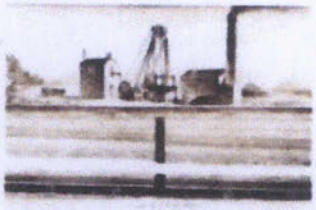
P2018/0139



nkc Geotech Ltd
engineering geologist specialising in the investigation and treatment of disused mineworkings

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WREXHAM COUNTY BOROUGH COUNCIL
20 FEB 2018
PLANNING DEPARTMENT

Coal Mining Risk Assessment



Afoneitha Road, Penycae

Michael Hughes
44 Comet Drive
Shrewsbury
SY1 4AZ

1803
3 January 2018

Coal Mining Risk Assessment

Introduction

Site owners, Mr & Mrs W Roberts of Cefn-y-Fedw, Penycae, LL14 1UA have submitted an application seeking outline planning permission for residential development on land south of Pinecroft, Afon Eitha Road, Penycae, LL14 2PF.

nkc Geotech Ltd of 25 Grosvenor Road, Wrexham, LL11 1BT have been commissioned to prepare a Coal Mining Risk Assessment Report of the proposed development site in order to provide the Local Planning Authority with information on coal mining and an assessment of its impact on land stability.

Site Location and Description

The site, identified edged red on the plan at Appendix 1 lies on the east side of Afon Eitha Road within the built-up area of Penycae. This was originally part of a larger site but planning permission was granted for the residential development of the northerly part in 2004. This has since been been developed as the Pinecroft housing estate.

The residual area – the application site – remains as a plot of unused land with an area of 2750 sq m. .Although at its south and east edges the site slopes down steeply to the Afon Eitha river and the recreation ground respectively the major part is flat and at approximately the same level as the adjoining Afon Eitha Road and the aforementioned Pinecroft housing estate.

Prior to their disposal of the land subsequently developed as Pinecroft Mr & Mrs Roberts were required by potential purchasers/developers to provide an *Environmental Report.* This study was carried out in 2005 by specialist consultants Richards Moorehead & Laing Limited of Ruthin and its scope was extended to include the current application site. It involved the excavation of five trial pits which revealed that the site is made up-ground and this is also an incidental finding of this Coal Mining Risk Assessment. This issue can be addressed satisfactorily – as it was in the case of the adjoining Pinecroft - by the use of raft foundations as opposed to the conventional strip foundations.

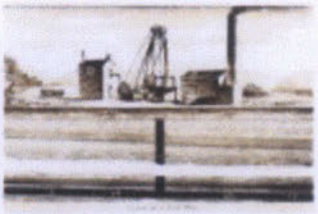
Description and Layout of the Proposed Development

This is an application for outline planning permission. The precise type and number of dwellings will be determined by a subsequent purchaser/developer. However what is clear at this stage is that the site will be developed by an access spur off the existing Pinecroft estate road as indicated on the plan at Appendix 2.

Scope of the Coal Mining Risk Assessment

The purpose of this Coal Mining Risk Assessment Report is to:

- **Present a desk-based review of all available information on the coal mining issues which are relevant to the application site;**
- **Use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;**
- **Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and**
- **Demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.**



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Site

Vacant development site for five dwellings adjacent to the recent Pinewood residential site which was completed by W D Stant in 2012.

Risk Assessment by
Neil Catlow B.Sc F.G.S Engineering geologist.

Summary of relevant mining information
Publication CIRIA32 'Construction over Abandoned Mineworkings'
Coal Authority Report 51001753151001 dated 3rd January 2018
Ordnance Survey 1:2500 First Edition 1875
Geological Survey 1:10560 plans

Nkc Geotech Ltd reports:
0716 Afoneitha Road, Penycae adjacent north June 2007
9813 Afoneitha Road, Penycae adjacent west May 1998
8903 Afoneitha Road, Penycae adjacent west June 1989

Past underground coal mining
Coal mining in Rhos and Penycae is recorded in 1452 when the area was part of the Ruabon 'waste' (ie common land) and mineral rights belonged to the Myddleton family of Chirk Castle. Industrial mining deeper than the outcrop workings and simple bell pits of the 'coal farms' in the 'waste' dates from the 16th century when there are descriptions of dangerous open shafts in Ponciau and Rhos The last underground coal mining in Penycae was the Wynne Hall Colliery immediately west of the site, finally abandoned in 1876 following flooding.

