for its stated purpose.

2 Brief Description of the Site

The plot of land that is the subject of this report, 'the Site' is located in the village of Heolgerrig, approximately 2 kilometres west of the centre of Merthyr Tydfil; it is irregular in outline and occupies an area of approximately 1.6 hectares (see *General Location Plan, drawing no. BC/MB/08.09.01.01*). The Site is located in a residential area on the fringes of Heolgerrig and is on north-easterly facing slopes in the Taff Valley on the side of Mynydd Aberdâr; it is hummocky and boggy in parts and there is an issue of water at the north-eastern corner. There are a number of circular depressions across the northern part of the Site that appear to be crown holes, indicating the collapse of shallow mine workings. The Terra Firma report describes one of the crown holes as 'recent' (in April 2005), suggesting that the process of collapse had been on-going until at least as recently as 2005.

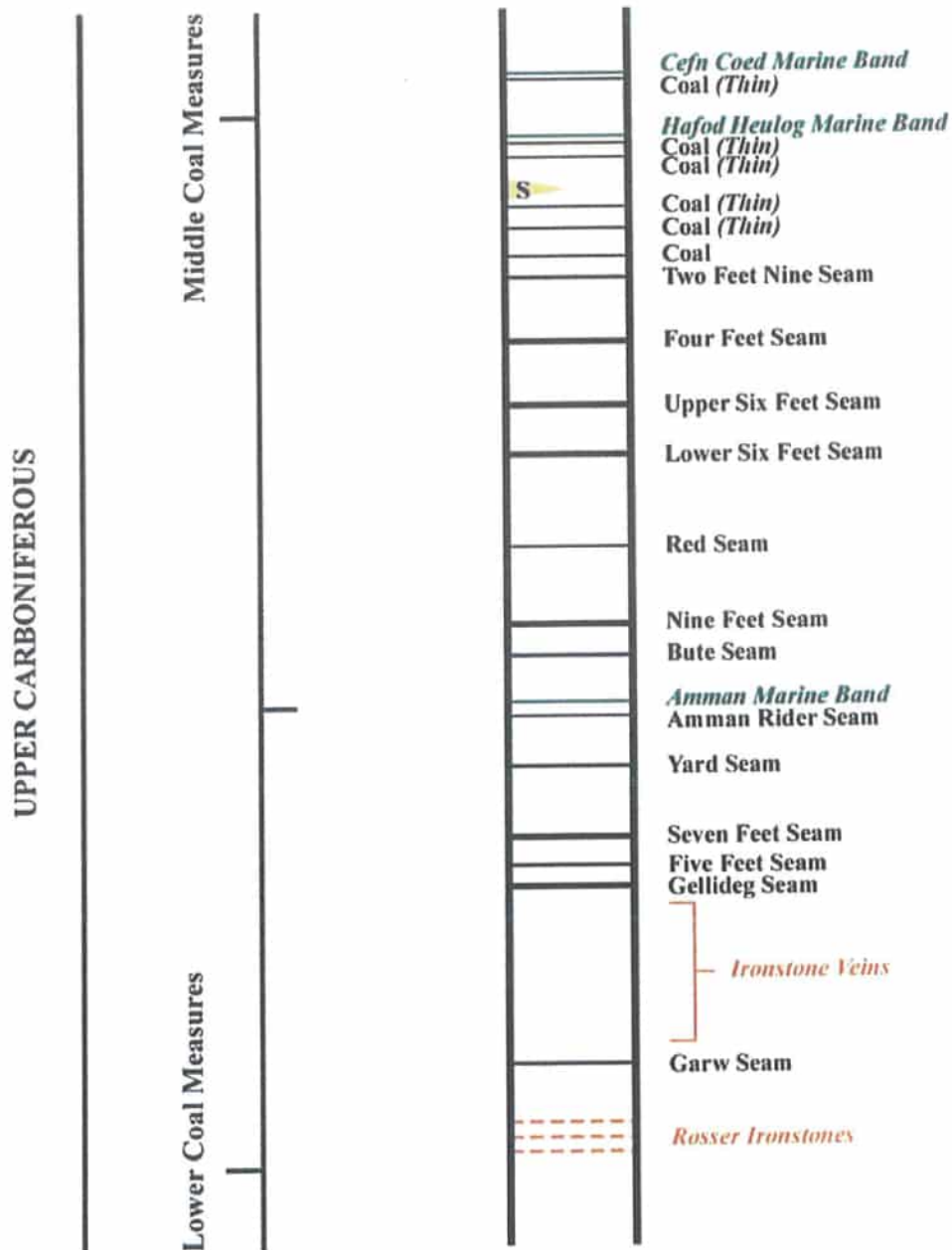
3 Geology of the Site

The Site is situated near the northern margin of the South Wales Coalfield and is underlain at shallow depths by strata assigned to the Middle Coal Measures, a sub-division of the Upper Carboniferous Period. The most recently published geological sheet at 1:10,560 scale (SO 00 NW) shows the inferred positions of the outcrop of the Upper Six Feet Seam to be present approximately 50m north-east of the Site (see *Geology Plan, drawing no. BC/MB/08.09.01.02*). However, mining records indicate that the outcrop of the Seam actually passes through the Site (see *Extract from Mine Records Plan: Six Feet Seam, drawing no. BC/MB/08.09.01.04*). The published geological sheet shows the outcrop of the Nine Feet Seam to be present approximately 100m north of the Site, mining records indicate it may be a little further north than this. The average dip of the strata in the region is 1 in 13 towards the south-south-west.

/Cont....

Part of the Stratigraphic Column.

Scale: 1 inch to 100 feet.



When both sets of records are taken together it is apparent that the Six Feet Seam outcrops within the confines of the Site and the Nine Feet Seam outcrops a relatively short distance to the north of it so that the Six Feet Seam underlies much of the Site at very shallow

