



nkc Geotech Ltd

engineering geologist specialising in the investigation and treatment of disused mineworkings

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Mining Investigation Report



Towers Day Nursery, Acrefair

Ms Ruth Roberts
Towers Day Nursery
Tower Hill
Acrefair
LL14 3SG

1924
3 June 2019



NKC Geotech Ltd

Site

A proposed garage and storage unit adjacent to Towers Day Nursery, Tower Hill, Acrefair.

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 51001993197001 dated January 21 2019

Ordnance Surveys 1:2500 from First Edition 1871 to 1912

Geological Survey 1:10560 plans

Geotechnics Coal Mining Risk Assessment PN193948 May 2019

Coal Authority Permit 18214

Nkc Geotech Ltd reports:

1275 Trefynant Fireclay No 1 Pit March 1975

2375 Trevor Villa June 1975

2376 Trefynant Hall, Tower Hill August 1976

9625 Trefynant Hall, Tower Hill May 1996

9931 The Fairways, Tower Hill May 1999

0277 Hawthorns, Tower Hill February 1977

0506 Sara, Tower Hill March 2005

1003 Hafan, Tower Hill January 2010

1321 Hawthorns Annexe, Tower Hill July 2013

Investigation results

Ground level

Unchanged throughout the investigation.

Site history

The site is at the rear of Victorian housing on Llangollen Road. Prior to 2005 the site was garden and agricultural land on the west side of Tower Hill. There is no recorded former industrial use. I have investigated 8 sites on Tower Hill since 1975, each site being underlain by solid coal or old shallow mineworkings in the Llwyneinion Half Yard Coal.

The Coal Mining Risk Assessment PN193948 by Geotechnics earlier this month describes the geology and history of the area in full detail.

Gas testing

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

Foundation soils

Brown sandy clay and limestone fill upto 1.0m in thickness overlying firm brown sandy clay. Brown sandstone rockhead, the Llwyneinion Rock, lies at predominantly 2.0m.



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Geology

The site lies on Carboniferous Westphalian rocks that form the Ruabon Coalfield, heavily faulted and dipping to the west at 1 in 7. These rocks are predominantly shales and sandstones containing seams of coal upto 4.5m in thickness at vertical intervals typically varying from 4.0m to 20.0m. Those coal seams which were of economic importance were given an identity when they were of sufficient quality and thickness to justify extraction by mining from the surface or at depth from mineshafts. Typical names for local coal seams reflect primarily on quality and thickness, for example Yard Coal, Wall & Bench Coal and Half Yard Coal.

The Carboniferous Productive Coal Measures have a total thickness in Ruabon of 520m, the rocks under the site representing the lowest 100m of this succession and there are only three coal seams of economic importance in this part of Acrefair, in descending order: the Yard Coal, the Wall & Bench Coal and the underlying Llwyneinion Half Yard Coal. The Wall & Bench Coal is only present 60m north-east of the site, where it was mined in 1860, and is not relevant to the investigation.

The site is in an area where the Geological Survey has inferred outcrop positions by extrapolation from the former Trefynant Fireclay quarry excavations and shaft sections from their underground workings north-east of the site, and the strata encountered in my nine previous investigations in Tower Hill shows a simple structure with the Llwyneinion Half Yard Coal 400mm thick and underlain by a fireclay deposit 1.5m thick. The coal is overlain by a thick sandstone layer called the Llwyneinion Rock. The strata dips eastwards at 1 in 7 and I have encountered no major faults.

Shallow mineworkings

Past underground coal mining

There are no records of past mining in coal seams under the site, but coal mining could have taken place before the Mines Act of 1887 which placed a requirement on colliery owners to maintain and preserve plans of their workings. In addition to these workings, the Coal Authority believed that there was coal close to surface which could have been mined and therefore an intrusive investigation was carried out by drilling 1 hole to 30m depth and a further 5 holes to 15m depth over a 6.0m grid in the location of the proposed garage.

My previous investigations in Tower Hill proved that the Llwyneinion Half Yard Coal would be within 12m of the surface, with the overlying Wall & Bench Coal approximately 15m higher and therefore outcropping east of the site.

On the site, the unworked and thin Llwyneinion Half Yard Coal was proved to lie at depths of 10.0m to 12.0m, dipping east at 1 in 7. No evidence of past mining activity was encountered in any of the boreholes although I encountered workings under the adjacent property Hafan in 2005. See log for Bhs 1-6.

Recorded mine entries on or within 20m of the site boundary

The Coal Authority Report 51001993197001 dated January 21 2019 states that there are no recorded mine entries on or within 20m of the site. The nearest recorded shafts are 327242-424 located 60m north of Tower Hill, and 327242-499 40m south of the site within the Trefynant Fireclay works.