There are records of past mining directly under the site from Afoneitha Colliery in the Wall & Bench coal seam at a depth of 80m in 1863. Until 1887 there was no statutory requirement to make and preserve plans of mineworkings, and mining activity prior to 1887 in shallow coal seams is consequently predominantly unrecorded.

The Geological Survey of 1875 shows the outcrops of a coal seams known locally as the Stone Coal, now termed Crown Coal by the Coal Authority, trending north-south across the site. The strata dips south-east at approximately 1 in 8.

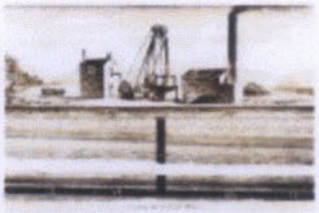
Previous investigations by myself and others has confirmed that three closely bedded seams known locally as the Stone Coal, Half Yard Coal and Nant Coal have been extensively mined in the past.

Present underground coal workings
There is no current coal mining within 20km of the site.

Future underground coal workings
There are no current coal mining proposals within 20km of the site.

Recorded mine entries on or within 20m of the site boundary
The Coal Authority have no records of any mine entries on or within 20m of the site. The nearest recorded shaft is Wynn Hall Foundry Pit, 80m deep to the Wall & Bench Coal and located 100m south-east of the site.

Coal mining geology
The Coal Authority have no records of any damage caused by geological faults.



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Past opencast mining
There are no former opencast coal mining sites within 200m of the site.

Present opencast mining
There are no current opencast coal mining sites within 200m of the site.

Future opencast mining
There are no proposed opencast coal mining sites within 800m of the site.

Mine gas emissions
There are no recorded mine gas emissions within the site boundary.

Faults
There are no faults shown on the published Geological Survey.

Surface hazards
There are no recorded remedial works being carried out by the Coal Authority on the site nor any subsidence claims.

Further information

Neither the Coal Authority nor the Ordnance Survey have records of any mine entries on or close to the site. The nearest known mine entries are 100m south-east of the site, but previous work by Nkc Geotech in Afoneitha has proved extensive unrecorded past shallow mining activity within 15m of the surface which pre-dates the requirement to keep mining records. Investigations on housing developments at Coed y Nant for Edward W Gittins in 1989, 100m west of the site, and at Oakleigh for Watkin Jones Ltd, 250m north-west of the site, encountered shallow mineworkings and shallow shafts in the Lower Yard Coal and Nant Coal seams.

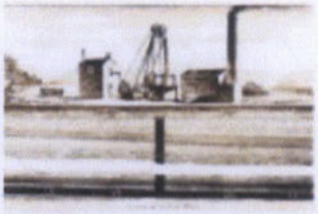
Intrusive investigation

Coal Authority Permit
Permit 15454 covers the following intrusive investigation for shallow mineworkings. Five holes were drilled to 30m depth to confirm the geology and investigate the presence of past shallow mining activity.

Gas testing
There were no methane or carbon dioxide emissions during the investigation period. See borehole logs for gas testing results.

Foundation soils
Shale and ash fill upto 6.5m in thickness infills the valley and overlies brown sandy clays with large gravel. Rockhead is predominantly brown weathered sandstone increasing in depth from 8.5m to 10.8m eastwards downstream. The fill is colliery derived, infilling the valley and dates from the period of the Ruabon Brook Tramway, connecting collieries in Penycae to the Llangollen Canal at Acrefair. A branch of the tramway terminated at Afoneitha Colliery north of and above the site in 1808, crossing the river on a bridge adjacent to the present road bridge which dates from 1895.

See borehole logs for SPT testing results.



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Shallow mineworkings

The probable outcrop of a seam of coal known locally as the Stone Coal was proved at a depth of 10.8m in Bh 4. A deeper seam known locally as the Half Yard Coal was encountered at depths increasing from 20.2m to 23.5m eastwards. This coal is only 500mm thick and interleaved with black shales. No evidence of past shallow mining activity was encountered in the five holes and no other coal was found.

Conclusions

The drilling results show the site must lie immediately west of the eastward dipping Stone Coal outcrop. There was no evidence of any past mining activity in the Half Yard Coal and the seam is of poor quality, interbedded with black shales.

