

COAL MINING RISK ASSESSMENT

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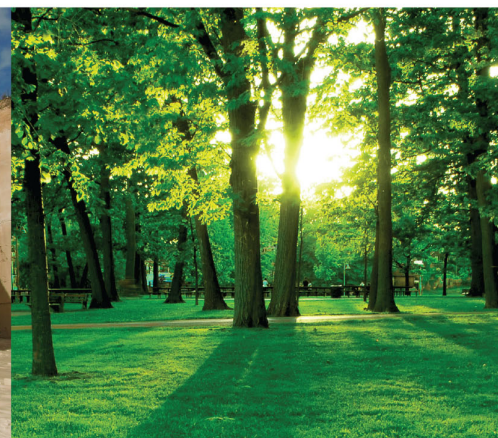
NEWLANDS HOUSE CARE HOME
WAKEFIELD, WF16 0AL

FOR

REGENCY HEALTHCARE LTD

REPORT REF: RH 3416

Engineering Geologists and Environmental Scientists



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Wakefield, WF16 0AL

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1. INTRODUCTION

This report describes the results of a Coal Mining Risk Assessment undertaken on a plot of land incorporating Newlands House Care Home at 93 High Street, Heckmondwike, West Yorkshire, WF16 0AL. The work was commissioned by Northern Design Partnership on behalf of their client Mr Fayyaz Chaudhry of Regency Healthcare Ltd. The assessment was carried out by this Consultancy, the Ashton Bennett Consultancy.

The purpose of this Coal Mining Risk Assessment was to assess the risk of past shallow and deep underground coal mining and mine shafts being present beneath or within influencing distance of the site. It is proposed to construct additional care home facilities on the site. The coal mining risk assessment comprised the collation and assessment of available information on the site including geological and mining maps, topographical maps, available borehole records and a Coal Authority Report.

This report describes the research work carried out, presents the results of the Coal Mining Risk Assessment (CMRA) and assesses the risk to the site stability from deep and shallow underground coal and fireclay mining and disused mine shafts and adits.

2. THE SITE

The site lies to the north of the High Street in Heckmondwike which forms the A638 between Dewsbury and Heckmondwike. Access is off the High Street.

The site is narrow and elongated generally north to south and presently occupied by lawns at the front leading to Newlands House Care Home building with further gardens beyond and flats with parking and further gardens at the north of the site.

The site is bounded to the north by a small industrial estate with sports fields beyond. The site is bounded to the south by the High Street with Heckmondwike Grammar School and sports fields beyond. The site is bounded to the west by residential and commercial properties and is bounded to the east by residential houses and gardens fronting onto the High Street and Commercial Street.

The site is centered at National Grid Reference 422067^E 423690^N at a height of approximately 80m above Ordnance Datum. The red line denotes the site area shown in Figure 2.

A Site Location Plan is presented as Figure 1 and a Detailed Site Location Plan as Figure 2 and a Geology Plan as Figure 3A and Detailed Coal Seam Geology as Figure 3B. A BGS Borehole Location Plan is presented as Figure 4. A Location of Coal Claims Plan is shown on Figure 5. A Plan of High Risk Development Areas is presented on Figure 6 and Surface Mining Past and Present as Figure 7. Past Shallow Coal Mine Workings are presented on Figure 8. Areas of Probable Shallow Coal Mining are shown on Figure 9 with a Plan of Coal Seams as Figure 10. A Plan of Mine Shafts is presented on Figure 11.

The Coal Authority Report is presented in Appendix A. The 1854 OS map is presented in Appendix B. A Plan of the proposed development is presented in Appendix C.