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Hazard management

The Geotechnics Coal Mining Risk Assessment PN193948 recommended drilling 3 holes to 30m depth over an area of 60 sq.m to investigate the geology underlying the garage. The drilling of 3 holes to 30m depth is valid on sites where the geology is uncertain, but my previous 8 investigations in Tower Hill, which includes the field immediately adjacent to the south-west boundary of the site where there is some evidence of outcrop workings, encountered the Llwyneinion Half Yard Coal at depths increasing from beyond outcrop to 15m and also proved the absence of any deeper coal seams within 30m of the base of the seam.

Accordingly, this investigation comprises one deep 30m hole to confirm again the known geology, followed by 5 holes to 15m depth which encountered the intact seam at depths varying from 11.0m to 12.7m. These holes were drilled within the area of the proposed garage to establish the condition of the ground at the Llwyneinion Half Yard horizon and enable remedial grouting to take place if any workings were found.

There is no evidence of past mining activity below the proposed garage in any of the 6 investigation holes and therefore no necessity to carry out remedial work to the Llwyneinion Half Yard Coal under the garage footprint.

Specialist foundations

Although there is firm sandy clay overlying sandstone at 2.0m depth it would be prudent for the proposed garage to use a structural foundation, designed to span 2.0m. This is because there is a possibility that unknown shallow workings may be present within 6m of the proposed building.