There is no necessity to take structural precautions against coal mining subsidence.

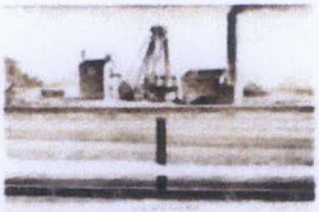
Although there is no evidence of shallow mineworkings under the site, the presence of over 4.0m of shale fill precludes conventional foundations and I recommend raft foundations for the proposed buildings.

For Nkc Geotech Ltd

[redacted]

Neil Catlow, B.Sc, F.G.S

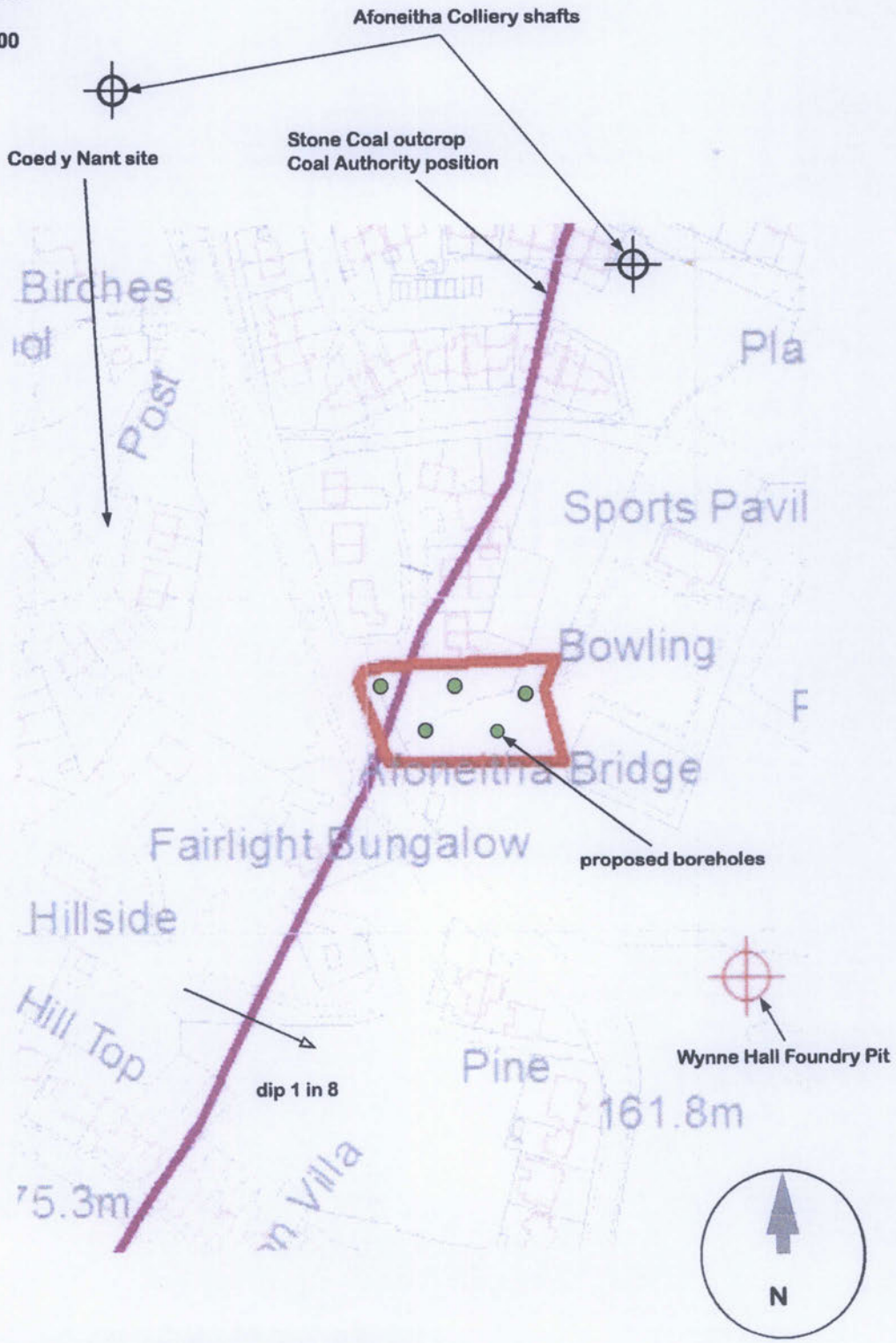
Appendix 3

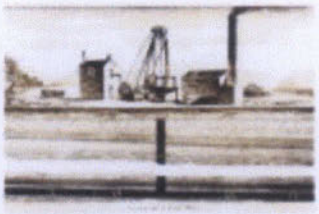


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Geology Plan

scale 1:2000

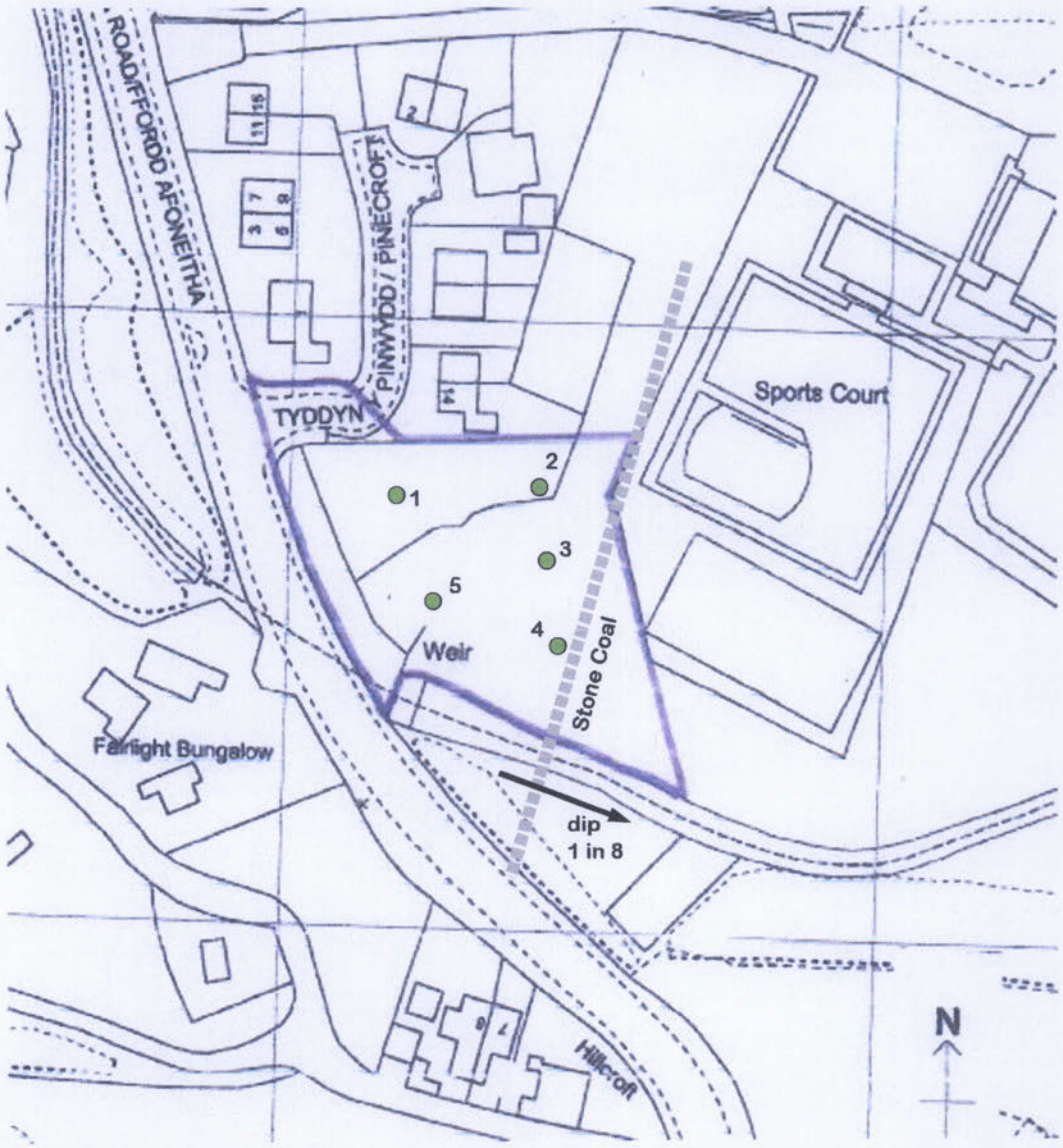


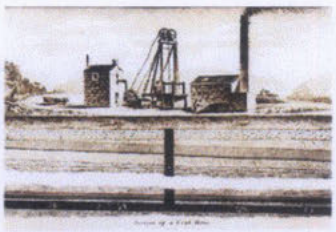


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Borehole Plan

scale 1:1250





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Bh 1

REF	1803	SITE	Afoneitha, Penycae	PRINTOUT	1 Feb 2018
Bh	1	CLIENT	Mr & Mrs Roberts	SCALE	1:200
				OSGN	
		TITLE			
				ORIENTATION	vertical
		ORIGIN	printout direct from rig on site	FLUSH	water
			drilled & logged by Neil Catlow	BIT	75mm T/C

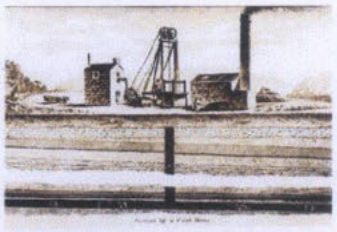
