



COAL MINING RISK ASSESSMENT

For:

UNIT 9A, MAPPLEWELL BUSINESS PARK

On behalf of:

HAYWOOD ENGINEERING SERVICES

Project Number: 19-0932

Reference: 19-092-REP-001

Revision: 0

Date: 19/09/19



REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

REVISION RECORD					
Rev	Description	Date	Originator	Checked	Approved
0	Preliminary	19/09/18	LJH	AJH	LJH

Prepared by:
Matrix Consulting Engineers
Unit 7, BBI Centre
Barnsley
South Yorkshire
S75 1JL

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

CONTENTS

SECTION	TITLE	PAGE
1.0	INTRODUCTION	3
2.0	THE SITE AND ITS SETTING	4
3.0	PROPOSED DEVELOPMENT	6
4.0	COAL MINING RISK ASSESSMENT	7
5.0	CONCLUSIONS AND RECOMMENDATIONS	14
	APPENDIX A – Architectural Layout	
	APPENDIX B – Coal Authority Reports	
	APPENDIX C – Borehole Records	

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK	Project Number:	19-0932		
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

1.0 INTRODUCTION

- 1.1 This report has been prepared in support of a full planning application for a proposed development to be situated within a Development High Risk Area to the rear of Unit 9A, Mapplewell Business Park.
- 1.2 This Coal Mining Risk Assessment has, therefore, been prepared by Matrix Consulting Engineers, on behalf of Heywood Engineering Services Ltd, to support the planning application (See Figure 1.1).

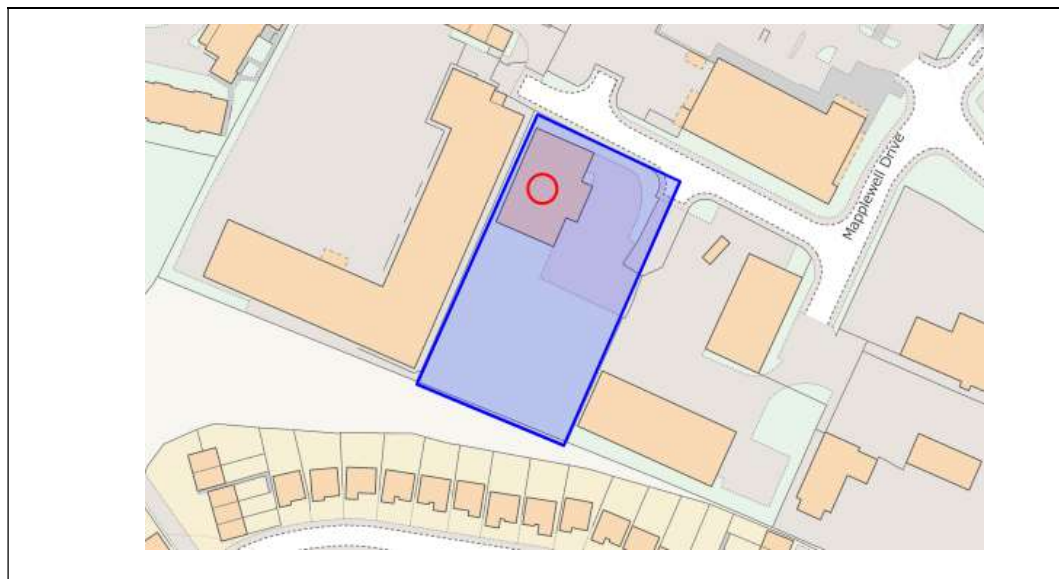


Figure 1.1. – UNIT 9A, MAPPLEWELL BUSINESS PARK

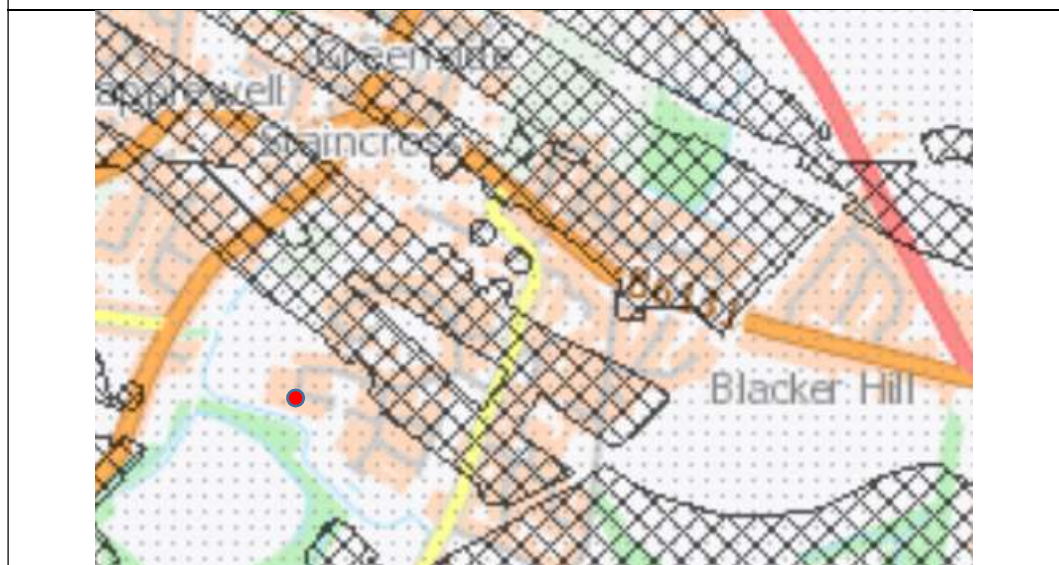


Figure 1.2. – Unit 9A, Mapplewell Business Park – Indicating Site is Situated in a Development High Risk Area

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

2.0 THE SITE AND ITS SETTING

2.1 The site is within an industrial estate, situated to the south of the B6131 Blacker Road, see Figure 2.1, 2.2 and 2.3. This estate was constructed on land that previously formed part of the North Gawber Colliery, which was closed in 1987. The site information is tabularised below.

Site Information	
Site Address:	Unit 9A, Mapplewell Business Park
Grid Reference:	Blacker Road
	Barnsley
	S75 6BP
	SE 33136 09959
Easting:	433136
Northing:	409959
Latitude	53.585177
Longitude	-1.5009377
Elevation:	98