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depths and the Nine Feet Seam underlies the whole of the Site at relatively shallow depths. A thin coal seam, the Red Seam, is sometimes present between the above two seams, but its presence has not been confirmed in this area. Exploratory drilling carried out in the surrounding area indicates that the Upper and Lower Six Feet Seams are two separate seams in some areas of Heolgerrig and elsewhere are one, thick, composite seam. Exploratory drilling within this Site suggests that the Six Feet Seam is there represented by the two separate seams, the Upper Six Feet Seam and the Lower Six Feet Seam. The Red Seam was not identified in exploratory drilling within the Site and the Nine Feet Seam was not encountered, being deeper than the maximum depth of the boreholes (30m).

Other coal seams underlie the Site at increasing depths, the principal ones, in descending order, are the Bute, Yard, Seven Feet, Five Feet/Gellideg and the Garw Seams (see *Part of the Stratigraphic Column*, above); there are also a number of ironstone veins below the Five Feet/Gellideg Seam.

The coal measures of the South Wales Coalfield have been affected by large faults. In the Heolgerrig area these large faults have a slightly sinuous trace at the surface and an average trend towards the north-west. The published geological sheet indicates that the Site is not affected by large scale faulting.

The published geological sheet also indicates that the coal measures locally are overlain with deposits of glacial boulder clay and that a lenticular area at the south-western end of the Site is occupied with made ground, likely to be colliery spoil. Ground investigation carried out on the Site by Terra Firma confirmed the presence of both soils. Published geological records indicate that the Site is not affected by landslip.

4 Mining History

The area has been subject to extensive mining operations for both coal and ironstone dating back to the earliest part of the nineteenth century. Coal seams and ironstone veins were accessed by adits driven into the mining horizons near their outcrops and by shafts sunk into the

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deeper coal seams and ironstone veins and there are a large number of disused shafts and adits in the locality. Air shafts were also sunk in order to provide ventilation to the underground mining operations. Our search of mining records found the Site to be underlain by old workings in a number of coal seams and ironstone veins, many of which are at considerable depths beneath the Site.