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						ground level
0.0	0.0	fill		grey shale		
0.5						
1.0					5 @ 1.0	
1.5						
2.0					6 @ 2.0	
2.5						
3.0					6 @ 3.0	
3.5						
4.0					7 @ 4.0	
4.5	4.5	clay		brown, silty, with stones, firm		
5.0						
5.5	5.2	gravel		brown, with sand		
6.0						
6.5						
7.0						
7.5						
8.0						rockhead
8.5	8.5	sandstone		brown, firm drilling		
9.0						
9.5						
10.0						
10.5						
11.0						
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5	15.6	shale		dark grey, firm drilling		
16.0						
16.5						
17.0						
17.5						
18.0						
18.5						
19.0						
19.5						
20.0	20.2	coal		black, firm drilling		Half Yard Coal
20.5						
21.0	20.8	shale		dark grey, firm drilling with black shale layers		
21.5						
22.0						
22.5						
23.0						
23.5						
24.0						
24.5						
25.0						
25.5						
26.0						
26.5						
27.0						
27.5						
28.0						
28.5						
29.0						
29.5						
30.0	30.0			bottom of hole		

[redacted]

IN HOLE GAS TESTING

% O2	20.6
% CH4	0.0
% CO2	0.0
% LEL	0.0
ppm H2S	0.0
ppm CO	0.0

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Bh 2