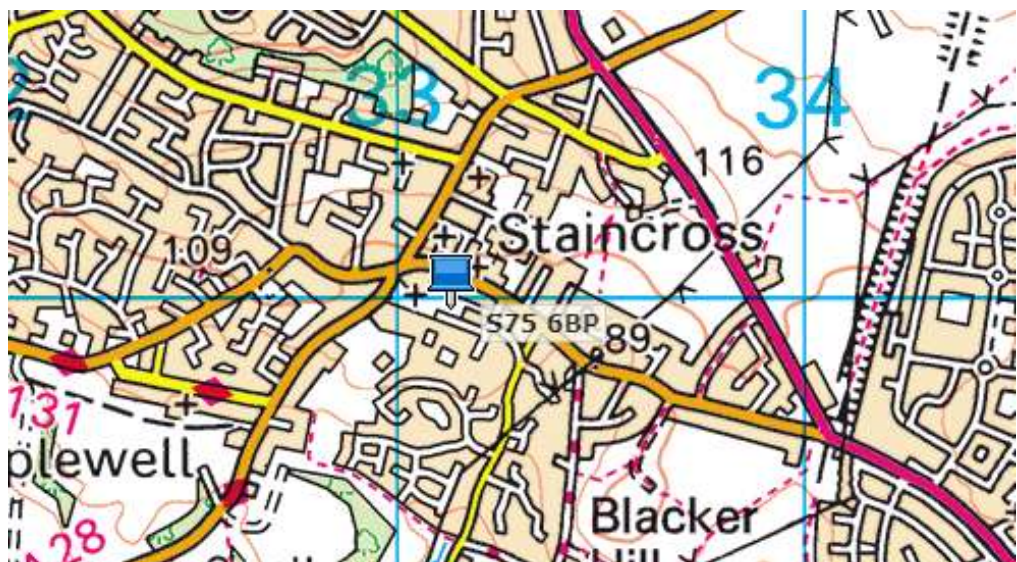


Figure 2.1 – Extract from OS Map

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK	Project Number:	19-0932		
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

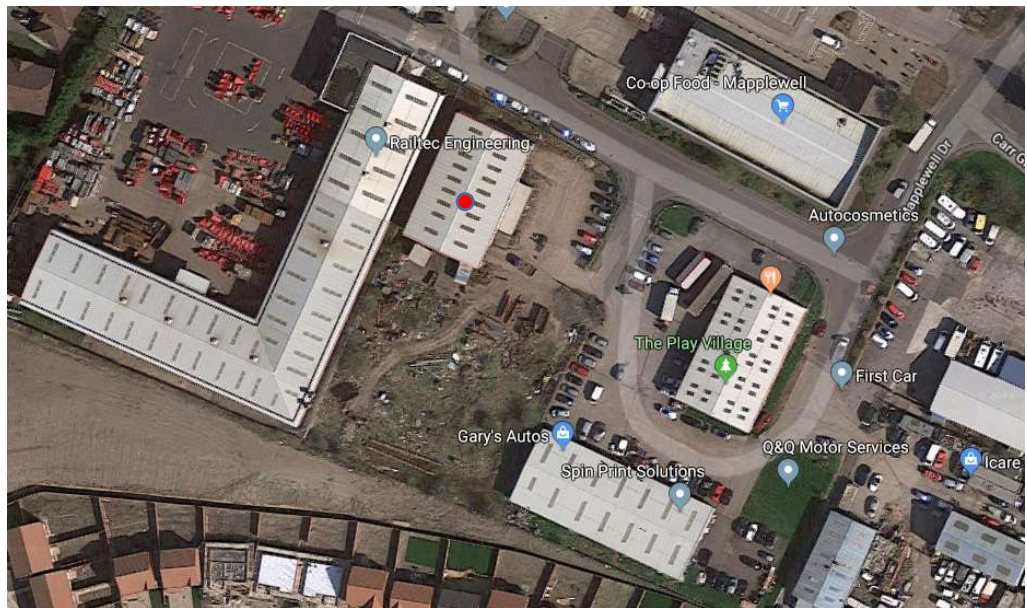


Figure 2.2 – Extract from Google Maps

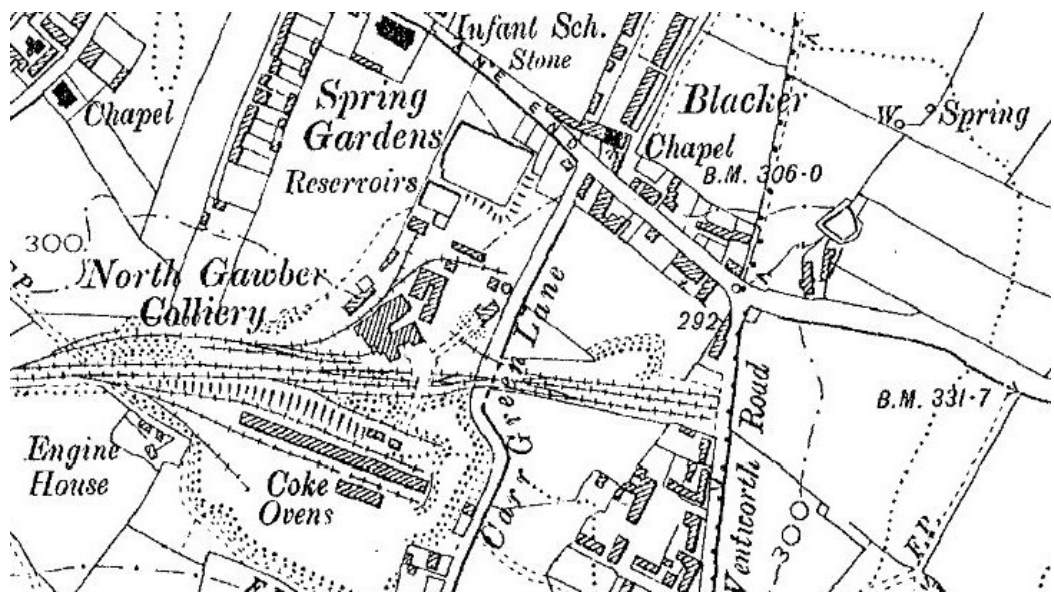


Figure 2.3 – Extract from 1985 Map

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

3.0 PROPOSED DEVELOPMENT

- 3.1 It is intended for the development to be comprised of a single industrial building, which is L-shaped on plan and sub-divided into 7No individual workshop units.
- 3.2 The superstructure will be formed from a light industrialised portal frame, with profiled metal cladding. The configuration of the substructure will ultimately depend on the prevailing ground conditions, though it is anticipated that the frame's foundation will be comprised of isolated pads, with a ground bearing concrete floor slab.
- 3.3 The development also includes for hard landscaping and an external service yard, with grading of levels from north to south (See Appendix A – NYP Architect's drawing Site Plan As Proposed - Reference 05/122/06(A)).

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

4.0 COAL MINING RISK ASSESSMENT

4.1 Information Sources

1. The following assessment of coal mining risks at the proposed site is based on information on coal mining hazards identified from the following sources:
 - i. Consultants Coal Mining Report: Reference – 51002169770001,
 - ii. Mine Entry Risk Assessment Report: Reference – 51002170398001,
 - iii. British Geological Survey Geoindex Website,
 - iv. The Coal Authority Interactive Map.

4.2 Geology

1. The site is underlain by the Kent's Rock, which is a sedimentary, sandstone bedrock laid down approximately 315 to 318 million years ago, in the Carboniferous Period, between the Westphalian and Namurian stages. It is fluvial, palustrine and shallow-marine in origin and forms part of the Pennine Middle Coal Measures Formation.