The shallowest seam underlying the Site that is thick enough to have supported underground mining operations is the Six Feet Seam, which outcrops within the Site and underlies much of it at relatively shallow depths; it is a coal seam of variable thickness and structure that has been mined in patches across a large area of the district in underground mining operations. Mining records show that the Seam was mined fairly intensively across the southern half of the Site, the workings were prosecuted from J.S. Jones' Levels (see *Extract from Mining Records Plan: Six Feet Seam, drawing no. BC/MB/08.09.01.04*). Older and unrecorded workings may also be present close to the outcrop of the seam, where so called 'crop robbing' mining may have taken place. The mining plan shows that one of J.S. Jones' Levels (disused) was situated within the Site, at its north-eastern corner, and that a disused air pit is also present within the confines of the Site; the second of the disused J.S. Jones' Levels lies immediately outside the Site. The Site was also undermined in the Nine Feet Seam prior to 1854 (see *Extract from Mining Records Plan: Nine Feet Seam, drawing no. BC/MB/08.09.01.05*).

Otherwise, there are no active coal mines in the locality, either deep mines or opencast, that would affect the structural integrity of the proposed dwellings and the Site has not previously been part of an opencast coal site.

5 Mine Gases

A number of studies of the old workings around Heolgerrig and dating back to the mid to late nineteenth century have shown that there is little risk from mine gases. This may be as a result of the nature of the coal seams or because the shallow old workings have vented most of the mine gases to atmosphere or is as a result of the combination of the two.

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6 Risk Assessment: Discussion and Recommendations

6.1 Solid Geology

There are no features associated with the solid geology of the Site that would require any particular measures to be included in the design and construction of the foundations for the proposed dwelling. It is recommended that no further action is required in this respect.

6.2 Mining History

6.2.1 Shallow Mine Workings

The area has been subject to extensive underground mining operations since at least the earliest part of the nineteenth century. The Six Feet Seam is the shallowest coal seam underlying the Site that is thick enough to have supported underground mining operations. Mining records indicate that the Seam has been intensively worked beneath the Site and exploratory boreholes drilled there have encountered old workings at very shallow depths. Mining records suggest that the seam outcrops within the Site so that a strip across the north of the Site and beyond the Seam's outcrop may be free from the risk of shallow mine workings, the Nine Feet Seam being too deep to pose a risk. However, the position of the outcrop as shown on the mine plan should be viewed as an approximate position and the presence of subsidence hollows in the north of the Site, indicating the collapsing of shallow mine workings, means that the area should be developed with caution.

The Nine Feet Seam is the next lowest thick coal seam in the geological sequence below the Six Feet Seam and has been extensively worked across the area. The old workings present in the Seam and underlying the Site will be at too great a depth to affect the structural integrity of the proposed dwellings. Similarly, other coal seams and ironstone veins further down in the geological sequence are all too

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deep and/or are of an age such that they will not affect the structural integrity of the proposed dwellings.

6.2.2 *Mine Entries*

Mining records indicate the presence of a disused air shaft near the north-eastern corner of the Site and also a disused mine adit in the north-eastern corner of the Site; a second disused adit lies immediately outside the north-eastern corner of the Site. The Coal Authority has no record that any of the entries has been stopped up to an acceptable engineering standard and it must be presumed, until proven to the contrary, that the two lying within the Site pose a risk to any surface development there.

The mouth of the second adit lies outside the confines of the Site and therefore beyond the client's control. We are not aware of any treatment of the adit during the construction of Winchfawr Park and it is prudent to assume that the mouthing has not been stabilised. To militate against any interaction in the event of the mouthing collapsing, no hard development should take place within an exclusion zone to be determined until the risk of interaction has been fully assessed and appropriate protection measures included. The exclusion zone should be based on the findings of an examination of ground conditions in the north-eastern corner of the Site.

Underground roadways leading from the two adit mouthings and present at very shallow depths beneath the Site are at a particularly high risk of collapse to the surface. The disused air shaft poses a risk both from the fact that there may be no safe cap on it or else by virtue of it collapsing into itself, resulting in subsidence in the area immediately around it.

6.2.3 *Mine Gases*

Various studies of the shallow old workings in the Heolgerrig area have found no particular risk from mine gases. However, it would be prudent to monitor any

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further exploratory boreholes for evidence of mine gases and to also monitor near the adit mouth and air shaft during any further drilling operations.

6.3 Risk Assessment

There is a risk of surface subsidence across most of the Site as a result of shallow mine workings in the Six Feet Seam. There is also a risk of surface subsidence/collapse near the disused air shaft and the two adits near the north-east corner of the Site. The risk from mine gases is thought to be low.