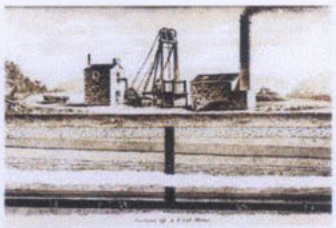
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				OSGN	
		TITLE			
				ORIENTATION	vertical
		ORIGIN	printout direct from rig on site	FLUSH	water
			drilled & logged by Neil Catlow	BIT	75mm T/C

	DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	SECTION
						ground level
0.0	0.0	fill		grey shale	not taken	
4.0	4.1	clay		brown, sandy, firm		
6.0	6.1	gravel		brown, with sand		
10.0						rockhead
10.5	10.2	sandstone		brown, firm drilling		
15.0	15.1	shale		grey, firm drilling		
22.5	22.8	coal		black, firm drilling		Half Yard Coal
23.5	23.3	shale		dark grey, firm drilling with black shale layers		
30.0	30.0					

% O2	20.6
% CH4	0.0
% CO2	0.0
% LEL	0.0
ppm H2S	0.0
ppm CO	0.0

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[redacted]



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Bh 3

REF	1803	SITE	Afoneitha, Penycae	PRINTOUT	5 Feb 2018
Bh	3	CLIENT	Mr & Mrs Roberts	SCALE	1:200
				OSGN	
		TITLE			
				ORIENTATION	vertical
		ORIGIN	printout direct from rig on site	FLUSH	water
			drilled & logged by Neil Catlow	BIT	75mm T/C