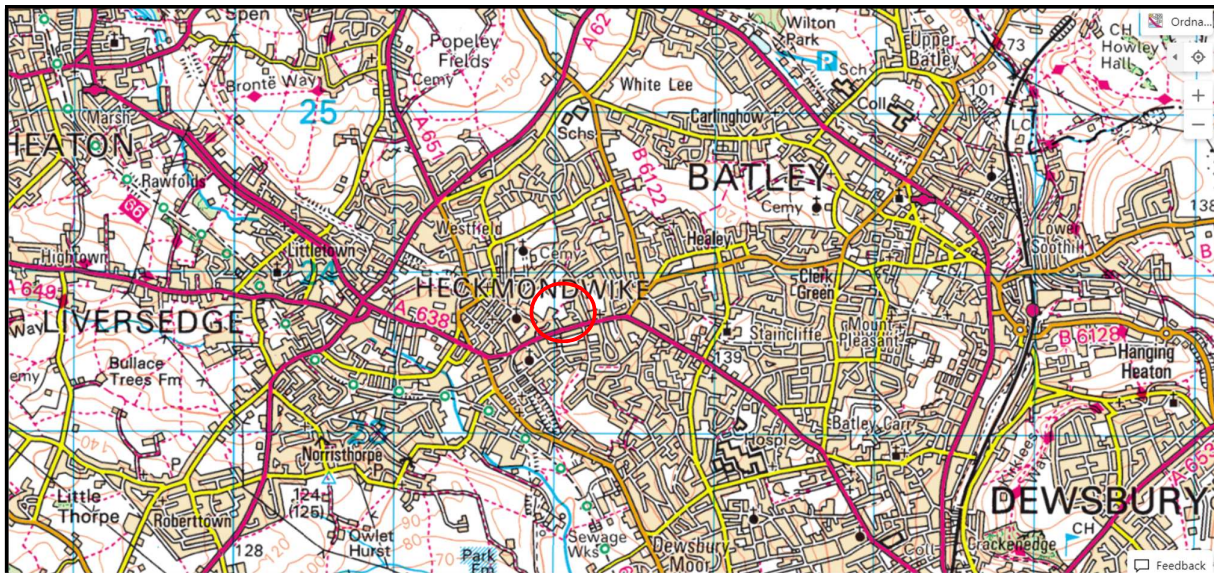


Figure 1 Site Location Plan

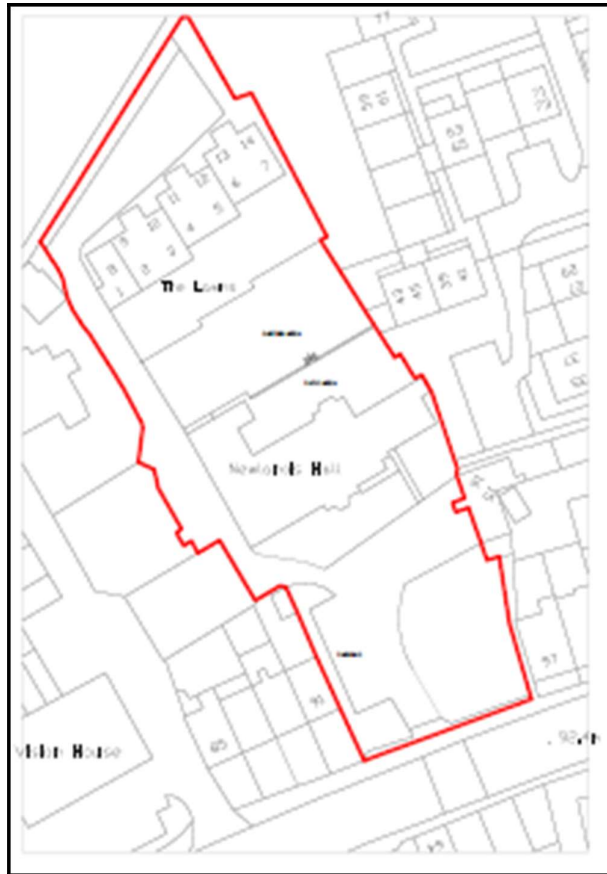


Figure 2 Detailed Site Location Plan

3. REPORT OBJECTIVE AND REPORT SCOPE

The objective of this Coal Mining Risk Assessment (CMRA) desk study is to examine the topographical, geological and mining data readily available for the site and determine the risk to the proposed development from past deep and shallow underground coal mining and disused mine shafts and adits.

In addition to the above this study has used the extensive knowledge and experience of the staff of Ashton Bennett Consultancy to assess the data and to interpret the data findings.

4. HISTORY AND HISTORIC MAPS

An historical map dated 1854 is presented in Appendix B and was inspected to assess the history of the site with regards to coal mining activities.

The 1854 map scaled at 1:10,560 indicates the site area to be partly occupied, with the Woolpack Inn adjacent and a drying house for textiles to the north. There are no coal mining activities evident on the site area. There are coal pits annotated to the north west and north east of the site. Booth Colliery existed later to the north east of the site.

5. SITE GEOLOGY

5.1 Geology

The published British Geological Survey (BGS) maps at a scale of 1:10,000 show the site area to be underlain by the Lower Coal Measures, Westphalian A strata, consisting of fine grained sandstone, mudstone and siltstone and interbedded coal seams of the Upper Carboniferous Period. The strata immediately beneath the site consists of mudstone potentially with outcropping Middleton Little Coal underlain by potentially a thin sandstone band and in turn underlain by mudstone with interbedded New Hards Coal, Wheatley Lime Coal and Middleton 11 Yards Coal underlain by the Fall House Rock Sandstone and further coal seams at >50m bgl. Plans of the geology and of the coal seams are presented in Figures 3A and 3B.

Superficial deposits do not underlie the site area although made ground may be present.

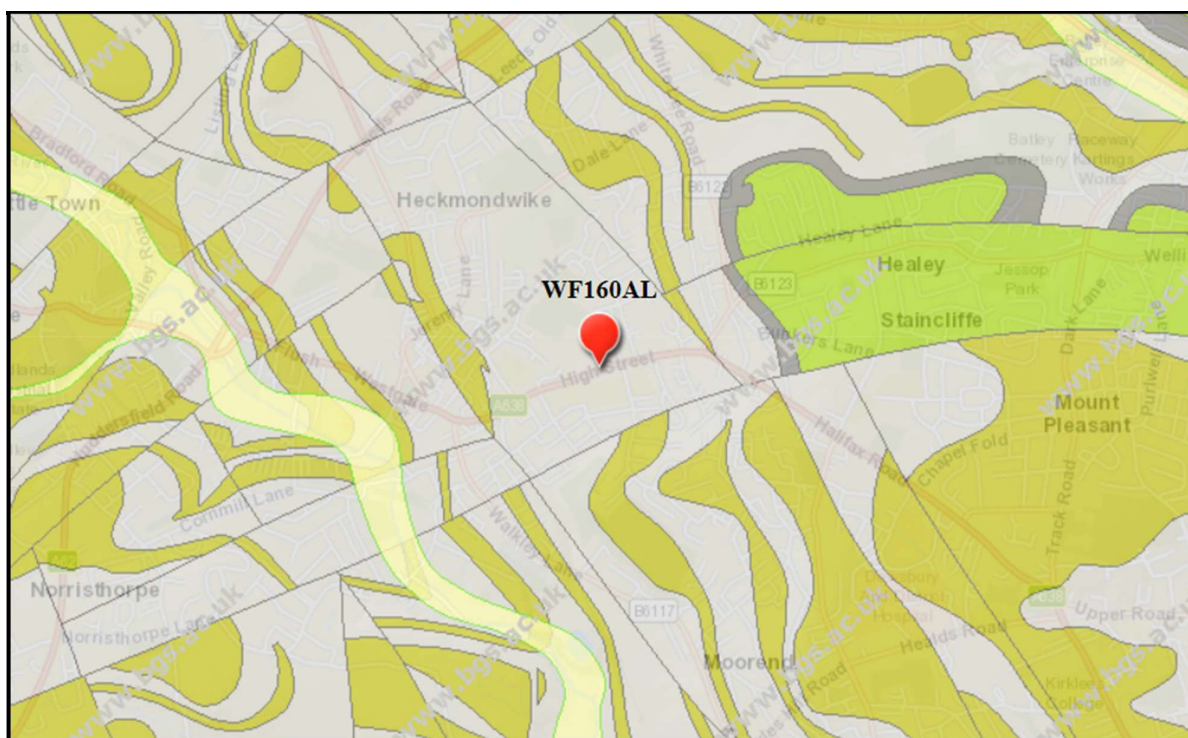


Figure 3A Geological Plan

The sequence of strata beneath the site comprises the strata presented in Table 1 although it is difficult to precisely predict the depths of each sequence.

