KEITH EDMONDSON

BSc., MSc., PhD., C.Geol., F.G.S.

Solutions to Mining, Geotechnical and Geological Problems

17 Diamond Ridge
Barlaston
STOKE-ON-TRENT ST12 9DS

Telephone (01782) 372305

keith.edmondson@ntlworld.com

MINING RISK ASSESSMENT

to accompany a Planning Application

for a new housing development at

160 Froghall Road, CHEADLE, Staffs, ST10 2DN

Report Ref 261003
OCTOBER 2015

1. INTRODUCTION

1.1 It is proposed to develop land at 160 Froghall Road, Cheadle, Staffordshire ST10 2DN (NGR 401110, 344610) for residential use. The site location is depicted on the accompanying Fig. 1 and on the plan attached to an appended Coal Authority Mining Report (Ref 51001019736001, dated 28th October 2015).

1.2 The site is within a "Development High Risk Area". Such areas are defined by the Coal Authority as being subject to potential land instability and other health and safety risks associated with former coal mining activities. The Coal Authority is a statutory planning consultee in these areas and requires a Mining Risk Assessment to be provided as part of a planning application to review the available information on relevant mining matters, recommend appropriate mitigation measures to address these issues and demonstrate the proposed development can be safely constructed. This report presents a desk-based assessment of past mining and advice to the applicant to accommodate any identified implications on the proposed development.

2. INFORMATION SOURCES

2.1 The Coal Authority Mining Report (CAMR) indicates the site is in the likely zone of influence of recorded workings at 40m depth but that any ground movements associated with these workings should have stopped. The CAMR does, however, indicate coal seams could be present at shallow depth which may have been worked in the past for which records have not survived.

2.2 It was not a legal requirement to maintain mining records until the late 1800's and even then it was not rigorously policed. Consequently records have not always survived of early mining and it is generally accepted that if coal seams are present close to the surface there is a possibility they could have been worked. Where, shallow workings remain, especially if worked by partial extraction methods and pillars were left to support the roof, then voids may still remain open despite the long period since mining ceased. Due to any one of a number of factors, including that of development, the equilibrium status the workings might appear to exhibit can be disturbed and progressive collapse of the roof strata above a void can result in its upward migration. Ultimately if a collapse reaches the surface or the underside of any foundations it could lead to a sudden loss of bearing.

2.3 The 1:50,000 scale geological map of Ashbourne (Sheet 124) published by the British Geological Survey, a copy of which is available at http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001616 shows the site is underlain by Coal Measures strata with the Cobble Coal depicted as cropping out a short distance to the south and east of the site dipping in a westerly direction at around 5°. Despite having a thickness of only 0.50m or thereabouts the coal was extensively worked in the Cheadle Coalfield as a consequence of its high quality. The sequence underlying the Cobble Coal includes the Rider Coal (of limited economic importance) followed by the Woodhead Coal. The Woodhead Coal was probably the most extensively worked seam in the Cheadle area. A vertical section

of the sequence between the Cobble and Woodhead Coal to the south of the site at the former Cheadle Park Colliery indicates the Rider Coal is at a depth of around 47m below the Cobble and the Woodhead Coal at around 76m. Other coals are present at increasing depth but they are not of significance in terms of impact on the surface. The interval between the Cobble and the Woodhead is replicated in other shaft sections in the area. The sequence overlying the Cobble Coal includes the Mans and the Foxfield Coals neither of which were extensively mined but have been opencast in the area. The Mans Coal is of the order of 30 or more metres above the Cobble and the Foxfield a further 15m.

2.4 The outcrop pattern of the Cobble Coal makes its depth beneath the site difficult to predict. The Coal Authority indicate the site is within the influence of workings at a depth of 40m and it is likely these workings are in the Cobble Coal in that the other extensively worked seam in locality, the Woodhead Coal, must be at a much greater depth than 40m. In any event the seam had probably been worked out long before mining records were kept. Assuming the foregoing it is conceivable that in descending order the Foxfield and Mans Coals could crop out or underlie the site at shallow depth and, whilst evidence of working of either seam is very limited, at shallow depth they could have been locally worked from shallow excavations.