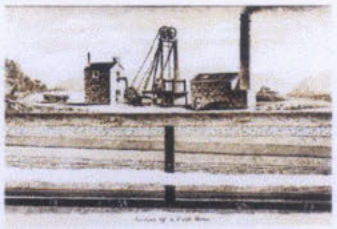
	DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	SECTION
						ground level
0.0	0.0	fill		grey shale		
0.5						
1.0					4 @ 1.0	
1.5						
2.0					6 @ 2.0	
2.5						
3.0					6 @ 3.0	
3.5						
4.0					5 @ 4.0	
4.5	4.5	clay		brown, sandy, firm		
5.0						
5.5						
6.0						
6.5						
7.0	7.1	gravel		brown, with sand		
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5						rockhead
11.0	10.8	sandstone		brown, firm drilling		
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5						
16.0						
16.5						
17.0						
17.5						
18.0						
18.5						
19.0	19.0	shale		grey, firm drilling		
19.5						
20.0						
20.5						
21.0						
21.5						
22.0						
22.5						
23.0	23.0	coal		black, firm drilling		Half Yard Coal
23.5						
24.0	23.5	shale		dark grey, firm drilling with black shale layers		
24.5						
25.0						
25.5						
26.0						
26.5						
27.0						
27.5						
28.0						
28.5						
29.0						
29.5						
30.0	30.0			bottom of hole		

[redacted]

IN HOLE GAS TESTING

% O2	20.6
% CH4	0.0
% CO2	0.0
% LEL	0.0
ppm H2S	0.0
ppm CO	0.0

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Bh 4

REF	1803	SITE	Afoneitha, Penycae	PRINTOUT	5 Feb 2018
Bh	4	CLIENT	Mr & Mrs Roberts	SCALE	1:200
				OSGN	
		TITLE			
				ORIENTATION	vertical
		ORIGIN	printout direct from rig on site	FLUSH	water
			drilled & logged by Neil Catlow	BIT	75mm T/C

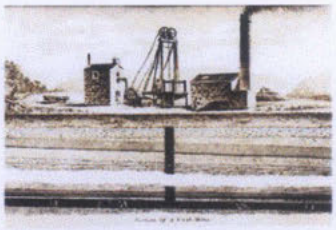
	DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	SECTION
						ground level
0.0	0.0	fill		grey shale	not taken	
0.5						
1.0						
1.5						
2.0						
2.5						
3.0						
3.5						
4.0	4.2	clay		brown, sandy, firm		
4.5						
5.0						
5.5						
6.0	6.2	gravel		brown, with sand		
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5						rockhead
11.0	10.8	shale		black, firm drilling		Stone Coal outcrop
11.5						
12.0	12.2	sandstone		brown, firm drilling		
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5						
16.0						
16.5						
17.0						
17.5						
18.0						
18.5	18.6	shale		grey, firm drilling		
19.0						
19.5						
20.0						
20.5						
21.0						
21.5						
22.0						
22.5						
23.0						
23.5	23.5	coal		black, firm drilling		Half Yard Coal
24.0						
24.5	24.1	shale		dark grey, firm drilling with black shale layers		
25.0						
25.5						
26.0						
26.5						
27.0						
27.5						
28.0						
28.5						
29.0						
29.5						
30.0	30.0			bottom of hole		

[redacted]

IN HOLE GAS TESTING

% O2	20.6
% CH4	0.0
% CO2	0.0
% LEL	0.0
ppm H2S	0.0
ppm CO	0.0

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Bh 5

REF	1803	SITE	Afoneitha, Penycae	PRINTOUT	6 Feb 2018
Bh	5	CLIENT	Mr & Mrs Roberts	SCALE	1:200
				OSGN	
		TITLE			
				ORIENTATION	vertical
		ORIGIN	printout direct from rig on site	FLUSH	water
			drilled & logged by Neil Catlow	BIT	75mm T/C

	DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	SECTION
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0.5						
1.0						
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						
5.0						
5.5						
6.0						
6.5	6.4	gravel		brown, with sand		
7.0						
7.5						
8.0	8.0	clay		brown, silty, with stones, firm		
8.5						
9.0						rockhead
9.5	9.6	sandstone		brown, firm drilling		
10.0						
10.5						
11.0						
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5	14.6	shale		grey, firm drilling		
15.0						
15.5						
16.0						
16.5						
17.0						
17.5						
18.0						
18.5						
19.0						
19.5						
20.0	20.2	coal		black, firm drilling		Half Yard Coal
20.5						
21.0	20.7	shale		dark grey, firm drilling with black shale layers		
21.5						
22.0						
22.5						
23.0						
23.5						
24.0						
24.5						
25.0						
25.5						
26.0						
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28.0						
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29.0						
29.5						
30.0	30.0			bottom of hole		