TABLE 1
Strata Beneath Site Estimated From Geological Plans

Strata	Thickness in m	Depth in m bgl	Workings recorded by Coal Authority beneath the site	Probability of workings
Middleton Little Coal	0.30-0.90	Ground level		Yes-Possibly
Mudstone				
Sandstone				
New Hards Coal	0.70-1.00	20		Yes
Sandstone				

Wheatley Lime	0.70-0.80	35		Yes
Mudstone				
Middleton 11 Yards	0.30-1.10	42		
Fall House Rock				
Blocking Rider	0.00-0.20	55		
Mudstone				
Blocking Coal	0.20-0.80	60		
Mudstone				
Churwell Thick	0.20-0.80	75		
Mudstone				
Lousey	0.00-0.20	92		
Mudstone				
Churwell Thin	0.40-0.60	115		
Mudstone				
Shertcliffe Coal	0.10-0.80	130		
Clifton Rock				
Crow Coal	0.10-0.40	175		
Mudstone				
Black Bed Coal		195	Yes	Yes
Thick Stone				
Better Bed Coal		235	Yes	Yes
Mudstone				

BGS hold records of local boreholes which have been used to assist in interpretation of the geology. Boreholes sunk in the vicinity of the site encountered strata as described in Table 2.

TABLE 2
Local Borehole Logs

BGS Reference no	Depth	Geology in m bgl	Groundwater In m bgl
SE22SW1063	200m	Sandstone, shale and mudstone	79.37m
SE22SW800	15m	Shale	
SE22SW803	18m	Sandstone, shale and mudstone with coal at 5.70m to 6.20m bgl	
SE22SW796	22m	Sandstone, shale and mudstone with coal at 3.20-3.80m bgl	
SE22SW 411 to 416	15m to 20m	Mudstone and thin sandstone	9m

Borehole locations are shown on Figure 4.

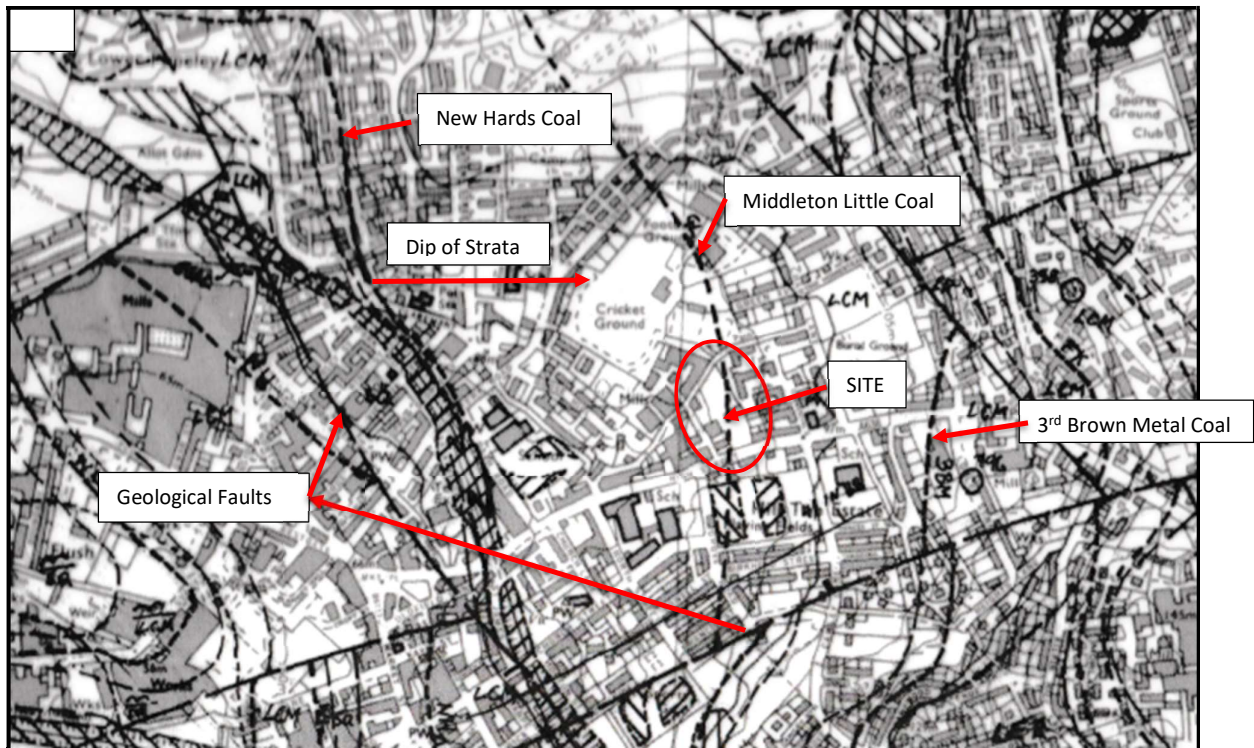


Figure 3B Detailed Coal Seam Geology

The Middleton Little Coal is shown in Figure 3B to outcrop across the site, dipping to the east and underlying the eastern part of the site at shallow depth. This is underlain by the New Hards Coal which outcrops to the north west of the site and lies at circa 20m bgl beneath the site.

5.2 Geological Faults

The geological maps indicate the presence of several known geological faults on all sides of the site. Two geological faults strike in a NW to SE direction to the west and east of the site, uplifting the strata around the site compared to younger strata to the west and east. Later in geological time these faults were intersected by SW to NE trending faults to the north and south of the site and uplifting strata between the faults. The faults are shown on Figure 3B.