6.4 Recommendations

The risk resulting from the mining heritage at the Site should be further explored with a combination of exploratory boreholes, trenching and, if appropriate, geophysical techniques. These are standard and common place techniques used to examine shallow mine workings and disused mine entries across mining areas such as South Wales. It would be prudent to include in any future exploration programme monitoring to assess the presence or otherwise of mine gases.

The risk from the mining relics should variously be reduced by means of commonly used techniques including, as appropriate, drilling and grouting of shallow mine workings, capping of the shaft, excavating out and/or drilling and grouting of the adit. An exclusion zone should be designed around the disused adit lying immediately outside the north-eastern corner of the Site; no hard development should take place within the exclusion zone without a full assessment of the risk and adequate safeguards being included.

**Dr Malcolm Blandford,
Chartered Geologist.**

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PLANS



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Geologists Working With The Environment...

Study on Land at Winchfawr Road, Merthyr Tydfil.

General Location Plan.

Plan Scale: 1:50,000.

Key to Symbols:



Approximate Position of Site.

Note:

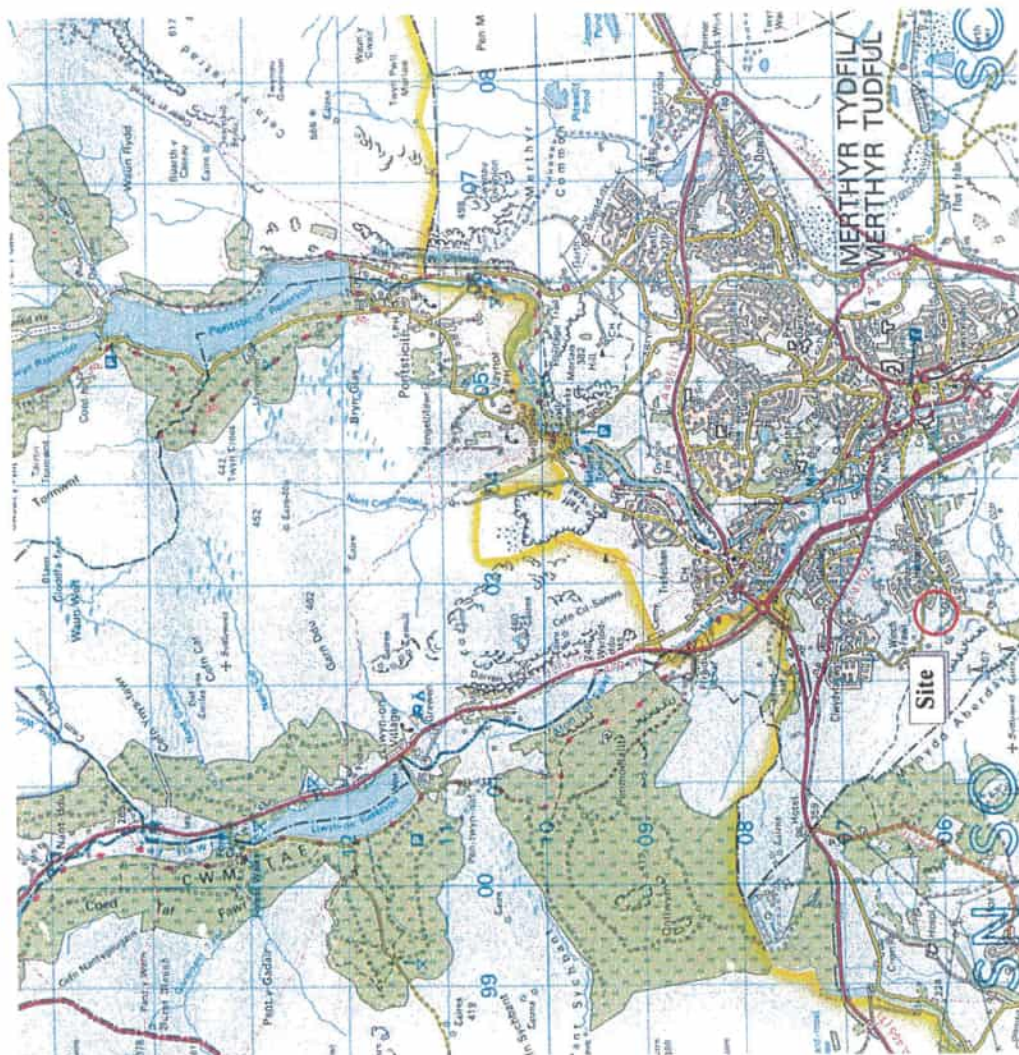
North is at top of plan.