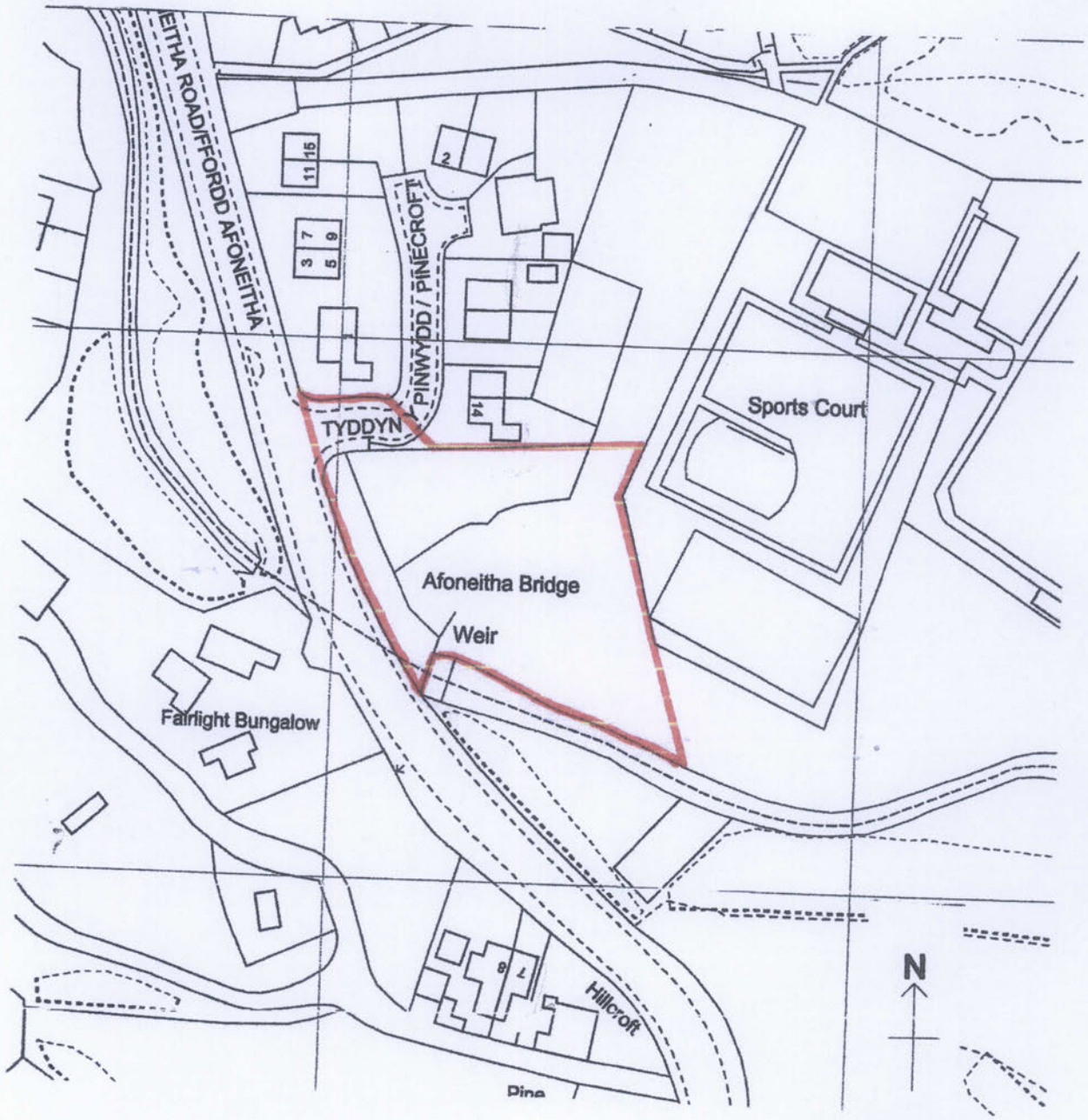
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IN HOLE GAS TESTING

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% CH4	0.0
% CO2	0.0
% LEL	0.0
ppm H2S	0.0
ppm CO	0.0