2.5 The Coal Authority mining report does not refer to any recorded mine shafts as within, or within 20m, of the site. If, however, there are unrecorded workings in the Cobble Coal the possibility of unrecorded entries in to the workings from the site cannot be totally discounted.

3. COAL MINING RISKS

3.1 The risks associated with shallow mine workings include -:

a) Collapse of the workings beneath the build area causing a sudden loss of bearing to the structure.

b) Collapse of the workings surrounding the build area causing disruption to the infrastructure.

c) Settlement of the workings and the overlying ground either as a result of self weight consolidation or foundation loading resulting in movement damage to the structure.

d) Settlement of the workings and the overlying ground as a result of self weight consolidation adjacent to the build area causing disruption to the infrastructure.

e) Failure of unrecorded mine entrances or areas of previously collapsed ground that have migrated to the surface beneath the build area causing a loss of bearing.

f) Failure of unrecorded mine entrances, areas of previously collapsed ground or backfilled surface workings adjacent to the build area causing disruption to the infrastructure and, depending on their location, a loss of bearing to the structure.

g) Migration of mine gases from old mine workings and shafts to the surface resulting in explosion or the build up of asphyxiating gases in confined areas. The effects can potentially cause serious structural damage to a building. Some coal seams are liable to spontaneous combustion, if exposed, leading to the production of obnoxious gases, fires and a potential loss of bearing.

h) There is a risk where the ground is faulted or fissured the long term release of mining or tectonic stresses and strains can be concentrated along these planes of weakness and induce disruption of the surface beneath a building or the infrastructure.

3.2 There is an implication that for all the foregoing situations a potential health risk could exist for both construction workers and end users of a development.

4. INTERPRETATION OF THE MINING SITUATION AND HOW THE POTENTIAL RISKS SPECIFIC TO THE PROPOSED CONSTRUCTION WORKS WILL BE ADDRESSED

4.1 If the Cobble Coal is at a depth of 40m or more the likelihood of residual voids associated with a worked seam thickness of 0.50m having an influence on surface stability can be discounted. The bulking of collapsed ground would choke any void long before it could migrate to the surface. As the spatial distribution of the Cobble Coal cannot be predicted with certainty and there is a possibility of shallow surface workings in the Foxfield and Mans Coal it is proposed that prior to construction an intrusive investigation of the ground conditions should be undertaken. This will involve drilling 3 exploratory boreholes across the build area to a depth of around 30m to establish the geological sequence and confirm the spatial distribution of any coals. If the coals are absent, or at a depth where even if worked voids would have no influence on surface stability, no further investigative work would be deemed necessary.

If the initial boreholes encounter an intact coal but there is no evidence of workings an additional 5 boreholes will be drilled to confirm the absence of workings beneath the whole of the build area. If any of the boreholes indicate the presence of workings that could have an influence on surface stability further investigation and the filling of voids will be undertaken. This will be achieved by drilling on a grid pattern beneath the whole of the building footprint and the injection of a cement based grout via these boreholes to infill the cavities and voids that might remain. The proposals will address the implications of an instability risk beneath the build area - a) of the hazards defined in para 3.1. A proposal for the work shown on Fig. 1.

4.2 In areas where the equilibrium status of the ground is unlikely to be changed as a consequence of development the investigation and the infilling of voids associated with shallow mine workings is not normally undertaken unless it is considered a serious risk to health exists. The situation is similar to that which exists in the area surrounding the site and, as in these areas, best addressed if and when a collapse occurs (item b) in 3.1).