The faults are unlikely to detrimentally affect the stability of the site unless shallow mined ground is present beneath the site.

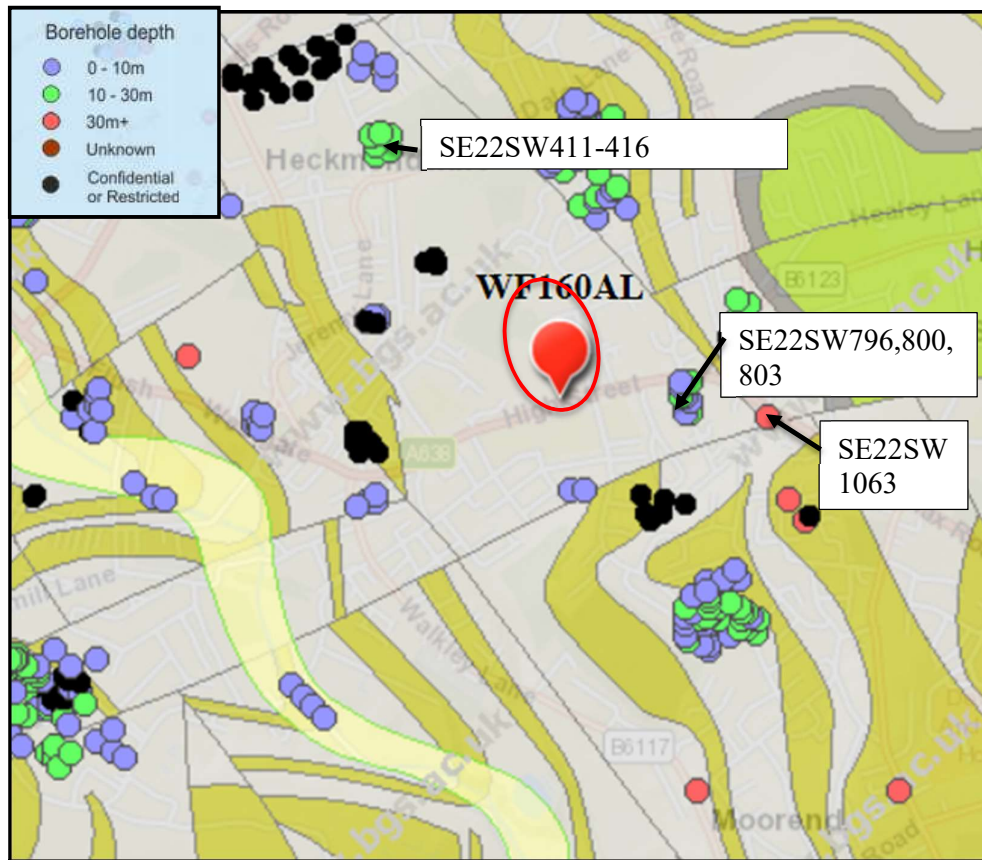


Figure 4 BGS Borehole Location Plan

6. MINING

6.1 The Coal Authority Report

The Mining Report from The Coal Authority for the site states that according to their records the property is within a surface area that could be affected by underground mining in one seam of coal at 200m to 210m depth, and last worked in 1908. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.

In addition, the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered, particularly prior to any site works or future development activity, as ground movement could still be a risk.

The property is not within a surface area that could be affected by present underground mining.

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods. The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods. The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future.

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods. The property does not lie within 200m of the boundary of an opencast site from

which coal is being removed by opencast methods. There are no licence requests outstanding to remove coal by opencast methods within 800metres of the boundary. The site is not within 800m of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m of the enquiry boundary, since 31st 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 preventative works before coal is worked under Section 33 of the Coal Mining Subsidence Act 1991.

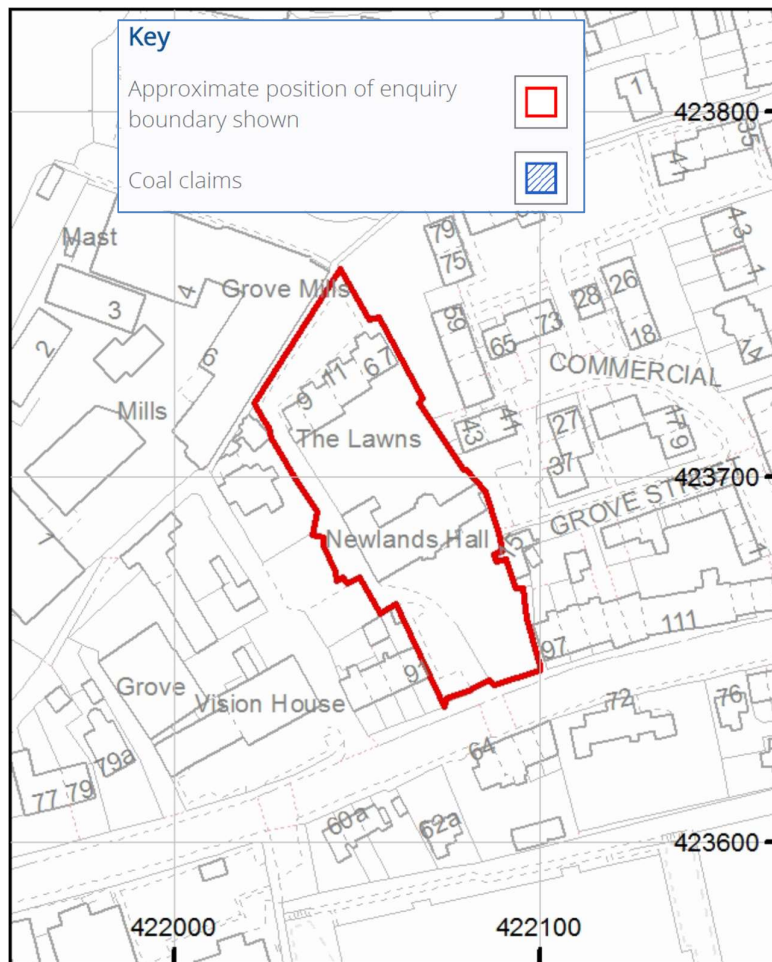


Figure 5 Location of Coal Claims Plan

The Coal Authority has no record of a mine gas emission requiring action. The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

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. The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof. The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

The site lies within an area of historical coal mining activity. The Middleton Little Coal is recorded to outcrop within the site. Nine abandonment plans are recorded of mining within influencing distance of the site namely, 5181, 6962, 4832, 5253, FGB709, FGB409, FGB414, FGB607 and CT40.