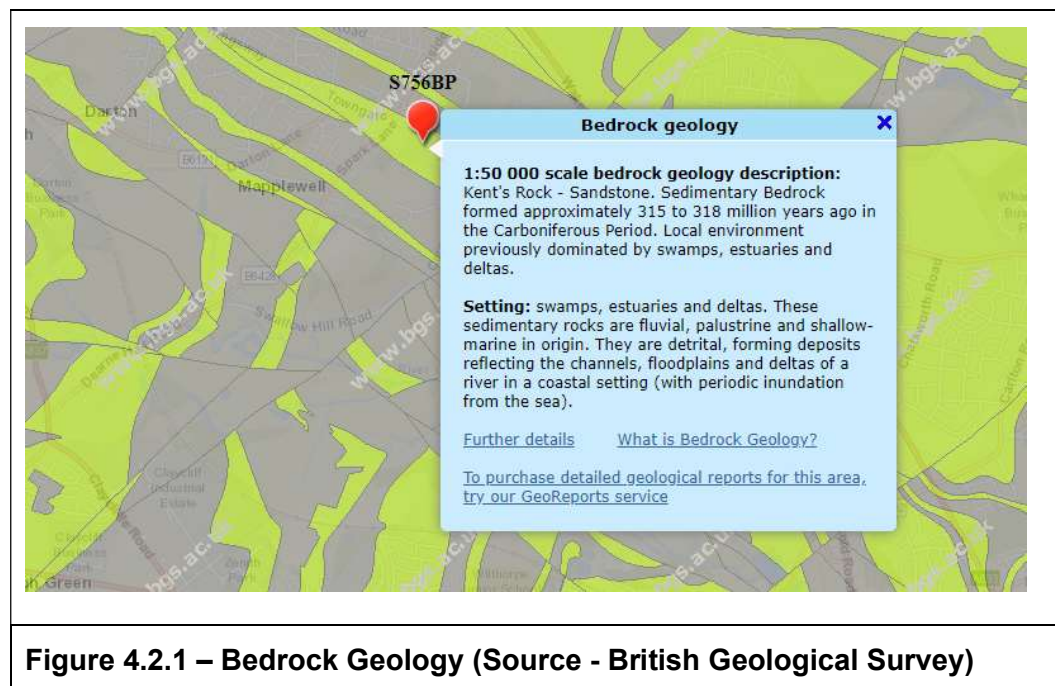


Figure 4.2.1 – Bedrock Geology (Source - British Geological Survey)

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

4.3 Mine Entries

1. The area has been extensively mined, as can be seen from Figure 4.3, with numerous entries surrounding and within the site. These features are associated with the North Gawber Colliery, with both working shafts and adits being referenced on plan.
2. Given the depth of the superficial deposits reported in the vicinity, the North Gawber Colliery Lidgett Downcast Shaft (Reference 4334409-002), North Gawber Colliery Barnsley Upcast Shaft (Reference 4334409-003) and the North Gawber Colliery No.2 Adit (Reference 4334409-012) are all sufficiently distant from the site not to pose any risk to the proposed development.
3. The North Gawber Colliery No.1 Adit (Reference 4334409-011), which is a horizontal or near horizontal mine entry, however, is recorded as being:
 - a. Approximately 3m in width.
 - b. Positioned directly beneath the southeast corner of the proposed building
 - c. Capped using a concrete plug in 1988.
4. The Mine Entry Risk Assessment, however, concludes that, with respect to North Gawber Colliery No.1 Adit (Reference 4334409-011):
 - a. *The main building (as shown on the plan) is within the area likely to be affected if coal mining subsidence was to occur because of ground movement. The statistical risk of the main building being damaged by subsidence especially given the information recorded in the treatment details above however is very small.*
 - b. *In the unlikely event of your site being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.*

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK	Project Number:	19-0932		
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

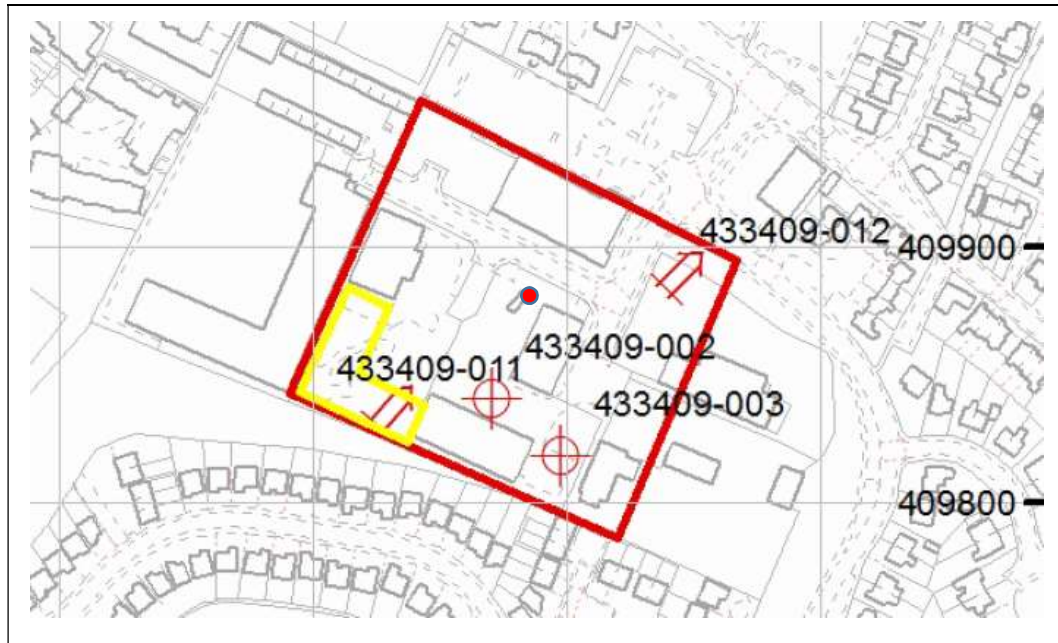


Figure 4.3 – Location of Mine Entries

4.4 Shallow Mine Workings

1. This relates to unrecorded coal workings that exist at or within 30 metres of the ground surface.
2. The site is within an area where it is believed there is coal at or close to the surface, which may have been worked at some time in the past. The risk of shallow mine workings existing at or close to the surface, which may affect the development, must, therefore, be considered possible (See Figure 4.4.1).
3. Given the depth of the Barnsley Coal seam recorded beneath the site, at 89 m, and the information presented on the mine abandonment plan (See Figure 4.4.3) this means the seams that may have been worked, at shallow depth beneath the site, are the Kent's Thick and Kent's Thin seams, which have maximum thicknesses of 1.9m and 2.6 m, respectively, and are described as being a 'good household coal'.

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK	Project Number:	19-0932		
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0



Figure 4.4.1 – Extent of Probable Shallow Mine Workings

4. The records suggests, therefore, that the coal seams which outcrop on the southern boundary and to the south west of the site, and dip beneath the site, are the Kent's Thin and Kent's Thick seams, and that it is these seams, which the adit in the southeast corner of the site, provides access to. (See Figure 4.4.2 and 4.4.3). The seams outcropping to the Northeast of the site are probably the Beamshaw Seams, Abdy Seam, Two Foot Coal Seam and, possibly, the Meltonfield Seam, the majority of which are also described as good household coal and are likely to have been worked from the surface.



