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CONSULTANCY

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Date: 30th June 2022
Your ref: (S70 5XA).
My Ref: CMRA 00298

FOR THE ATTENTION OF MR TOM AGUS

Dear Sir,

COAL MINING RISK ASSESSMENT (CMRA) - FOR PROPOSED RESIDENTIAL DEVELOPMENT AT LAND AT HAY GREEN LANE, BIRDWELL, BARNESLEY S70 5XA

Introduction

Planning permission is being sought for a detached dwelling at the above named site, the location of which can be seen on the attached plan No. 00298/A in Appendix 1. The site is centred around national grid reference E: 434755 / N: 401355. A Coal Mining Risk Assessment is required for the proposals, in order to competently address the mining legacy for the site and determine what impact this may have had upon the land. The assessment is intended to be included as a supporting document to a future planning application to Barnsley MBC.

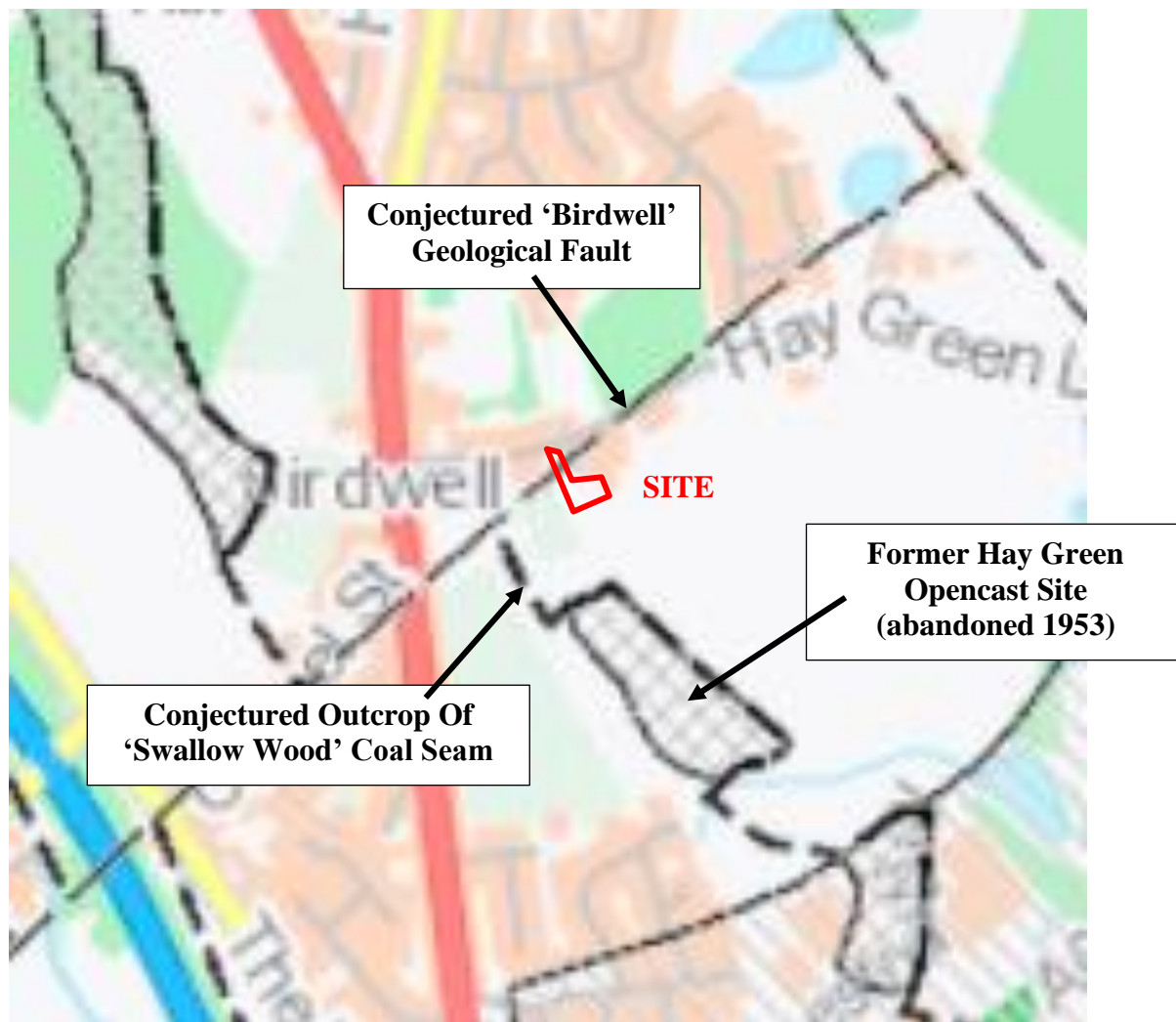
Scope of the Coal Mining Risk Assessment