4.3 (Item c - in 3.1) The filling of voids remaining in shallow workings only minimises the risk of collapse causing a sudden loss of bearing. There is a possibility that loading, or long term consolidation of ground affected by shallow mining could still induce settlements. If such conditions are encountered they will be accommodated in the building design by strengthening the foundations. The likelihood of adopting piles in the construction is considered unlikely but if such a solution to the foundation design is implemented the piling contractor will be advised to design the piles to avoid transferring loads to ground that has been disturbed by mining.

4.4 (Item d in 3.1) Just as the collapse of ground due to shallow mining in the area surrounding the proposed extension would be most economically undertaken if and when it was to occur so the implications of the consolidation of mining disturbed ground will be similarly addressed.

4.5 (Item e and f in 3.1) There are no recorded mine shafts in the vicinity of the site and no specific precautions are necessary in the proposed development with respect to same. During the intrusive investigation of shallow mine workings and at the time of construction a more realistic assessment of whether unrecorded mine entries, areas where collapses may have migrated to the surface and the implications of primitive surface workings will be undertaken. If such conditions are encountered they will be accommodated by filling any associated voids, installing a reinforced concrete cap over the mouth of a shaft and/or designing foundations to span the features. In infrastructure areas if any unrecorded mine entries are encountered a concrete plug or cap will be installed over the mouth to minimise the risk of a collapse causing a health risk.

4.6 (Item g in 3.1) As part of the investigative programme gas monitoring will be undertaken to establish whether elevated levels of mine gases are present. If encountered then the installation of membranes and venting will be incorporated in to the construction.

4.7 (Item h in 3.1) The are no major faults shown on the geological map in the immediate area of the site and the risk of any significant movements due to the release of ground stresses can be discounted. The Coal Authority Mining Report does not indicate they have any records of ground movements in the vicinity of the site caused by past mining activity.

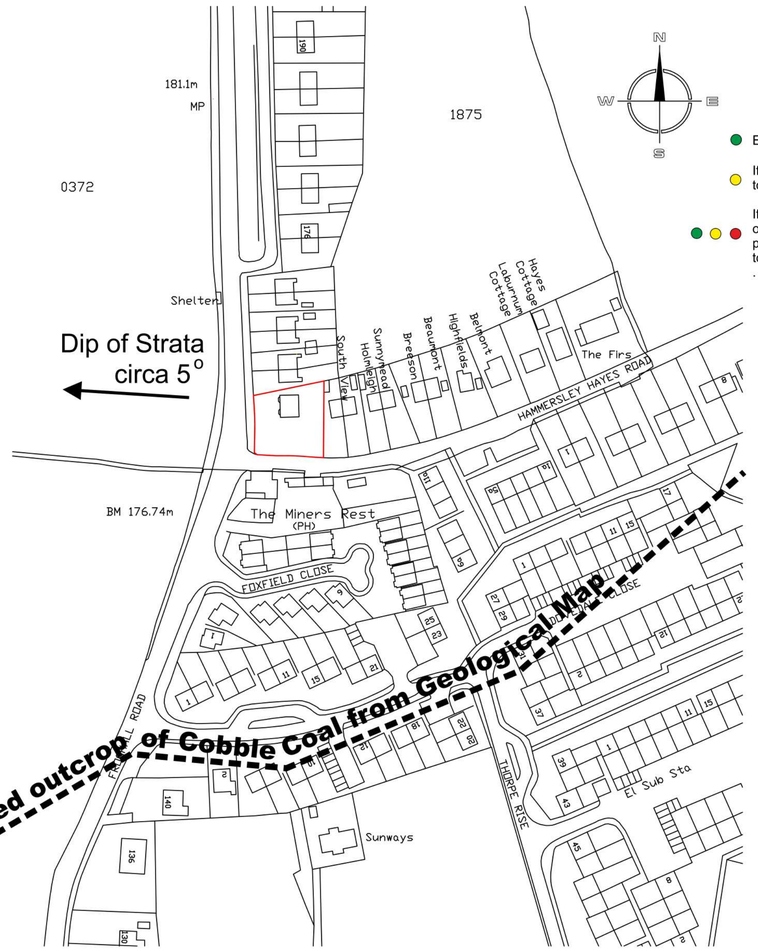
4.8 Although it can be concluded risks to the proposed development and users of the site do exist as a consequence of past mining it is expected that if appropriately addressed they can be accommodated in the construction process.