Figure 4.4.2 – Location of Inferred and Actual Coal Outcrops

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK			Project Number:	19-0932
Reference:	19-092-REP-001			Date:	19/09/19
				Rev:	0

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
NORTH GAWBER	BARNSELEY	Coal	64P3	89	Beneath Property	7.9	North-East	277	1883
NORTH GANBER	TOP HAIGH MOOR	Coal	640X	149	North-West	3.6	East	94	1949
unnamed	TOP HAIGH MOOR	Coal	6Y82	157	North	5.6	North-East	99	1948
DARTON	LIDGETT	Coal	64P9	192	South-West	3.7	East	72	1931
unnamed	LIDGETT	Coal	6Y43	203	North	5.5	North-East	76	1932
NORTH GAWBER	LIDGETT	Coal	64PA	211	East	2.8	East	72	1933
unnamed	FENTON	Coal	6Y83	285	North-West	5.9	North-East	210	1964
WOOLLEY	FENTON	Coal	64PS	290	North-West	4.9	East	175	1965
WOOLLEY	MIDDLETON MAIN	Coal	64PC	327	North-West	4.9	North-East	112	1957
unnamed	MIDDLETON MAIN	Coal	6Y05	338	North-West	5.0	North-East	126	1958

Figure 4.5 – Record of Past Deep Coal Mining

- There are no licence requests outstanding to remove coal at depths within 200 metres of the boundary nor within 200 metres of a site for which a licence to remove coal at depth has been granted.

4.6 Opencast Sites - Surface Mining Workings

- No licenses have been issued by the Coal Authority, either within, or within 200 metres, of the enquiry boundary in relation to the undertaking of surface coal mining, underground coal mining or underground coal gasification

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK	Project Number:	19-0932		
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

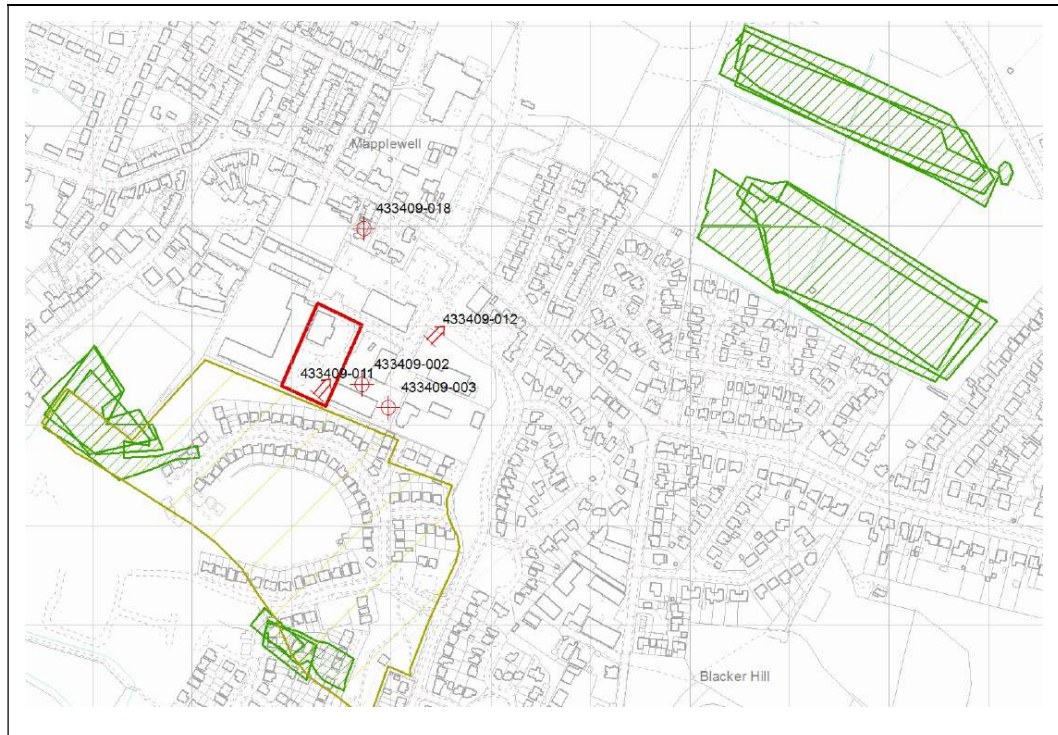


Figure 4.6 – Records of Open Cast Workings

4.7 Geological Faults, Fissures and Breaklines Fissures (Geological Features)

1. There are no faults, fissures or breaklines shown on the geological map of the site, nor does the Coal Authority possess records of any damage arising on the site due to geological faults, or other lines of weakness, that may have been affected by coal mining. The risk of mining affected geological features impacting on development at the site is therefore considered to be low.

4.8 Coal Authority managed tips

1. There are no disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

4.9 Coal Mining Subsidence

1. There are no Coal Authority records of any remedial works carried out on the site nor is there any current Stop Notices delaying the start of remedial works or repairs.

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

2. The Coal Authority has not received a damage notice for any buildings within 50m of the site since 31st October 1994.
3. 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.

4.10 Mine Gas

1. The Coal Authority has no record of a mine gas emission requiring action within 500m of the site.

4.11 Future Coal Recovery

1. There are no records of any 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, which is the zone of likely physical influence, allowing for seam inclination, however, has been included.
2. The site is not in an area where a license has been granted to remove coal using underground or opencast methods within 200m of the site. Consequently, the site is not likely to be affected by future mining activity, though reserves of coal exist in the local area which could be worked at some time in the future.
3. There are no court orders affecting the site 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.
4. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
5. The site is in an area where notices to withdraw support were given, in 1946, but 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.
6. With respect to the payments to owners of former copyhold land, the site is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

5.0 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 The site is located in an area where extensive mine workings have taken place over a protracted period of time. Some of these workings will be recorded and others will not. It is, therefore, recommended that 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 good engineering practice developed for mining areas.
- 5.2 With respect to deep and open cast mining activity, all influences on the site should now have ceased. Although the Coal Authority appears to have granted no licenses, nor have plans for any mining activity that will affect the site, they have issued a notice, in 1946, of their intention to withdraw support, which has never been cancelled. The likelihood that this notice will ever be acted on, however, is extremely low.
- 5.3 Given that the superficial deposits on the site are estimated to be approximately 1-2m in depth, the proposed building is not considered to be within the zone of influence of any mine entries that are outside of the site boundary. Moreover, the statistical risk of the proposed building being damaged by subsidence associated with North Gawber Colliery No.1 Adit (Reference 4334409-011), is also considered, by the Coal Authority, to be very small.
- 5.4 From a review of the desk-based information, it has not, however, been possible to discount the risks posed to the new development by the shallow mine workings, due to the possible presence of unrecorded worked seams within 30m of the surface, primarily associated with the Kent's Thick and Kent's Thin seams.
- 5.5 Given this, we would make the following recommendations for intrusive investigation works, in accordance with the guidance provided in CIRIA Special Publication 32, *Construction Over Abandoned Mine Workings*, though the exact scope of the investigation should be established by means of a detailed Phase 1 Desk Top Study:
 - i A group of 3No investigatory boreholes should be undertaken, down to a depth of 26 m below bedrock level, as this will establish whether 10 times the

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

seam thickness of rock cover exist over the thickest conjectured seam, which is the 2.6 m thick, Kent's Thick seam. Given a 15° Angle of Draw, this group should extend 4m beyond the extremities of any new construction, where possible.