The Coal Authority Report is presented in Appendix A and should be read in full.

6.2 Shallow Coal Mining

The Coal Authority Report states that they believe there is coal at or close to the ground surface beneath the site. The Coal Authority records only date from 1872 and as shallow mining occurred before that date, there are often no records of the early mined coal seams. The coal seams present at shallow (<30m bgl) depth beneath the site are shown in Table 1 with the probability of each seam being worked.

The Middleton Little Coal Seam is shown to outcrop across the site, and to dip at shallow depth beneath the eastern part of the site. The New Hards Coal lies at 20m bgl and the Wheatley Lime Coal at circa 35m bgl.

The site does not lie within a high risk area for development as shown in Figure 6 and is not known to be underlain by shallow mining according to the Coal Authority maps reproduced in Figure 9.

There is a **medium risk** that the site has been undermined at <30m depth bgl. Any voids remaining in workings at this depth may migrate by successive roof collapse and reach the ground surface to cause subsidence and damage to overlying structures.

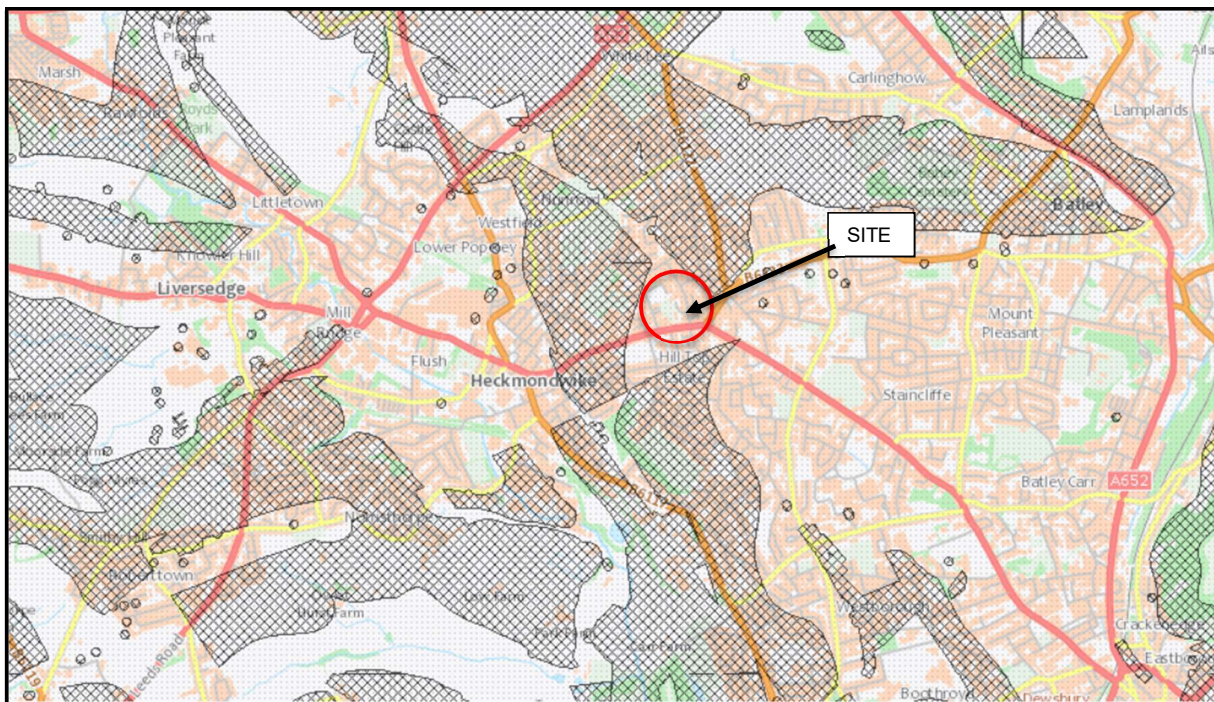


Figure 6 High Risk Development Areas

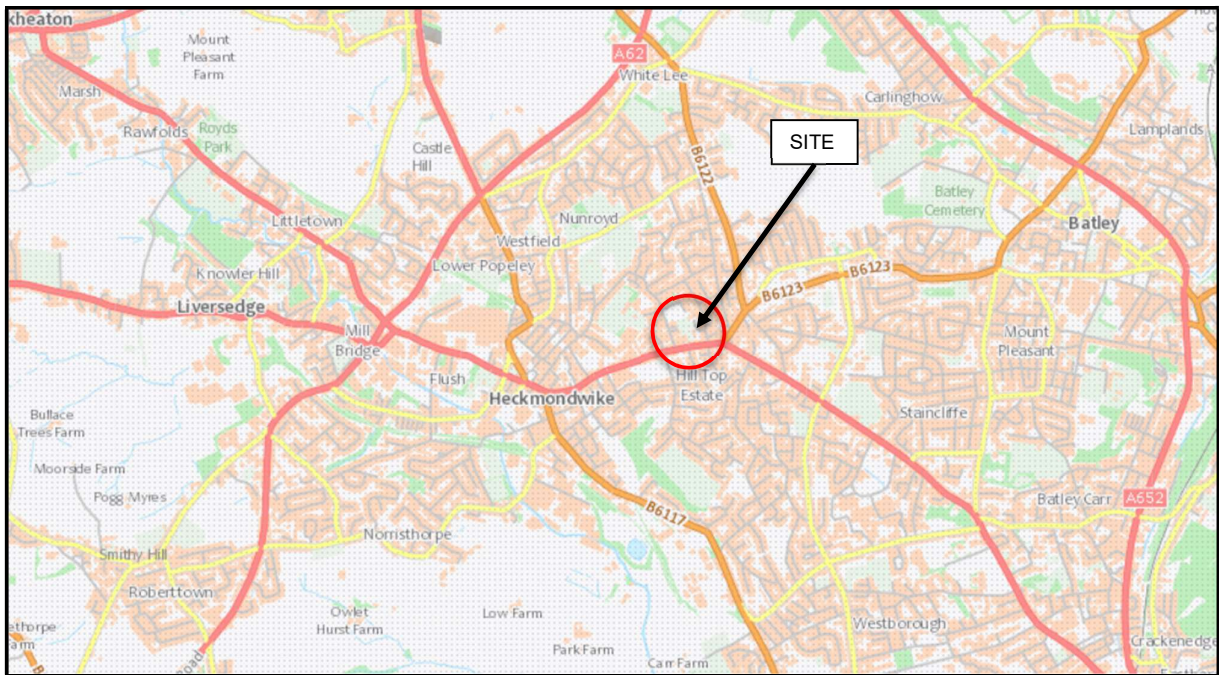


Figure 7 Surface Mining Past and Present

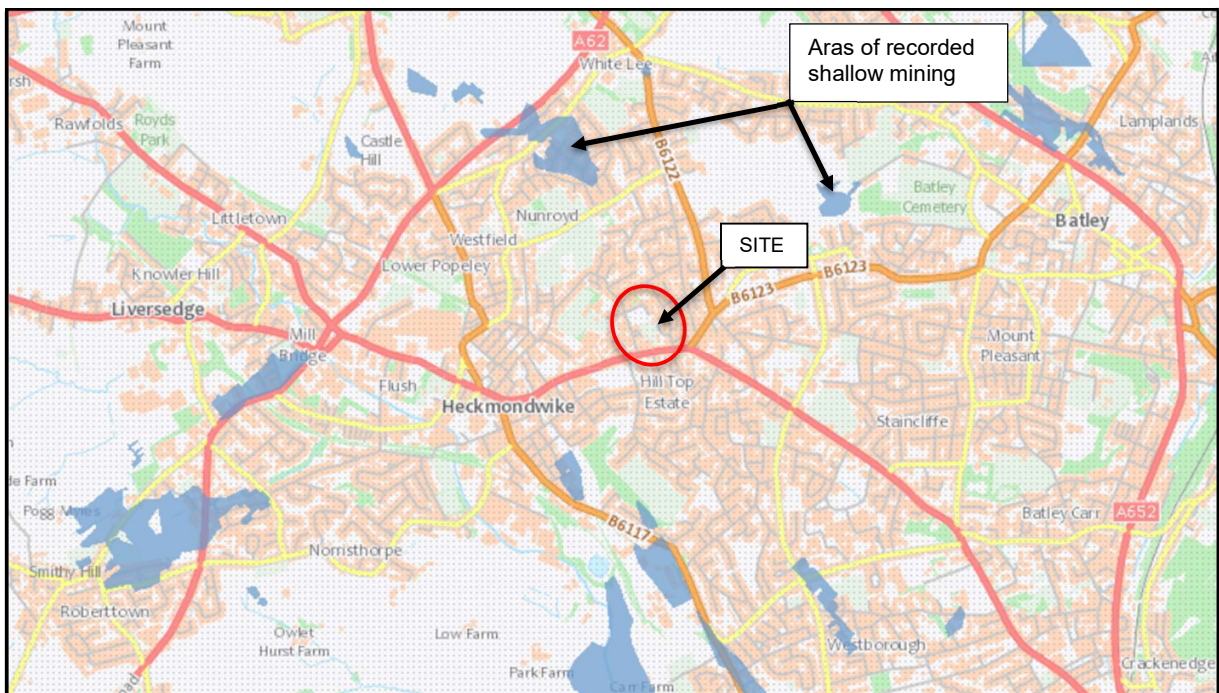


Figure 8 Past Shallow Coal Workings

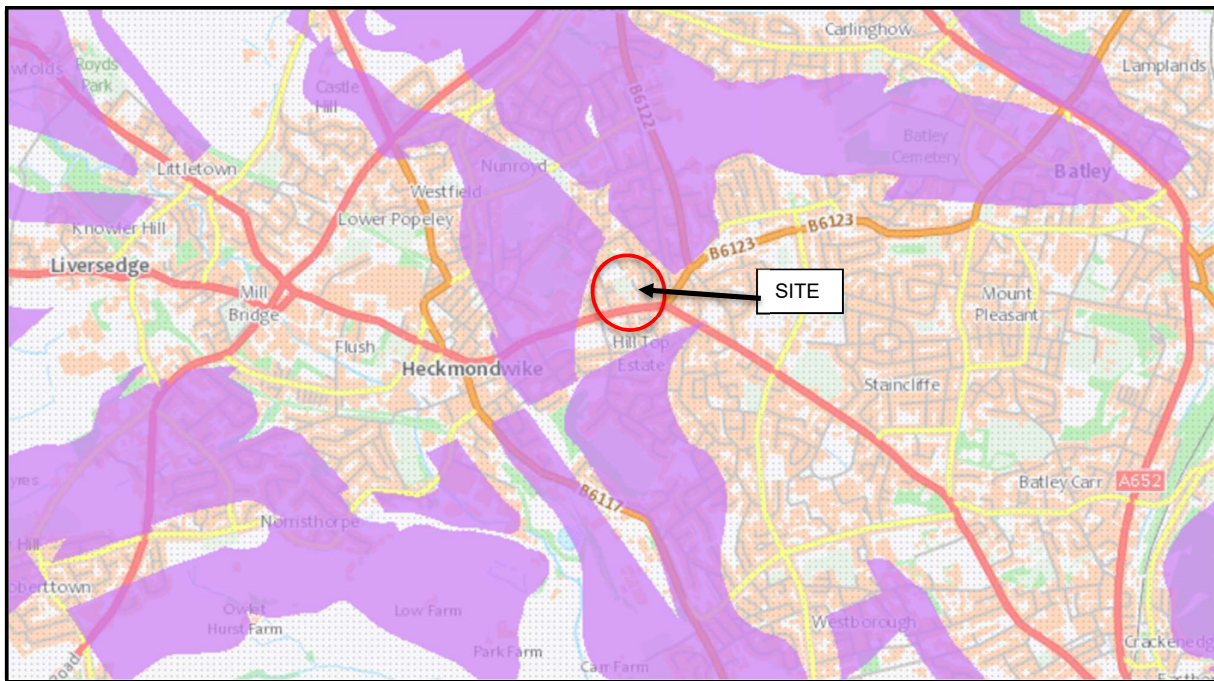


Figure 9 Areas of Probable Shallow Coal Mine Workings

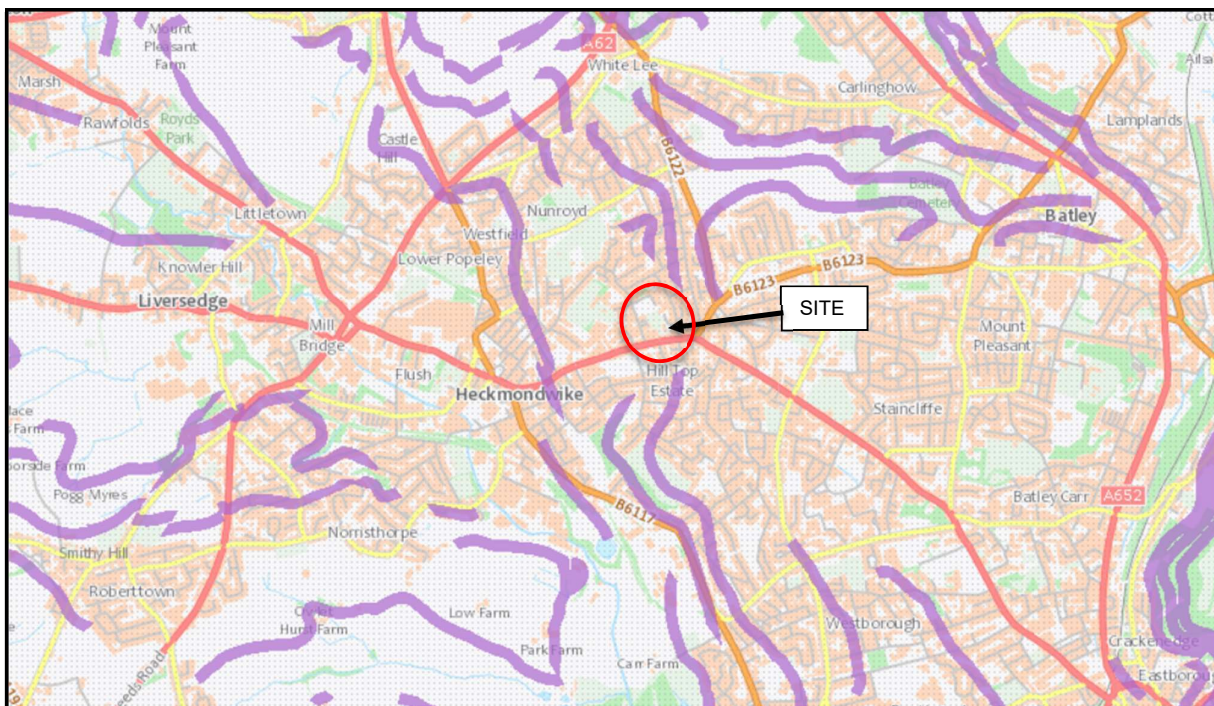


Figure 10 Plan of Coal Seams

The risk that collapse of underground workings could cause subsidence at the ground surface above is normally empirically assessed using the T10 rule (developed by the National Coal Board in 1973 and based on experience) whereby if a thickness of 10 x the worked seam thickness of competent cover (i.e. rock) is present over the worked seam then it is deemed sufficient to be able to choke the voided ground without giving rise to surface settlement.

In summary there is a **medium risk** that ground subsidence may occur on the site due to shallow mining in the Middleton Little Coal and / or New Hards Coal seams. Although the Coal Authority hold no records of such mining, mining may have occurred before the date of 1872, after which it was required by law to deposit abandonment plans with the then Ministry of Power.

6.3 Deep Coal Mining

The Coal Authority have records of coal being worked at 200m to 210m bgl beneath or within influencing distance of the site within the Better Bed, evidence by the knowledge of a fault in the Better Bed as shown on the 1:10,000 geological map. Records held by the Coal Authority of deep mining are available on the Abandonment Plans.

It is a **low risk** that any deep mining (>30m bgl) will detrimentally affect the stability of the site due to the substantial cover of competent strata above any workings.

6.4 Mine Shafts and Adits

The Coal Authority Report states that the Coal Authority have no records of any mine shafts within, or within 20m of the boundary of the site. There may be unrecorded mine entries in the local area that do not appear on Coal Authority records.

The closest Mine Shafts are presented in Figure 11 and lie at a distance where they will not detrimentally affect stability of the site.