4.9 A Permission will be obtained from the Coal Authority for the intrusive investigation and the infilling of any voids associated with former workings.

Keith Edmondson

Appendix Coal Authority Mining Report
Fig 1 Development Location and Proposed Investigation Works

Site Plan as Proposed 1:100



Inferred outcrop of Cobble Coal from Geological Map

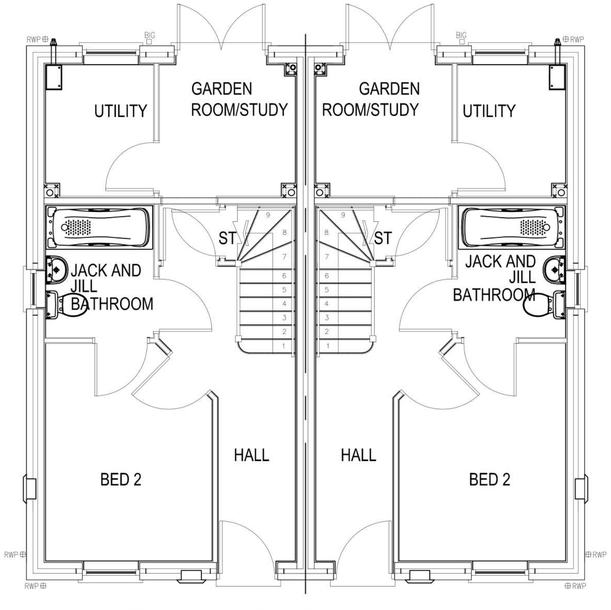
Site Location Plan 1:1250

Rev.	Drawn	Comments	Date

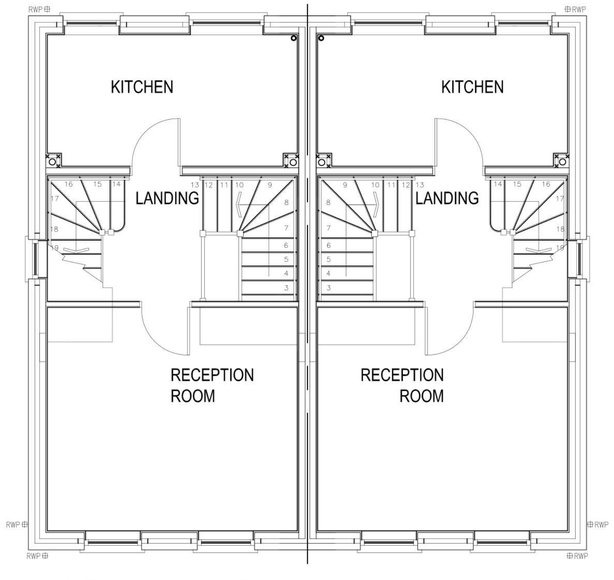
- Exploratory boreholes to establish spatial distribution of coal seams
- If intact coal encountered in exploratory boreholes drill additional boreholes to confirm coal is intact beneath build area
- If workings encountered in any of initial boreholes within influencing distance of the surface drill all green, yellow and red coloured boreholes on a proportioned grid pattern over build area and inject cement based grout to fill any residual voids.

.