- ii A GPR or slit trench survey should be undertaken to establish the location of the North Gawber Colliery No.1 Adit, on the southeast corner of the site
- iii During these investigations, tests should be undertaken and records kept relating to: the nature and depth of the superficial deposits, the depth of any rock head, the nature and thickness of rock cover to any coal seams, the thickness of any coal seams and any evidence that the coal seams have been worked, such as broken ground or voids.

5.6 Should it be established that no worked coal seams or worked coal seams with a rock cover in excess of ten times the seam thickness, exist beneath the site, then no further action is required.

5.7 Should it be established that worked coal seams exist beneath the site, with rock cover less than ten times the seam thickness, then, dependent on the nature and depth of the workings, measures should be adopted to ensure that the buildings will not be damaged by the effects of shallow mine workings. These include:

- i. Adopting conventional foundations in conjunction with remedial ground measures, to consolidate the mine workings, such as:
 - a. For very shallow seams, bulk excavation and backfilling of the workings.
 - b. Partial grouting, to either improve bearing characteristics of specific areas on site or to reduce the risk of void migration.
 - c. Full grouting of the mine workings, and possibly overlying strata, to improve overall ground-bearing characteristics.
- ii. Adopt foundations which incorporate additional design measures to accommodate or avoid problems from associated ground movements, such

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

as stiff rafts or piled foundations, which extend through the workings and into competent strata beneath.

- 5.8 In order to mitigate the effects of differential settlement associated with building over the remediated North Gawber Colliery No.1 Adit (Reference 4334409-011), foundations should be adopted that span across this feature, utilising either pads or piles. Should it be confirmed that piles are required to bridge the adit, whereas, pad foundations may be adopted elsewhere, then suitable movement joints should be provided in the superstructure and substructure, to mitigate the effects of differential settlement.

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

APPENDIX A – ARCHITECTURAL LAYOUT

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0



REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

APPENDIX B – COAL AUTHORITY REPORTS

Consultants Coal Mining Report: Reference – 51002169770001

Mine Entry Risk Assessment Report: Reference - 51002170398001



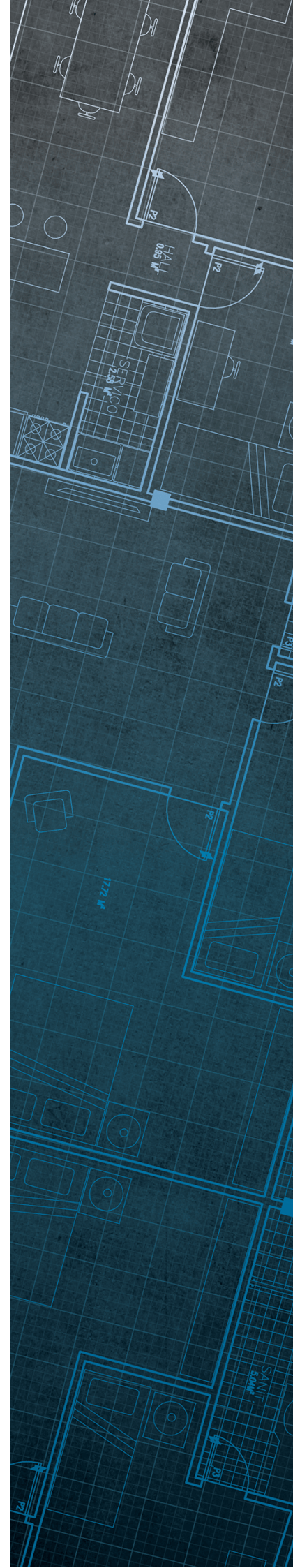
The Coal
Authority

Consultants Coal Mining Report

Haywood Engineering Services
Mapplewell Drive
Mapplewell
Barnsley
S75 6BP

Date of enquiry:	11 September 2019
Date enquiry received:	11 September 2019
Issue date:	11 September 2019

Our reference:	51002169770001
Your reference:	19-092



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

Andrew Hoyland

Enquiry address

Haywood Engineering Services
Mapplewell Drive
Mapplewell
Barnsley
S75 6BP

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

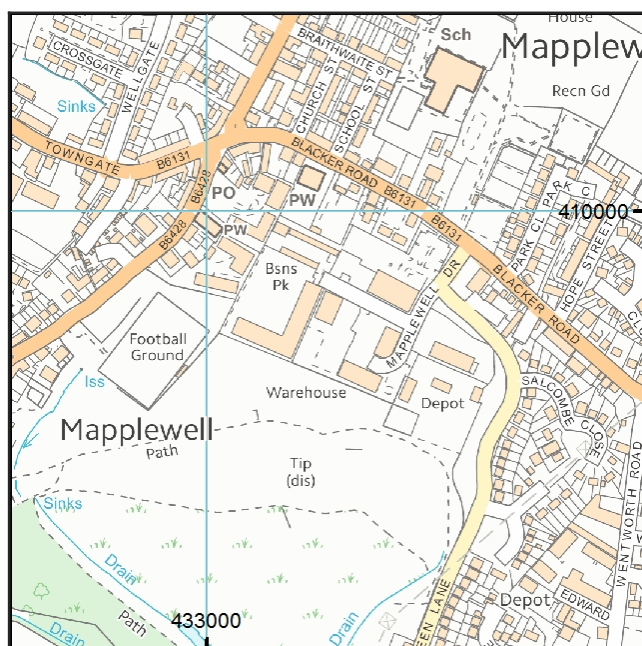
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2018. All rights
reserved.

Ordnance Survey Licence number: 100020315

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
NORTH GAWBER	BARNSLEY	Coal	64P3	89	Beneath Property	7.9	North-East	277	1883
NORTH GANBER	TOP HAIGH MOOR	Coal	640X	149	North-West	3.6	East	94	1949
unnamed	TOP HAIGH MOOR	Coal	6Y82	157	North	5.6	North-East	99	1948
DARTON	LIDGETT	Coal	64P9	192	South-West	3.7	East	72	1931
unnamed	LIDGETT	Coal	6Y43	203	North	5.5	North-East	76	1932
NORTH GAWBER	LIDGETT	Coal	64PA	211	East	2.8	East	72	1933
unnamed	FENTON	Coal	6Y83	285	North-West	5.9	North-East	210	1964
WOOLLEY	FENTON	Coal	64PS	290	North-West	4.9	East	175	1965
WOOLLEY	MIDDLETON MAIN	Coal	64PC	327	North-West	4.9	North-East	112	1957
unnamed	MIDDLETON MAIN	Coal	6Y05	338	North-West	5.0	North-East	126	1958

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

Distance to spine roadway (m)	Direction to spine roadway
3.2	South-West
Within	N/A
Within	N/A

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	433409-002	433171 409841	was filled in April 1987	Coal	
Shaft	433409-003	433198 409818	was filled in April 1987	Coal	
Adit	433409-011	433126 409830	was filled in May 1987	Coal	
Adit	433409-012	433238 409884	was filled in July 1988	Coal	
Shaft	433409-018	433173 409997		Coal	

Abandoned mine plan catalogue numbers

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

BE26	NE158	SCC14
NE695	NE978	NE492
BE29	NE1033	NE996

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

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

Distance to site investigation (m)	Direction
3.3	South

See Section 4 for further information.