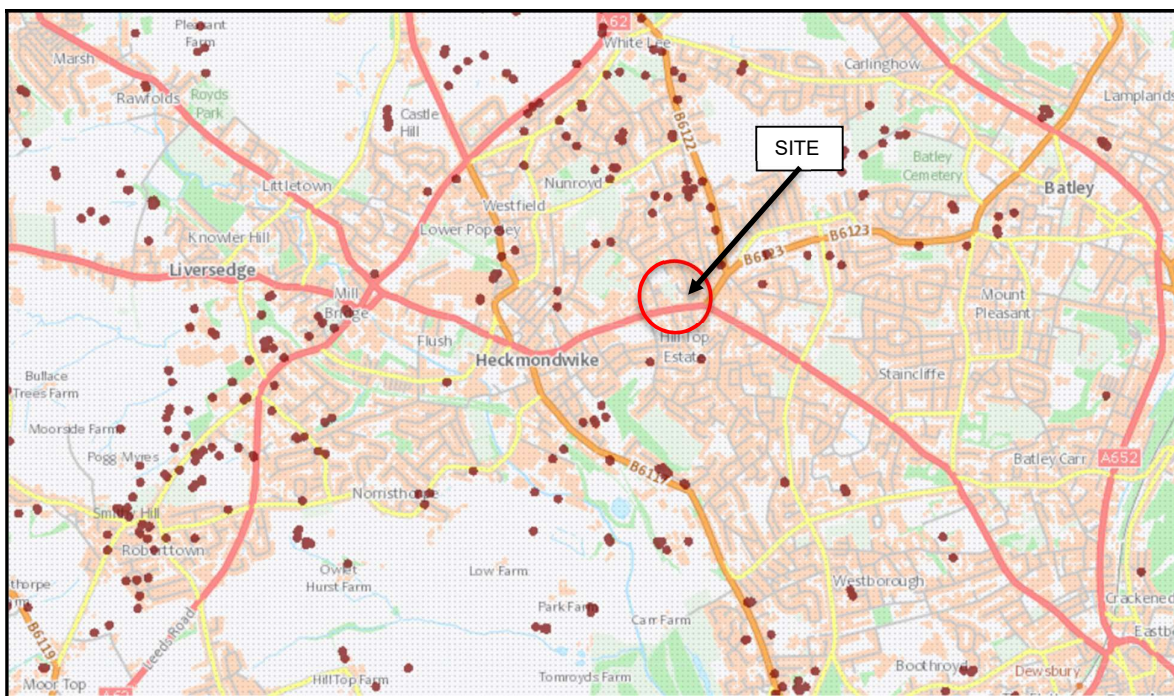


Figure 11 Plan of Mine Shafts

There is a **low risk** that mine shafts and adits may cause ground subsidence and affect the stability of the site in the future. The Coal Authority records are incomplete and any circular features detected on site should always be assessed by an engineer in case it represents an unrecorded mine shaft.

6.5 Mine Gas

The Coal Authority have no record of any mine gases in the site area. However, mine gas should be considered during any drilling, and monitoring should be undertaken in standpipes before construction on the site, in order to assess any mitigating measures for safe development.

6.6 Fireclay

There is no evidence that fireclay was mined from this site.

7. RISK ASSESSMENT

The Coal Mining Risk Assessment undertaken has indicated that the site is underlain by the Coal Measures comprising mudstones, sandstones and interbedded coal seams. Based on the BGS geological maps and Coal Authority Report, the site is expected to be underlain by mudstones and sandstones with two shallow (<30m) interbedded coal seams and further sandstones and mudstones and coal seams at greater depths.

The Middleton Little Coal is recorded as outcropping on the site and both the New Hards and underlying Wheatley Lime Coal underlie the site at shallow <30m bgl depth. Both coal seams dip towards the east.

The Coal Authority hold no records of shallow mining beneath the site, although shallow mining may have taken place before abandonment records were required. The Coal Authority plans indicate the site does not lie in a high risk area for development or an area of recorded shallow (<30m) coal mining. Due to the geological faults around the site it is possible that mining did not extend from the surrounding area into the faulted block.

If voids remain in any pillar and stall workings in the shallow coal seams at <30m bgl, then they may migrate to the surface and cause ground subsidence if insufficient thickness of competent strata overlies the workings.

Any **shallow coal** workings therefore pose a **medium risk** to future site stability.

Any subsidence from mining at depths >30m bgl in the coal seams should be complete. Any voids remaining in these workings are unlikely to migrate to the ground surface due to the considerable cover of competent strata overlying the workings.

The risk of the site being detrimentally affected by workings in **coal at depth** (>30m bgl) is a **low risk** due to the significant cover of competent strata.

The risk that collapse of underground workings could cause subsidence at the ground surface above is normally empirically assessed using the T10 rule (developed by the National Coal Board in 1973 and based on experience) whereby if a thickness of 10 x the worked seam thickness of competent cover (i.e. rock) is present over the worked seam then it is deemed sufficient to be able to choke the voided ground without giving rise to surface settlement.

Two mine shafts lie at a distance >20m from the site. The shafts are unlikely to affect the stability of the site due to distance. There are no records of any adits on or within 20m of the site.

8. CONCLUSIONS AND RECOMMENDATIONS

The evidence gathered in this coal mining risk assessment report suggests that there is a medium risk that ground subsidence from shallow coal mining could occur in the future.

If ground subsidence occurs due to shallow mining, the risk is that any development constructed on the site may suffer structural damage in the future. It is therefore recommended that an intrusive mining investigation is undertaken to assess the depth and condition of any coal seams. The investigation should comprise 2 openhole water flush boreholes to 30m bgl with installations to enable monitoring for methane gas. If voids or loose ground and evidence of mining is detected a grouting programme may be required to enable development. Foundation design would need to take into account any grouted mine workings as the grout prevents roof collapse, but does not have bearing strength to support buildings.

If any new circular features appear on the ground in the future development these should be checked by an engineer.

9. GENERAL REMARKS

This report truly reflects the conditions found during the coal mining risk assessment study. Whilst the mining risk assessment was undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research, the results portrayed only pertain to the information attained and the ground and mining conditions expected. It is possible that other undetected information, undetected ground conditions and undetected mining conditions may exist. The mining risk assessment was only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. The conclusions are only a brief summary of the report, and it is recommended that the report is read in full to ensure that all recommendations have been understood.

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