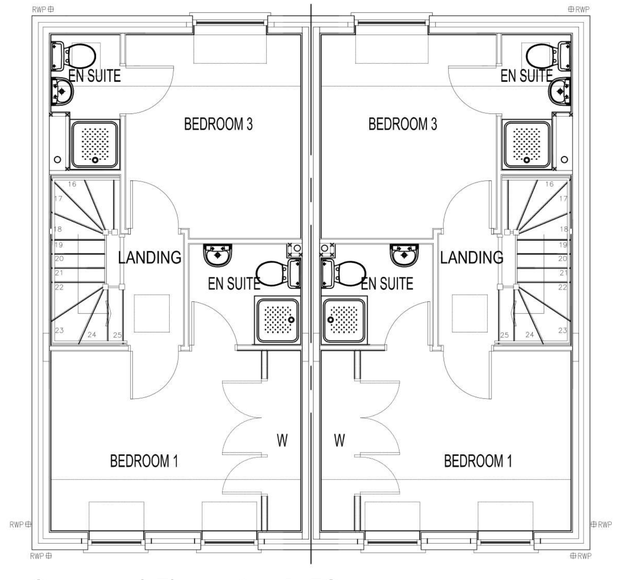
FIG 1 SITE LOCATION DEVELOPMENT PROPOSALS AND MINING LEGACY INVESTIGATON



Ground Floor A 1:50



First Floor A 1:50



Second Floor A 1:50

Hewitt&Carr Architects
A: 2-4 Cross Street I Cheadle I Staffordshire I ST10 1NP
T: 01538 756888
E: enquiries@hcarchitects.co.uk
W: www.hcarchitects.co.uk

Client
AJ BEAMAN

Project
Proposed Residential Development
on Land off Froghall Rd, Cheadle, Staffs

Title
Proposed Site and Location
Proposed Plans Building A

Status

Date 15/09/2015 Drawn AS

Scale @A1 AS STATED Checked

Project No 00371 Drawing No. AL(0)04 Rev

File Ref: HC REF

The Coal Authority

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

KEITH EDMONDSON LTD
17 DIAMOND RIDGE
BARLASTON
STOKE-ON-TRENT
ST12 9DS

Our reference:	**51001019736001**
Your reference:	**261003**
Date of your enquiry:	**28 October 2015**
Date we received your enquiry:	**28 October 2015**
Date of issue:	**28 October 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

LAND ADJACENT TO 160, FROGHALL ROAD, CHEADLE, ST10 2DN

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 1 seam of coal at 40m depth, and last worked in 1854.

Any ground movement from these coal workings should have stopped by now.

In addition the property is in an area where the Coal Authority believe 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 prior to any site works or future development activity. Your attention is drawn to the Comments on Coal Authority Information section of the report.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

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

Present

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

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

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

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which 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.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, 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. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

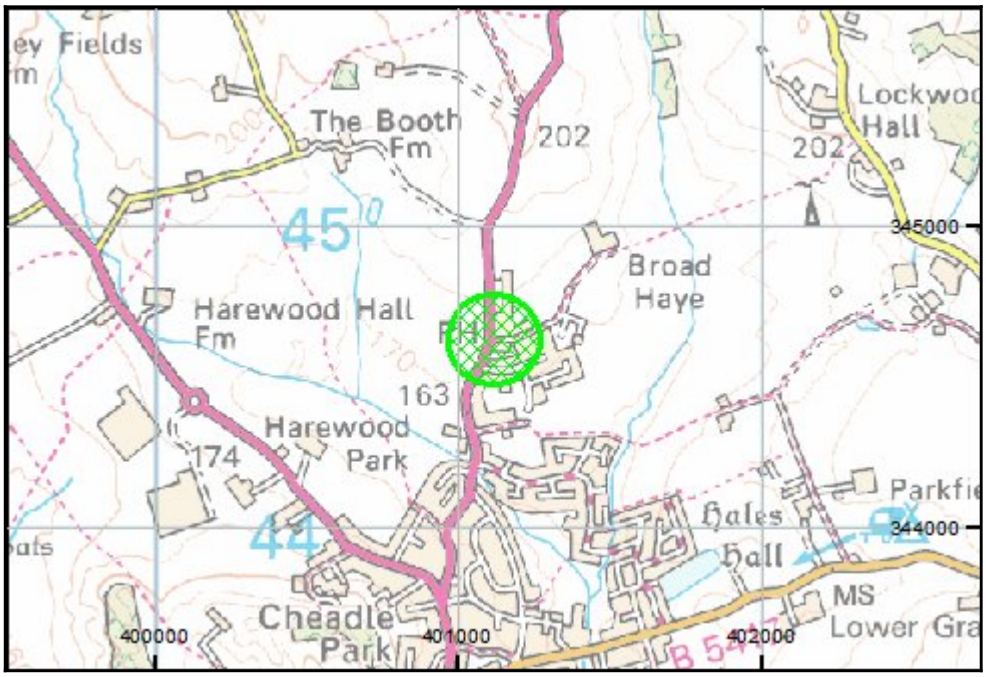
Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database right. 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.