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 in an area where notices to withdraw support were given in 1946.

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.

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.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

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.

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.

This page left intentionally blank

VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	11 September 2019
Issued to	ANDREW HOYLAND 311 WAKEFIELD ROAD SMITHIES BARNSELEY S71 3LR
Property search for	HAYWOOD ENGINEERING SERVICES MAPPLEWELL DRIVE MAPPLEWELL BARNSELEY S75 6BP
Reference number	51002169770001
Date of issue	11 September 2019
Cost	£112.13
VAT @ 20%	£22.43
Total received	£134.56
VAT registration	598 5850 68



The Coal
Authority

Resolving the **impacts** of mining

Mine Entry Interpretive Report



HEYWOOD ENGINEERING SERVICES LTD, UNIT 9A,
MAPPLEWELL BUSINESS PARK, MAPPLEWELL DRIVE, MAPPLEWELL,
BARNSELY, S75 6BP

Date of enquiry:	16 September 2019
Date enquiry received:	16 September 2019
Issue date:	16 September 2019

Our reference:	51002170398001
Your reference:	19-092

Mine Entry Interpretive Report

This report has been prepared using the records held by the Coal Authority at the time the report was produced.

Client name

Andrew Hoyland

Enquiry address

HEYWOOD ENGINEERING SERVICES LTD, UNIT 9A,
MAPPLEWELL BUSINESS PARK, MAPPLEWELL
DRIVE, MAPPLEWELL, BARNSELY, S75 6BP

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

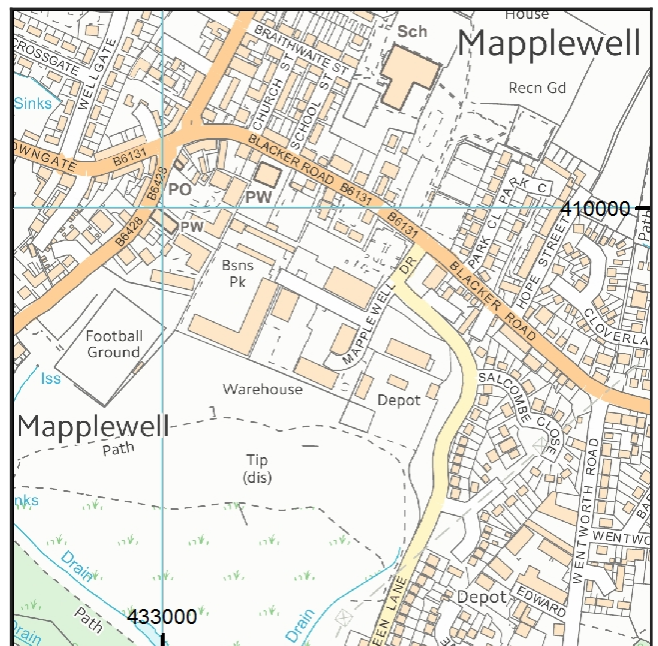
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2018. All rights
reserved.

Ordnance Survey Licence number: 100020315

Mine entry information

If you live in a coal mining area there is a very small risk that your home or other property may be affected by coal mining subsidence.

To work out if your property is within the area of possible ground movement the report will take into account the actual or plotted position of the mine entry, its known or assumed diameter and the thickness of deposits above rockhead. For more information, please see our general information section.

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. The mine owner will treat the mine entry and arrange for repairs to the property to be carried out to the reasonable satisfaction of the property owner. The mine owner may also be liable to pay compensation for damage to moveable property such as furniture.

Please Note - The Coal Mining Subsidence Act 1991 does not cover subsidence damage caused by extraction of minerals other than coal.

Any insurance given with previous mining reports does not cover this report.

Mine entry reference 433409-002

Shaft or adit	Shaft
Mineral worked	Coal
Source	OS:1/2500 Scale 262/15 4th NG ed Ab Plan:NE978 NE979 NE493 NE816 NE695 NE868 Geol:1/10560 Scale 262 SE2nd ed SE 30 NW NG ed Other:North Gawber- Barnsley SMP
Colliery name	Unknown
Entry name	North Gawber Colliery Lidgett Downcast Shaft
Date abandoned	1-Mar-1986
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	203.0
Diameter/maximum width (m)	5.5
Probable adit azimuth	Not Applicable
Treatment details	was filled in April 1987
Conveyance	Not Applicable
Other information	None

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is outside the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage to the garden areas/other buildings, especially given the information recorded in the treatment details above, is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

In our opinion, the main building (as shown on the plan) is not at risk of coal mining subsidence damage from the subject mine entry. This is because it is not within the area of possible ground movement.

In the unlikely event of other parts of your property being damaged by coal mining subsidence such as outbuildings, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

Mine entry reference 433409-003

Shaft or adit	Shaft
Mineral worked	Coal
Source	OS:1/2500 Scale 262/15 1st 2nd 4th NG ed Ab Plan:M1096 NE816 NE695 NE978 NE979 NE493 NE868 Geol:1/10560 Scale SE 30 NW NG ed Other:North Gawber-Barnsley SMP
Colliery name	Unknown
Entry name	North Gawber Colliery Barnsley Upcast Shaft
Date abandoned	1-Mar-1986
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	102.0
Diameter/maximum width (m)	4.3
Probable adit azimuth	Not Applicable
Treatment details	was filled in April 1987
Conveyance	Not Applicable
Other information	None

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is outside the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage to the garden areas/other buildings, especially given the information recorded in the treatment details above, is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

In our opinion, the main building (as shown on the plan) is not at risk of coal mining subsidence damage from the subject mine entry. This is because it is not within the area of possible ground movement.

In the unlikely event of other parts of your property being damaged by coal mining subsidence such as outbuildings, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

Mine entry reference 433409-011

Shaft or adit	Adit
Mineral worked	Coal
Source	Ab Plan:NE492 NE978 NE979 NE493 NE996 NE868 Geol:1/10560 Scale SE 30 NW NG ed Other:Colliery Surface Overlay
Colliery name	Unknown
Entry name	North Gawber Colliery No.1 Adit
Date abandoned	Unknown
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	Unknown
Diameter/maximum width (m)	3.0
Probable adit azimuth	41
Treatment details	was filled in May 1987
Conveyance	Not Applicable
Other information	None

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is within the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage, especially given the information recorded in the treatment details above, is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

In our opinion, the main building (as shown on the plan) is within the area likely to be affected if coal mining subsidence was to occur because of ground movement.

The statistical risk of the main building being damaged by subsidence especially given the information recorded in the treatment details above however is very small.