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Study on Land at Winchfawr Road, Merthyr Tydfil.

Geology Plan.

Plan Scale: 1:10,560.

Key to Symbols:

— Approximate Site Boundary.

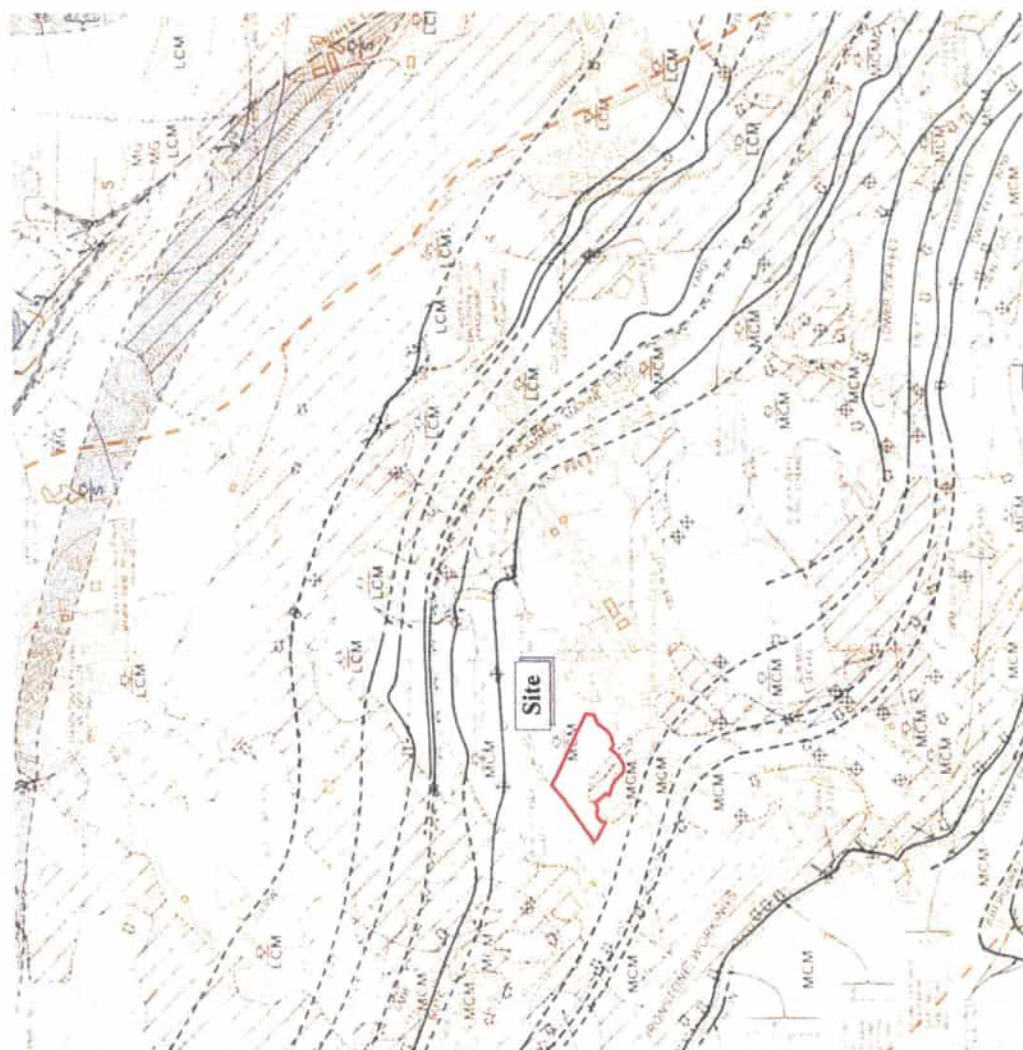
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Drawing No: BC/NB/08.09.01.02.



Study on Land at Winchfawr Road, Merthyr Tydfil.