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Appendix 1

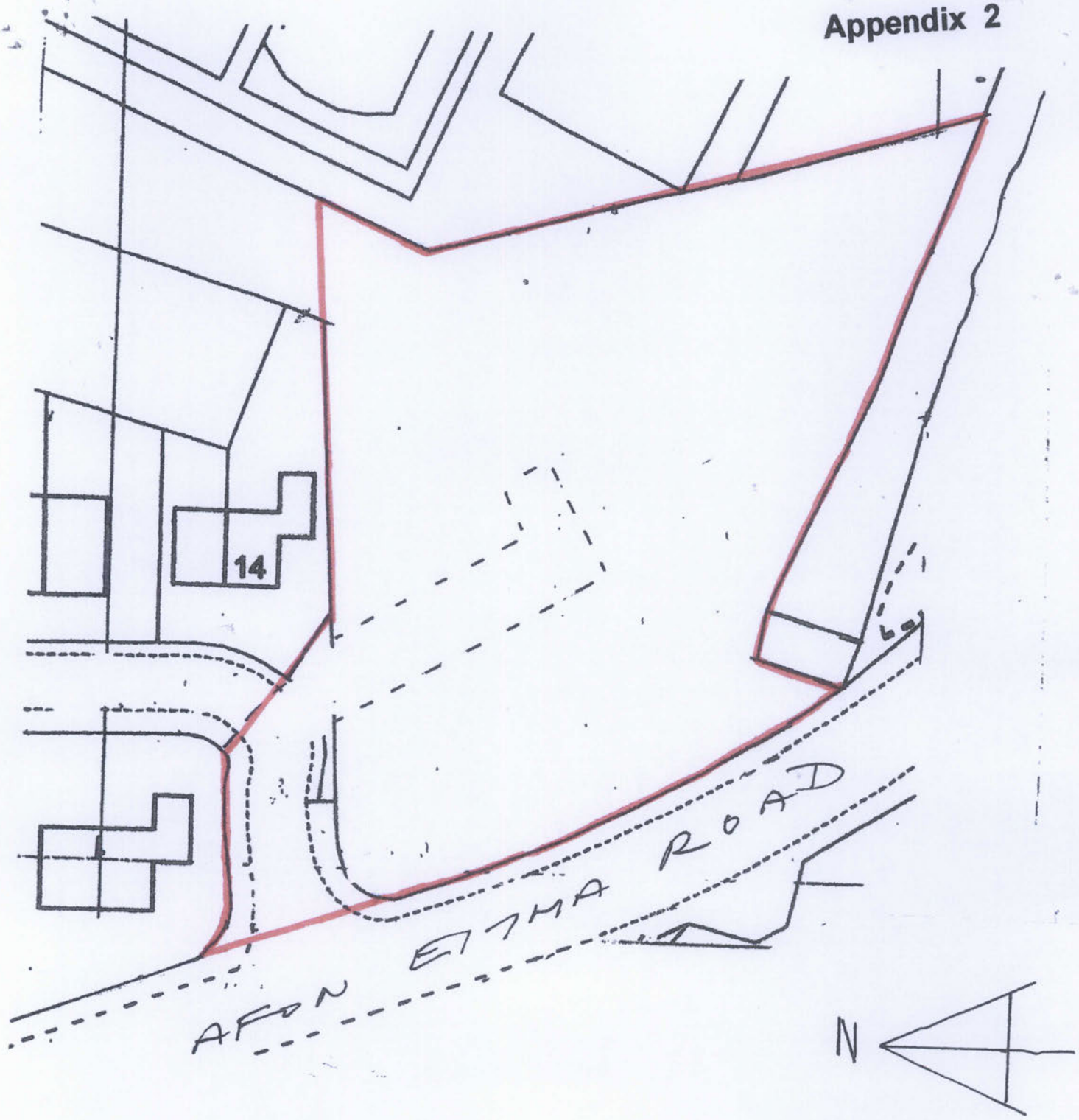


Location Plan

Proposed Residential Development
South of Pinecroft
Afon Eitha Road
Penycae

Scale 1:1250
Plan No WR/1

Appendix 2



Principle of Proposed Means of Access

Proposed Residential Development
South of Pinecroft
Afon Eitha Road
Penycae

Scale 1: 500
Plan No WR3



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Appendix 4

Borehole Plan

scale 1:1250