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

Mine entry reference 433409-012

Shaft or adit	Adit
Mineral worked	Coal
Source	Ab Plan:NE492 NE979 NE493 NE996 Geol:1/10560 Scale SE 30 NW NG ed Other:Colliery Surface Overlay
Colliery name	Unknown
Entry name	North Gawber Colliery No.2 Adit
Date abandoned	Unknown
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	Unknown
Diameter/maximum width (m)	3.0
Probable adit azimuth	45
Treatment details	was filled in July 1988
Conveyance	Not Applicable
Other information	None

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is outside the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage to the garden areas/other buildings, especially given the information recorded in the treatment details above, is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

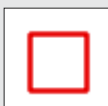
In our opinion, the main building (as shown on the plan) is not at risk of coal mining subsidence damage from the subject mine entry. This is because it is not within the area of possible ground movement.

In the unlikely event of other parts of your property being damaged by coal mining subsidence such as outbuildings, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

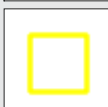
Enquiry boundary

Key

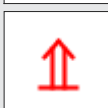
Approximate position of enquiry boundary shown



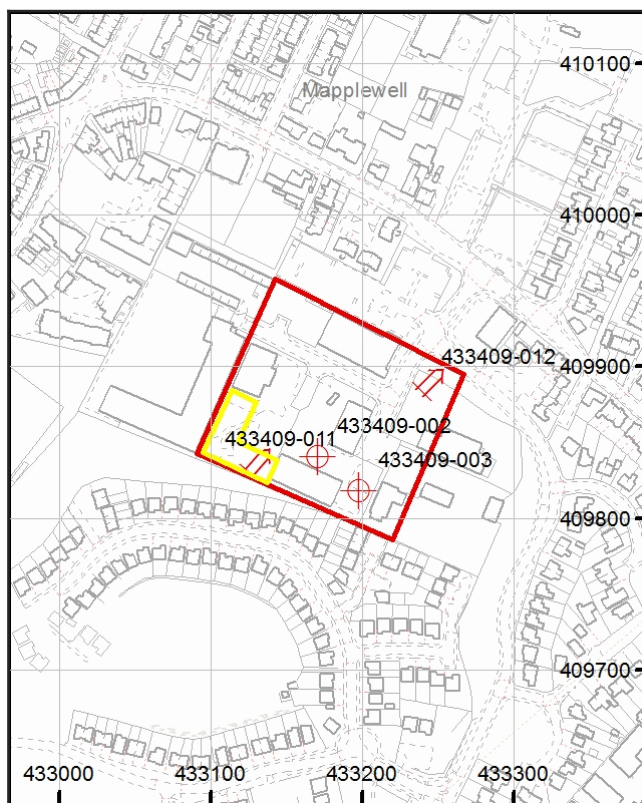
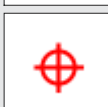
Approximate position of main building shown



Disused adit



Disused mineshaft



How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2018. All rights
reserved.

Ordnance Survey Licence number: 100020315

General information

The following information is based on the Authority's interpretation of the facts in its possession at the time the report was produced and on the Ordnance Survey's (OS) improved data. A site inspection has not been carried out.

1. Some of the source documents used may be very old and can have varying standards of accuracy. As a result, the plotted positions of mine entries can be different, to varying degrees, to their actual positions.
2. The thickness of superficial deposits has been taken from the records of the Authority and/or those of the British Geological Survey. © NERC All rights reserved. Where the Authority has information about activities such as infill operations or excavation, which may have affected the thickness of deposits above rockhead, this will also be taken into account.
3. The Authority will only provide the depth of a mine entry where this is known.
4. Where information about the diameter of a shaft is not known, it will be assumed. The assumption will be based on other shafts in the vicinity, the likely date it was sunk and any other relevant information, for example the depth of seams the shaft is thought to have accessed. Where a shaft is not circular, the maximum diagonal dimension will be used.
5. The zone of possible ground movement of an adit will be calculated for the estimated position of the mouth of the adit. It will not apply to the underground length of the adit. The approximate adit direction, where applicable, will be quoted in degrees from North.
6. Where treatment details are recorded, this information will be given. Where records are not available, "Unknown" will be reported.
7. The issue of ownership of mine entries is extremely complicated. Where details of the sale of a mine are known these will be provided. Where no sale details are available, in most instances, ownership will rest in the Coal Authority. Whatever the position with ownership, if coal mining subsidence damage does occur, statute provides for the 'responsible person' to provide a remedy. The 'responsible person' is either the Coal Authority or a licensed mining operator.
8. The report has been prepared by experienced mining surveyors with knowledge in the management and interpretation of coal mining information.

Disclaimer

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Alternative formats

If you would like this information in an alternative format, please contact our communications team on 0345 762 6848 or email communications@coal.gov.uk.

Terms and conditions

Our full terms and conditions can be found on our website – www.groundstability.com.

VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	16 September 2019
Issued to	ANDREW HOYLAND 311 WAKEFIELD ROAD SMITHIES BARNSELEY S71 3LR
Property search for	HEYWOOD ENGINEERING SERVICES LTD UNIT 9A MAPPLEWELL BUSINESS PARK MAPPLEWELL DRIVE MAPPLEWELL BARNSELEY S75 6BP
Reference number	51002170398001
Date of issue	16 September 2019
Cost	£121.91
VAT @ 20%	£24.38
Total received	£146.29
VAT registration	598 5850 68

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

APPENDIX C – BOREHOLE RECORDS

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

4 SE 30 NW/9 87 87/

NORTH GAMBER COLLIERY New Liddett Shaft

1-in. Geological map: 87
6-in. map: Yorks. 262 N.W.

Site: Lat. 53° 35' 2" Long. 1° 29' 57"

Height above O.D. 306.67 ft. Date: 1926

Dip of Strata 1 in 12 N.E.

	Description of Strata	Thickness	Depth
	Soil	0.30 1 0	1 0
	Sandstone rag	1.83 6 0	7 0
	Sandstone rock	3.89 12 9	19 9
KENT'S THIN	COAL	0.76 2 6	22 3
	Fireclay	0.61 2 0	24 3
	Sandstone rock	3.02 9 11	34 2
	Blue bind	2.92 9 7	43 9
	Sandstone	2.31 7 7	51 4
	Blue bind	4.98 16 4	67 8
	Grey stone	0.38 1 3	68 11
	Blue bind	0.46 1 6	70 5
	Sandstone rock	2.31 7 7	78 0
	Blue bind	2.76 2 6	80 6
	Sandstone rock	0.46 1 6	82 0
	Blue bind with ironstone bands	2.69 8 10	90 10
	COAL	0.23 9	91 7
KENT'S THICK	Clunch	1.09 3 7	95 2
	COAL	3 7	98 9
	Clunch	0.84 2 9	101 6
	Blue bind	6.32 20 10	122 4
	Ironstone	0.08 3	122 7
	COAL	0.05 2	122 9
	Bind	0.61 2 0	124 9
	Blue bind	4.37 14 4	139 1
	Clunch	0.69 2 3	141 4
	Stone bind	4.44 14 7	155 11
BARNESLEY RIDER	Fireclay	1.53 6 0	161 11
	Stone bind	2.46 8 1	170 0
	Blue bind	2.36 7 9	177 9
	Stone bind	3.07 10 1	187 10
	Blue bind	1.60 5 3	193 1
	Ironstone bind	0.46 1 6	194 7
	Blue bind	8.53 28 0	222 7
	COAL	0.46 1 6	224 1
	Clunch	6.40 21 0	245 1
	Blue bind	5.21 17 1	262 2
BARNESLEY	Stone bind	15 7	277 9
	Blue bind with ironstone nodules	21 4	299 1
	COAL	3 - 2	
	Dirt	6	
	COAL	5 - 10	
	Clunch	1 11	310 6
	Blue bind with ironstone nodules	21 9	332 3
	Black bat with coal streaks	6	332 9
	Blue bind	8 10	341 7
	COAL	10	
	Clunch	6	
	COAL	4	
	Clunch	1 8	343 3
	COAL	4 11	348 2
	COAL with dirt partings	1 6	349 8
	Blue bind	4 11	354 7
	COAL	3	354 10
	Blue bind	18 9	373 7
	Hard grey rock	5 1	376 8