Detailed Location Plan.

Plan Scale: 1:1,250.

Key to Symbols:

— Approximate Site Boundary.

Note:

North is at top of plan.

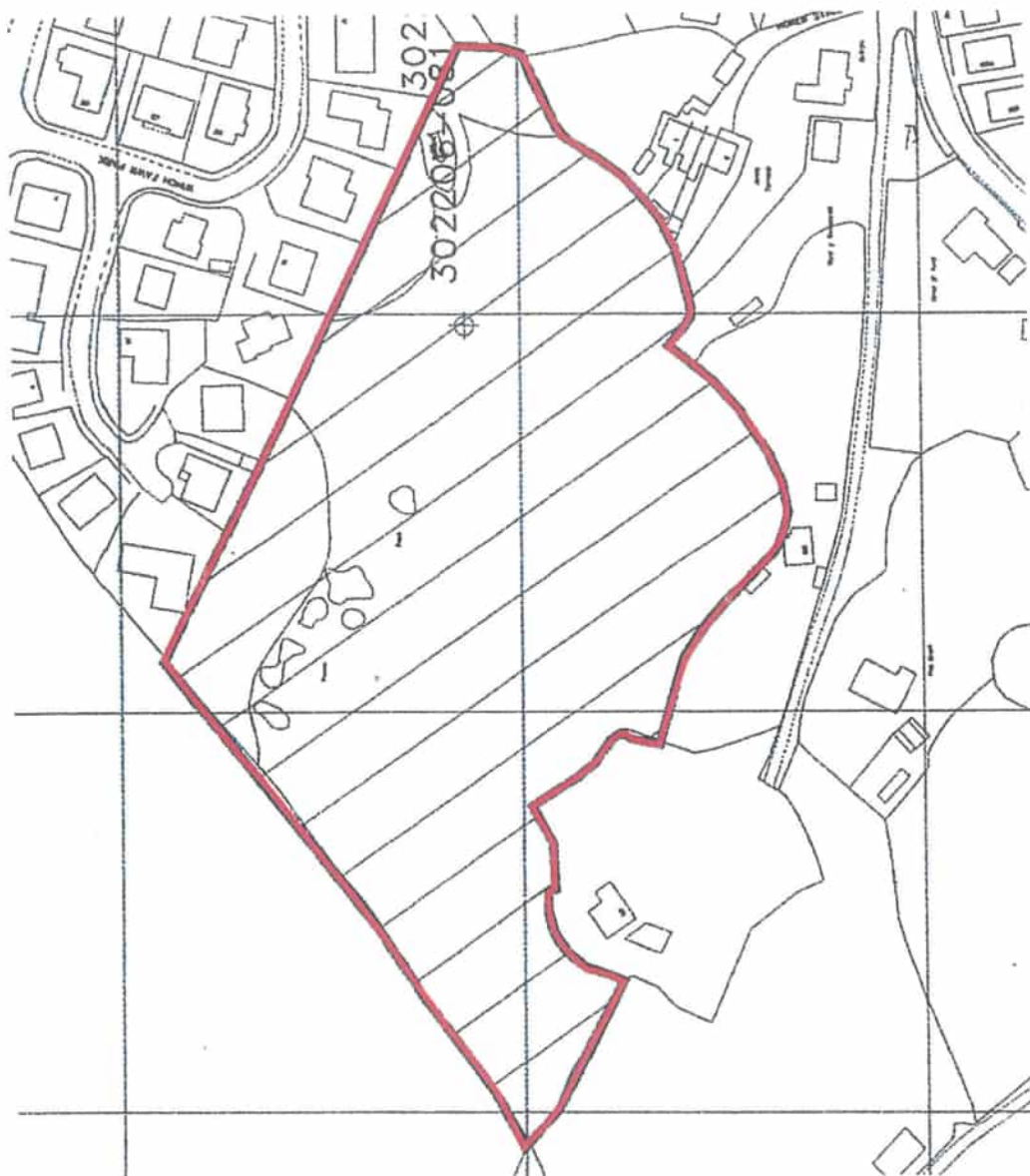
Drawing extracted from documents provided by client.

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Drawing No: BC/MB/08.09.01.03.