For Nkc Geotech Ltd



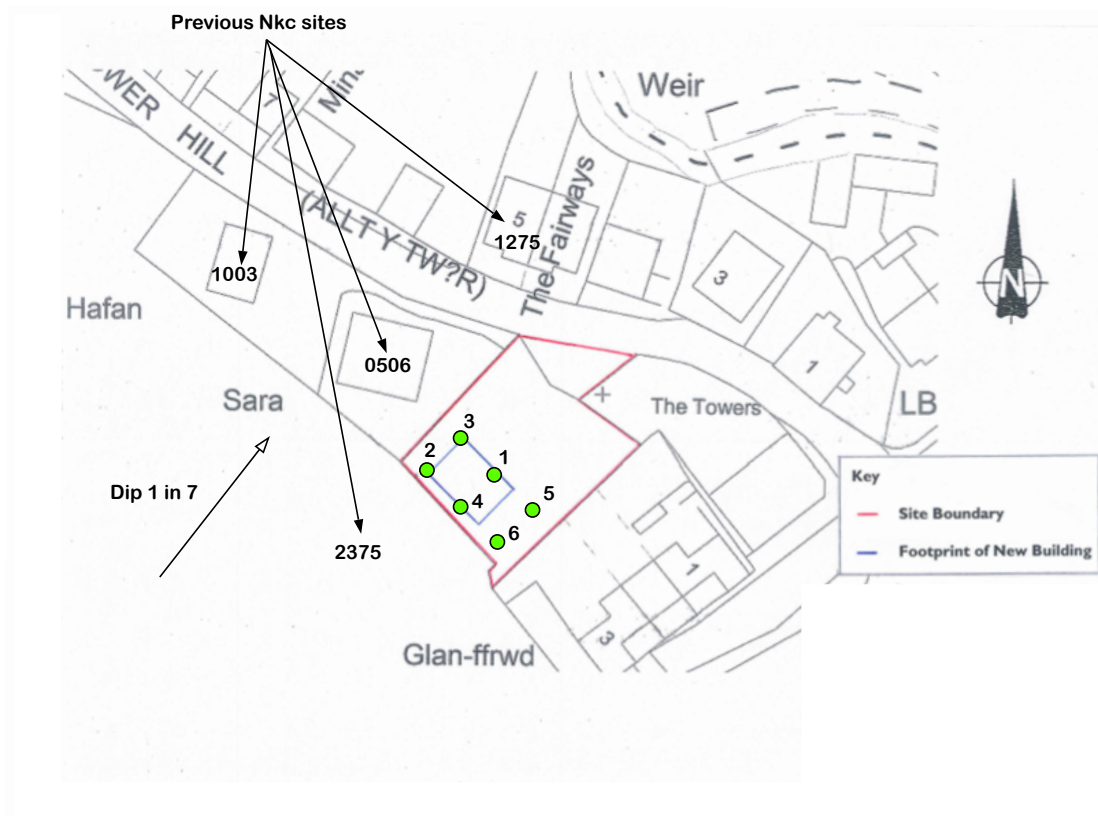
Neil Catlow, B.Sc, F.G.S

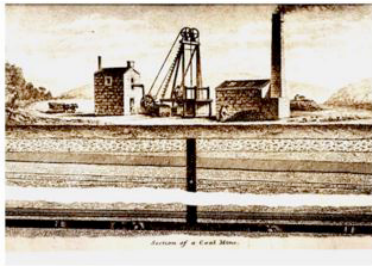


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Borehole plan

Scale 1:1000 @ A4





Bh 1

REF 1924
Bh 1

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT
SCALE
GL AOD

29 May 2019
1:200

TITLE

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

RIG
ORIENTATION
FLUSH
BIT

Montabert Hydrofore
vertical
fresh water piped supply
75mm T/C

DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill	grey shale and limestone	not taken	ground level
0.5					
1.0	1.0	clay	brown, sandy, firm		
1.5					
2.0	2.1	sandstone	brown, firm drilling with thin grey shale layers		rockhead
2.5					
3.0					Llwyneinion Rock
3.5					
4.0					
4.5					
5.0					
5.5					
6.0					
6.5					
7.0					
7.5					
8.0	8.2	shale	grey, firm drilling		
8.5					
9.0					
9.5					
10.0					
10.5					
11.0	11.2	coal	black, firm drilling		Llwyneinion Half Yard Coal
11.5	11.8	seatearth	light grey, soft drilling		
12.0					
12.5					
13.0	13.0	shale	grey, firm drilling		
13.5					
14.0					
14.5					
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19.5					
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20.5					
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21.5					
22.0					
22.5					
23.0					
23.5					
24.0	24.2	sandstone	brown, firm drilling		
24.5					
25.0					
25.5					
26.0					
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29.5					
30.0	30.0		bottom of hole		

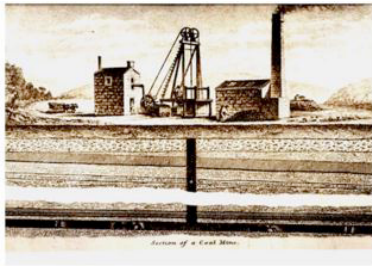
IN HOLE GAS TESTING

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



drilled and logged by
Neil Catlow B.Sc FGS

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25 Grosvenor Road
Wrexham
LL11 1BT
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Bh 2

REF 1924
Bh 2

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT
SCALE

29 May 2019
1:200

TITLE

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

RIG

Montabert Hydrofore

ORIENTATION

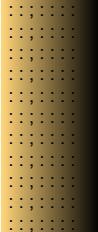
inclined west

FLUSH

fresh water piped supply

BIT

75mm T/C

	DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill		grey shale and limestone	not taken	ground level
0.5						
1.0	1.0	clay		brown, sandy, firm		
1.5						
2.0						
2.5	3.0	sandstone		brown, firm drilling with thin grey shale layers		rockhead Llwyneinion Rock
3.0						
3.5						
4.0						
4.5						
5.0						
5.5						
6.0						
6.5						
7.0						
7.5						
8.0	8.0	shale		grey, firm drilling		
8.5						
9.0						
9.5						
10.0						
10.5						
11.0						
11.5	11.5	coal		black, firm drilling		Llwyneinion Half Yard Coal
12.0	12.0	seatearth		light grey, soft drilling		
12.5						
13.0						
13.5	13.0	shale		grey, firm drilling		
14.0						
14.5						
15.0	15.0			bottom of hole		
15.5						
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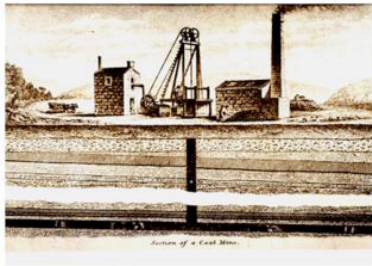


drilled and logged by
Neil Catlow B.Sc FGS

IN HOLE GAS TESTING

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

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT
www.nkc.co.uk



REF 1924
Bh 3

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT
SCALE
GL AOD

30 May 2019
1:200

TITLE

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

RIG
ORIENTATION
FLUSH
BIT

Montabert Hydrofore
vertical
fresh water piped supply
75mm T/C

DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill	grey shale and limestone	not taken	ground level
0.5					
1.0	1.0	clay	brown, sandy, firm		
1.5					
2.0	2.0	sandstone	brown, firm drilling with thin grey shale layers		rockhead Llwyneinion Rock
2.5					
3.0					
3.5					
4.0					
4.5					
5.0					
5.5					
6.0					
6.5					
7.0					
7.5					
8.0	8.0	shale	grey, firm drilling		
8.5					
9.0					
9.5					
10.0					
10.5					
11.0	11.0	coal	black, firm drilling		Llwyneinion Half Yard Coal
11.5	11.5	seatearth	light grey, soft drilling		
12.0					
12.5					
13.0	13.0	shale	grey, firm drilling		
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15.0	15.0		bottom of hole		
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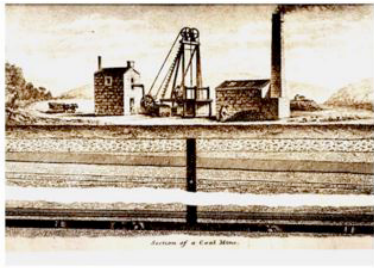


drilled and logged by
Neil Catlow B.Sc FGS

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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REF 1924
Bh 4