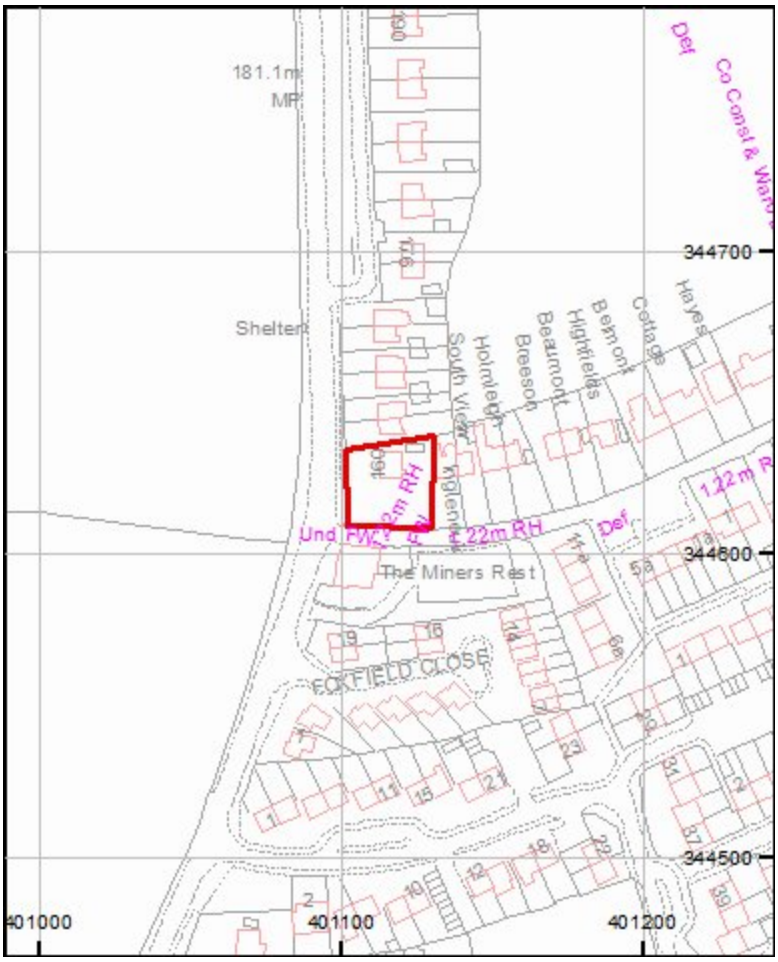
Issued by:	The Coal Authority, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG
Tax Point Date:	28 October 2015
Issued to:	KEITH EDMONDSON LTD 17 DIAMOND RIDGE BARLASTON STOKE-ON-TRENT ST12 9DS
Property Search for:	LAND ADJACENT TO 160, FROGHALL ROAD, CHEADLE, ST10 2DN
Reference Number:	51001019736001
Date of Issue:	28 October 2015
Cost:	£59.00
VAT @ 20%:	£11.80
Total Received:	£70.80
VAT Registration	598 5850 68

Location map

Approximate position of property



Enquiry boundary



Key

Approximate position of enquiry boundary shown