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

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

Surface Geology (inc. any superficial deposits)

Records indicate the site to be located on sandstone of the Middle Coal Measure series from the Carboniferous formation. No superficial deposits are indicated in the vicinity of the site itself. The strata is shown to dip to the ENE (east-north-east) in this vicinity at a rate of around 1 in 14 (4°). A summary of the surface geology is illustrated on the image below which is an extract from the BGS Onshore Interactive Viewer:



Fault Planes or Fissures

As shown above, the 'Birdwell' geological fault is conjectured to pass through the northern part of the site. This may be encountered as a single plane of weakness or a 'zone' of various such planes in the same direction (WSW to ENE), throwing the strata down to the NW by between 10m to 20m. Although no fissuring of bedrock is known in the vicinity, the likelihood of natural fissures that could have been opened out by the past deep coal mining in the area should not be precluded.

Coal Seam Outcrops

As outlined on the extract image above from the BGS Onshore Interactive Viewer, the 'Swallow Wood' coal seam is conjectured to outcrop some 80m away to the south-west of the site. This seam is known locally to be around 1m in thickness and is estimated to be beneath the site at between 6m to 10m deep.

No other coal seams are expected at shallow depth in the vicinity, or at an influencing depth (by way of mining void migration) beneath the Swallow Wood seam horizon.

Made Ground

No made ground is indicated beneath the site.

Opencast Coal Workings.

No opencast coal operations are known within the site itself. The former Hay Green opencast is located some 100m away to the south, as illustrated on the above image, which worked the Swallow Wood coal seam. Details from the 'Rockingham Opencast' operations, a little further away to the south-east, show a seam thickness of the Swallow Wood coal as 0.95m.

Underground Coal Workings - Deep

Deep coal mining (over 50m deep) has taken place beneath the site in various coal seams, all settlement from which will be long complete. As no coalfields now exist, the site should remain stable from the deep coal mining perspective for the foreseeable future.

Underground Coal Workings - Shallow

Although no specific records of any shallow underground workings of the Swallow Wood coal seams are known beneath the site itself, such workings are known in both seams in the surrounding vicinity. As such the likelihood of discovering uncharted historic workings within these seams should not be discounted (as reflected by the fact that the site lies in a Coal Authority area of 'probable shallow coal workings').

Wherever there is a workable quality coal seam at shallow depth, there is always a possibility that un-recorded, possibly illicit, workings may be present. Such historic workings would be very likely to be via pillar and stall workings, from which any associated mining voids may remain that could impact upon surface stability. At the anticipated depth, any such workings of the Swallow Wood coal seam may impact upon these proposals unless it can be proved that the coal is too deep considering its thickness (*the general rule of thumb from CIRIA C758D (Abandoned mine workings manual) guidelines is that a site would need ten times the coal seam section of*

competent natural strata beneath the formation level and top of the coal for it to be considered as stable whether worked or otherwise).

The Swallow Wood seam is very likely to be too deep to affect surface stability to the north of the Birdwell fault.

Mine Entries

No mine entries are known within 100m of the site itself. Some potential will exist however for other mine entries being encountered which there are no records considering the shallow workable coal seams. Grey circular areas of fill material within natural bedrock would be an indication of an historic mine shaft for example.

Fugitive Gases

As far as we are aware, no evidence of coal mining related fugitive gas emissions are known within 250m of the site. However, there will be some risk for associated gases in relation to the shallow workable coal. These risks will be greater should any shallow workings be proved and far greater should any unrecorded mine entries be discovered.

Historical Records

According to the historical records, no nearby indications of any mining or quarrying activities are noted within close proximity of the site itself.

Coal Mining Risk Assessment (based on the above).