Study on Land at Winchfawr Road, Merthyr Tydfil.

Extract from Mine Records Plan. - Six Feet Seam -

Plan Scale: 1:2,500.

Key to Symbols:

— Approximate Site Boundary.

△ Approximate Location
of Disused Adit.

⊕ Approximate Location
of Disused Shaft.

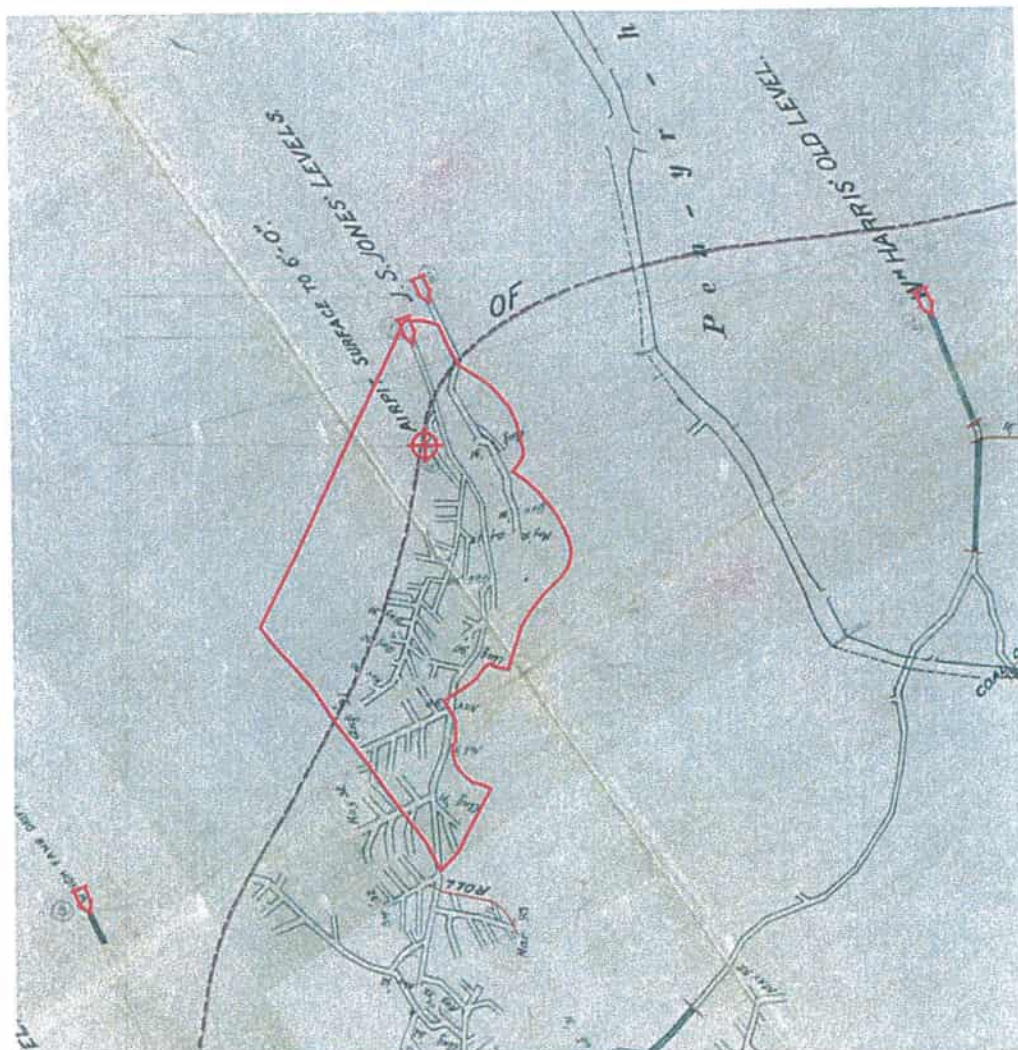
Note: North is at top of plan.

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Drawing No: BC/MB/08.09.01.04.



Study on Land at Winchfawr Road, Merthyr Tydfil.

Extract from Mine Records Plan. - Nine Feet Seam -

Plan Scale: 1:2,500.

Key to Symbols:

— Approximate Site Boundary.

Note: North is at top of plan.