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT
SCALE

30 May 2019
1:200

TITLE

GL AOD

Montabert Hydrofore

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

RIG

inclined west

FLUSH

fresh water piped supply

BIT

75mm T/C

DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill	grey shale and limestone	not taken	ground level
0.5					
1.0	1.0	clay	brown, sandy, firm		
1.5					
2.0	2.0	sandstone	brown, firm drilling with thin grey shale layers		rockhead
2.5					
3.0					Llwyneinion Rock
3.5					
4.0					
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8.0					
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9.0					
9.5	9.5	shale	grey, firm drilling		
10.0					
10.5					
11.0					
11.5					
12.0	12.2	coal	black, firm drilling		Llwyneinion Half Yard Coal
12.5	12.7	seatearth	light grey, soft drilling		
13.0					
13.5	13.5	shale	grey, firm drilling		
14.0					
14.5					
15.0	15.0		bottom of hole		
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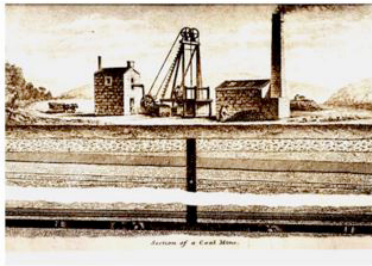


drilled and logged by
Neil Catlow B.Sc FGS

IN HOLE GAS TESTING

%	O ₂	20.6
%	CH ₄	0.0
%	CO ₂	0.0
%	LEL	0.0
ppm	H ₂ S	0.0
ppm	CO	0.0

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT
www.nkc.co.uk



REF 1924
Bh 5

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT
SCALE

30 May 2019
1:200

TITLE

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

RIG

Montabert Hydrofore

ORIENTATION

vertical

FLUSH

fresh water piped supply

BIT

75mm T/C

DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill	grey shale and limestone	not taken	ground level
0.5					
1.0	1.0	clay	brown, sandy, firm		
1.5					
2.0	2.0	sandstone	brown, firm drilling with thin grey shale layers		rockhead
2.5					
3.0					Llwyneinion Rock
3.5					
4.0					
4.5					
5.0					
5.5					
6.0					
6.5					
7.0	7.0	shale	grey, firm drilling		
7.5					
8.0					
8.5					
9.0					
9.5					
10.0					
10.5					
11.0	11.0	coal	black, firm drilling		Llwyneinion Half Yard Coal
11.5	11.5	seatearth	light grey, soft drilling		
12.0					
12.5					
13.0	13.0	shale	grey, firm drilling		
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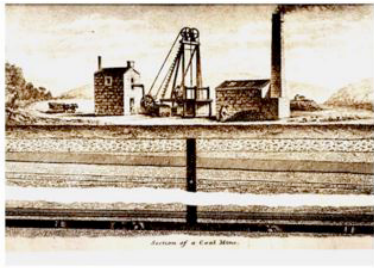


drilled and logged by
Neil Catlow B.Sc FGS

IN HOLE GAS TESTING

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

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT
www.nkc.co.uk



REF 1924
Bh 6

SITE
CLIENT

Towers Day Nursery, Acrefair
Ms Ruth Roberts

PRINTOUT 30 May 2019
SCALE 1:200

TITLE

GL AOD
RIG Montabert Hydrofore
ORIENTATION inclined south
FLUSH fresh water piped supply
BIT 75mm T/C

ORIGIN

printout direct from rig on site
drilled & logged by Neil Catlow

DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT N value	INTERPRETATION
0.0	0.0	fill	grey shale and limestone	not taken	ground level
0.5					
1.0	1.0	clay	brown, sandy, firm		
1.5					
2.0					
2.5					
3.0					
3.5	3.5	sandstone	brown, firm drilling		rockhead
4.0			with thin grey shale layers		Llwyneinion Rock
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11.0	11.0	shale	grey, firm drilling		
11.5					
12.0					
12.5	12.7	coal	black, firm drilling		Llwyneinion Half Yard Coal
13.0	13.0	seatearth	light grey, soft drilling		
13.5					
14.0					
14.5		shale	grey, firm drilling		
15.0					
15.5					
16.0	16.0		bottom of hole		
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drilled and logged by
Neil Catlow B.Sc FGS

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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