Coal Seam / Coal Mining Issue	Risk Assessment (VeryHigh/High/Moderate/Low/VeryLow)
Underground coal mining (at shallow depths)	Moderate
Mine entries (shafts and adits)	Low to Moderate
Geological faulting	Moderate to High
Geological fissures	Moderate
Fugitive gas emissions	Low to Moderate
Surface mining (opencast workings)	Low
Aggressive ground	Low
Coal exposed / near foundation level	Low

Defined Risk Assessment

(Where 'Underground Coal Mining' above = Very High to Moderate)

Extent of known underground mining in this/these shallow coal seam/s in the wider vicinity	(Extensive / Much / Occasional / None Known) Much
Intrusive Site Investigation of Coal Seam / Mines of Coal (given nature of proposals).	(Required / Recommended / Unnecessary)** Reccomended
Advised critical depth beneath foundation level to investigate considering geology and nature of the shallow coal/s*	20m

Key:

* *The critical depth is calculated according to Ciria C758D guidance which details that for the land to be regarded as stable from any voided mineworkings, then a suitable section of competent rock cover above the workings should be proved that is equal or greater than ten times the 'in-tact' coal seam thickness. The advised critical depth to investigate to in this report takes into account the available geological information, any nearby mining records and may include a contingency for the seam to be of a slightly greater thickness than anticipated. Due care and diligence should be employed on-site to ensure that sound information is gathered of the in-tact seam thickness, particularly if concluding that old workings are outside the critical depth of affecting stability for the proposed development.*

** *Where :*

Required	<i>Intrusive Site Investigation required of the shallow coal/s and/or mine entries to determine any necessary stabilisation works for the given development.</i>
Recommended	<i>Intrusive Site investigation recommended – given a lower level of risk in relation to the nature of proposed development some proposals may reduce the risk to an acceptable level via suitable design considerations.</i>
Unnecessary	<i>Intrusive Site Investigation deemed unnecessary – given geological/mining information.</i>

Coal Authority

Prior written permission from The Coal Authority is required for intrusive activities which will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits). Further information on The Coal Authority's permissions process can be found at:

www.coal.gov.uk/services/permissions/index.cfm

Information sources:

- *British Geological Survey Map Sheet SE 30 SW 1980 Edition*
- *British Geological Survey – Geology Of Britain Viewer*
- *Coal Authority Interactive Viewer and Mine Abandonment Plans*
- *Historical Mapping – old-maps.co.uk*

CONCLUSIONS

- 1) The site can be regarded as stable from the **Deep Coal Mining** perspective, and as no coal fields now remain this position should continue for the foreseeable future.
- 2) Given the **Shallow Coal Mining** position, and nature of development an intrusive site investigation of between 3 to 5 boreholes would be recommended to check the depth and nature of the shallow 'Swallow Wood' coal seam; namely to determine whether any treatment works of shallow mining voids and/or suitably designed foundations are required. Holes can be terminated in firm strata beneath the Swallow Wood seam, as no seams are expected to be of effect below this horizon. If no coal is encountered then holes should be extended to 20m to confirm the position. A guide to a recommended site investigation process is outlined in appendix 2; CIRIA C758D 'Abandoned Mine Working Manual' guidance should be followed. A permit from the Coal Authority should be secured to enable such an investigation. Water flush drilling methods would be required to mitigate from fugitive gas risks.
- 3) In terms of the fugitive mine gas risks from the potential shallow coal, actual risks would increase if any shallow mining voids are discovered and more so if any unchartered mine entries are encountered. The only way to prove whether protection measures are or aren't required would be for a period of gas monitoring via boreholes and stand pipes, usually undertaken over a period of 3 to 6 months. Without this investigation it may be a more pragmatic solution to include gas protection measures (such as a methane membrane and/or positive ventilation layers) within future foundation designs in any case. All usual safety precautions should be employed regarding possible fugitive gases in any deep excavation work taking place.

- 4) A watching brief should be employed during future grounds works for any signs of unrecorded mine entries. A site scrape to natural ground is the most effective procedure to check for such features; circular areas of grey fill within bedrock would be an indication. If suspected the Coal Authority (as owners) should be notified immediately for appropriate deliberations.

- 5) A similar watching brief should be employed during future grounds works for any signs of geological faulting and/or opened out fissures in sandstone bedrock. Appropriate ground treatment works and foundation design considerations may be required.

Note: should there be any uncertainty of actual conditions during future ground works Lyons CMC or indeed the Coal Authority themselves can be further consulted for on site assessment if necessary.

A suitably qualified and competent professional should be employed to use this report to determine the conditions on site, and ultimately advise on what action, if any, is necessary to safeguard the development. It should be noted that any future works to investigate any coal seam, mines of coal or associated mine entries will need the prior consent of the Coal Authority via their permitting procedure.