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Drawing No: BC/MB/08.09.01.05.



APPENDIX



THE ENTERPRISE CENTRE,
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CF14 5DR

This matter is being dealt with by Phil Huddleston

Our Ref: 00009185-05
Your Ref: 8966-HEOLGERRIG
Electronic Ref: EME_00002620780001_005
RRUID: 005.00002620780001
Date: 11 April 2005

Dear Sir,

Coal Mining Report
**LAND ADJACENT TO 8, WINCHFAWR PARK, HEOLGERRIG, MERTHYR
TYDFIL**

I refer to the enquiry dated 08th April 2005, received 08th April 2005, in connection with the above.

This report is based on and limited to the records in the possession of The Coal Authority at the time the search is answered.

Past Underground Mining

The property is within the likely zone of influence on the surface from workings in 4 seams of coal at shallow to 80m depth, the last date of working being 1950.

Present Underground Mining

The property is not within the zone of likely physical influence on the surface from any present underground coal workings.

Future Underground Mining

The property is not within a geographical area for which a licence to extract coal by underground methods is awaiting determination by the Coal Authority.

The property is not within a geographical area for which a licence to extract coal by underground methods has been granted.

The property is not within the zone of likely physical influence at the surface from plans of future workings in our possession.

However reserves of coal exist in the locality which could be worked at some time in the future subject to feasibility, licences, and planning consents.

We have no record of any notice of the risk of the land being affected by subsidence being given under S.46 of the Coal Mining Subsidence Act 1991.

Shafts and Adits

Within or within 20 metres of the property there are 2 mine entries, the approximate positions of which are shown on the attached plan. Your attention is drawn to the statements made on that plan.

We have no record of what steps, if any, have been taken to treat the mine entries.

The records held by the Coal Authority may be incomplete. Consequently, there may exist in this locality mine entries of which we have no knowledge.

Surface Geology

Records in our possession do not disclose any fault or other line of weakness at the surface as having affected the stability of the property.

Past Opencast Mining

The property is not located within the geographical boundary of an opencast site from which coal has been extracted by opencast methods.

Present Opencast Mining

The property does not lie within 200 metres of the geographical boundary of an opencast site within which coal is being extracted by opencast methods.

Future Opencast Mining

The property is not within 800 metres of the geographical boundary of an opencast site for which a licence to extract coal by opencast methods is awaiting determination.

The property is not within 800 metres of the geographical site boundary of an opencast site for which a licence to extract coal by opencast methods has been granted.

Subsidence

The records in our possession do not disclose any damage notice or claim having been given, made or pursued in respect of the property since 1 January 1984.

The records in our possession do not disclose any current "Stop Notice" affecting the property.

The records in our possession do not show any request having been made to execute preventative works under S.33 of the Coal Mining Subsidence Act 1991.

Withdrawal of Support

The property does not lie within a geographical area in respect of which a notice of entitlement to withdraw support has been published.

The property does not lie within a geographical area in respect of which a notice has been given under S.41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not within a geographical area that is the subject of an Order made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not within an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Additional Remarks

In view of the mining circumstances a prudent developer would seek appropriate technical advice before works are undertaken on site. All proposals should have regard to good engineering practice in mining areas as identified in authoritative publications on mining stability problems. In any event, no activities should be undertaken that intersect, disturb, or interfere with any coal or mines of coal without permission of the Coal Authority.

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We acknowledge the receipt of your remittance in payment of our fee.

Yours faithfully

A handwritten signature in black ink, appearing to read 'S Pennell', with a stylized flourish at the end.

Stephen Pennell

Director of Mining Information and Services



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This is a plan of the boundaries of the property in respect of which this report has been prepared. It is the responsibility of the user to ensure that the boundaries shown correspond with those of the property.

APPROXIMATE POSITION OF ENQUIRY BOUNDARY SHOWN



APPROXIMATE POSITION OF DISUSED MINE SHAFTS SHOWN



APPROXIMATE POSITION OF DISUSED MINE ADITS SHOWN



This plan shows the approximate location of the disused mine entry/entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A DTI leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0845 762 6848.

If you wish to discuss the relevance of any of the information contained in the attached report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are available at our Mansfield office, free of charge, by prior appointment, telephone 01623 638233. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.