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001	Date:	19/09/19	Rev:	0

SE 30 NW 1/4 87/43C

	Blue bind	6	11 7	388 3
	COAL	9		
	Clunch	9	2 0	390 3
	COAL			
	Stone clunch		3 10	394 1
	Can		1 6	395 7
	Blue bind		10 4	405 11
	COAL		10	406 9
	Clunch		5 10	412 7
	Grey rock		3 10	416 5
	Blue bind		15 7	432 0
	COAL		10	432 10
	Clunch		6	433 4
HAIGH MOOR	Stone bind		11 4	444 8
ROCK (78")	Sandstone		66 9	511 5
	COAL			
TOP HAIGH	Dirt	3	2 3	513 8
MOOR	COAL	1 - 8		
	Pireclay		2 0	515 8
	Blue bind		14 0	529 8
LOW HAIGH	COAL		2 4	532 0
MOOR				
	Clunch		6 11	538 11
	Blue bind		12 3	551 2
	Clunch		7	551 5
	Blue bind		37 5	589 2
	COAL	6		
	Dirt	4	11	590 1
	COAL			
	Pireclay		1 6	591 7
	Blue bind		46 8	638 3
	COAL	3		
	Clunch	7		
	COAL	5		
LIDGETT	Clunch	11	5 0	643 3
	COAL	3		
	Dirt	2		
	COAL	2 - 5		
	Clunch		4 0	647 3
	COAL		3	647 6
	Blue bind		8 8	656 2
	COAL		10	657 0
	Blue bind		9 10	666 10

45. 14 6.22

REPORT					
Project Title:	UNIT 9A, MAPPLEWELL BUSINESS PARK		Project Number:	19-0932	
Reference:	19-092-REP-001		Date:	19/09/19	Rev: 0

SE 30 NW 17

		Hard grey clunch with rootlets and ironstone nodules	0.76 2 6	133 10 40.79
		Grey siltstone	0.61 2 0	135 10 41.40
		Grey shale with plant remains	0.10 4	136 2 41.50
		Grey siltstone	0.30 1 0	137 2 41.81
		Hard grey shale	0.56 1 10	139 0 42.37
		Grey siltstone	1.22 4 0	143 0 43.59
		Grey shale with ironstone nodules and mussels	1.07 3 0	146 6 44.65
		Shelly ironstone	0.05 2	146 8 44.70
		Dark grey shale with ironstone nodules and mussels	0.86 2 10	149 6 45.57
		Hard grey sandstone	0.28 11	150 5 45.85
		Dark grey siltstone with mussels	0.18 7	151 0 46.02
		Banded siltstone	2.90 9 6	160 6 48.92
		Hard grey silty shale	1.65 5 1	165 7 50.47
		Ironstone	0.08 3	165 10 50.55
		Dark grey shale with mussels	0.56 1 10	167 8 51.10
		Black shale with abundant mussels	0.86 2 10	170 6 51.97
		Shelly ironstone	0.03 1	170 7 51.99
		Black shale with mussels	0.33 1 1	171 8 52.32
		Ironstone	0.05 2	171 10 52.37
		Black shale with abundant mussels and ostracods	0.30 1 0	172 10 52.68
		COAL	1-2 0.36	
		CANNEL	5 0.13	
		Stone clunch with rootlets and ironstone nodules	0.76 2 6	174 5 53.12
		Grey siltstone	3.07 10 1	176 11 53.92
		Grey shale with occasional mussels	0.33 1 1	187 0 57.00
		COAL	0.15 6	188 1 57.33
		Grey clunch with rootlets and ironstone nodules	1.04 3 6	188 7 57.48
		Grey siltstone	1.50 4 11	192 1 58.55
		Banded sandstone	0.53 1 9	197 0 60.05
		Grey siltstone	0.84 2 9	198 9 60.58
		Hard grey siltstone	0.46 1 6	201 6 61.42
		Banded siltstone	0.20 8	203 0 61.87
		Banded sandstone	0.69 2 3	203 8 62.08
		Grey siltstone	2.37 7 10	205 11 62.76
		Hard grey silty shale with ironstone nodules and occasional mussels	1.37 4 6	213 9 65.15
		Grey siltstone	1.83 6 0	218 3 66.52
		Banded siltstone	0.67 2 3	224 3 68.35
		Grey siltstone	2.21 7 3	226 6 69.04
		Grey shale	0.88 1 3	233 9 71.25
		Black shale with mussels and abundant ostracods	0.46 1 6	235 0 71.63
		Grey shale with ironstone bands and mussels	0.91 3 0	236 6 72.09
		Black shale with abundant mussels and ostracods	0.88 11	239 6 73.00
		Grey shale with ironstone nodules and scattered mussels	2.39 7 10	240 5 73.28
		Black shale with mussels and abundant ostracods	0.15 6	248 3 75.67
		Grey shale with ironstone nodules	0.53 1 9	248 9 75.82
		Dark grey shale with mussels	0.08 3	250 6 76.35
		Grey shale with ironstone nodules and mussels	1.70 5 7	250 9 76.43
		Dark grey shale with mussels	0.81 2 8	256 4 78.13
		Black cannelloid shale	0.18 7	259 0 78.94
		Inferior CANNEL and shale	10 0.25	259 7 79.12
		Hard carbonaceous shale	1-9 0.53	
		COAL	3 0.68	
		Carbonaceous shale	1 0.93	
		Dark grey siltstone	1-0 0.18	
		COAL	6 0.39	
		Dark grey clunch	6 0.15	
		Inferior COAL	8 0.20	
		Dark grey clunch	0.88 1 3	265 3 80.85
		Grey clunch with rootlets	1 3	266 6 81.23
		Stone clunch with rootlets and ironstone nodules	0.69 2 3	267 9 81.61
		Grey siltstone with scattered plant remains	7.06 23 2	270 0 82.30
		Banded sandstone and siltstone	2.08 6 10	293 2 87.36
		Banded sandstone	2.44 8 0	300 0 91.44
		Grey siltstone	1.37 4 6	308 0 93.88
		Hard grey shale	0.80 1 0	312 6 95.25
		Grey siltstone	0.76 2 6	313 6 95.55
		Grey shale with plant debris	1.52 5 0	316 0 96.32
				321 0 97.84