I trust that this satisfies your requirements, however please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

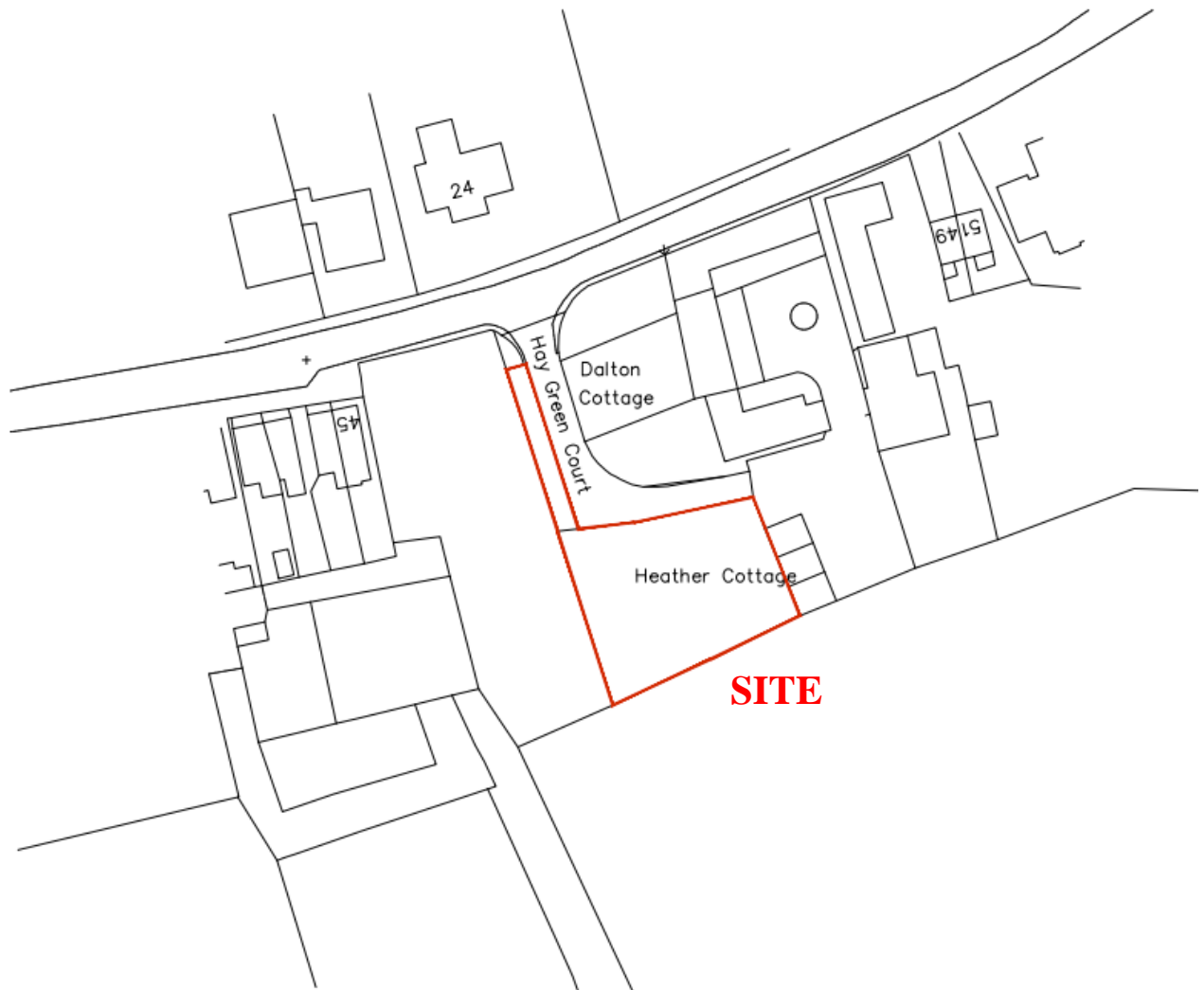
M Lyons

M. Lyons
Consultant Mining Engineer
BSc CSci MIMMM

Enc.

THIS COAL MINING RISK ASSESSMENT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA C758D "Abandoned mine workings manual." The opinion may be overruled by Government Authorities decisions based on other information not in my record. If a site investigation is recommended then this risk assessment will be superseded by the factual findings of that investigation. All site investigation work should be carried out by a competent professional from which independent conclusions and recommendations for safe development should be provided. It should be noted that: no operation should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. The investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases; these risks both under and adjacent the site should be fully considered in any proposals both for personnel and public safety. Copyright in this CMRA belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

Appendix 1 – Location Plan No. 00298/A
(Not To Scale)
Site centred at O.S. 434755 / 401355



**Borehole Site Investigation (SI) Process Guide
(Shallow Underground Coal Workings)**

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