Coal Mining Risk Assessment

Fall Head House, Silkstone

Reference : 20163-R-001-V01
Date : 17 May 2022

SOIL AND STRUCTURES

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Fall Head House, Silkstone

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Report Status

Project Number	20163
Report Number	001

Revision	V01 – Issue for information

Date Issued	17 May 2022 (V01)

Report Author

Author	Signature
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Executive Summary

In conclusion, the Coal Mining Risk Assessment finds that:

> The risk of coal mining related hazards affecting the Site is considered moderate to low at most but generally, low (no hazard indicators); and,

> No further assessment or risk mitigation is recommended

Recommended follow-on work is outlined in Section 6.0 of this Report.

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Appendices Drawings, Borehole Records, Coal Authority Permit

Annex Scope and Context, Background Threat

Appointment

Soil and Structures Ltd were instructed by Emma Prichard-Selby (the Client) in March 2022 to prepare a Coal Mining Risk Assessment (this Report) to support the proposed re-development of Fall Head House, Silkstone (the Site). The proposed development comprises renovation of existing buildings or re-development of dilapidated structures primarily over former footprints.

Scope and Context

The Coal Mining Risk Assessment offers advice on coal and non-coal mining related hazards with respect to the proposed development of the Site.

The legal context of this advice relates to an assessment of potential coal and non-coal mining related hazards that may affect the development.

The assessment of potential coal mining related hazards is governed by both health and safety law (various acts) and also rooted within national planning policy that is governed by planning law (various regulations and orders).

In practice, this necessitates acceptance of this report and its findings by the Coal Authority, a statutory consultee on planning applications.

For further information on the scope and context of the Coal Mining Risk Assessment please refer to the annex.

References

The Coal Mining Risk Assessment has been written with reference to various sources of information that are either appended or referenced a footnotes throughout the Report. Existing ground-related reporting has been made available for review.

1.0 Introduction

1.1 The Site

Location and size: The proposed development Site comprises a parcel of land approximately 0.5 Ha in size. The Site comprises Fall Head House and its associated out-buildings that date back to the 1700s (Figure 1).

Access: The Site is accessed on foot or by car off Fall Head Lane (Figure 1) that itself is accessible off Barnsley Road (A628).

Topography: The Site is located at an elevation of between 90 to 100 mAOD with a general north-easterly fall in levels from the high-point in the southern corner. This trend continues to the north-east with the Site located on the north-western slope of a local 'knoll' the high-point of which lies around 250 m south-west of the Site at c. 140 mAOD.

Existing structures / features: At the point of the intrusive investigation fieldworks, the Site was occupied by Fall Head House and its associated out-buildings the condition of which varied. Whilst not representing a structural survey, a walkover of the Site did not reveal any evidence of potential subsidence-related damage with a lot of damage appearing to have arisen from disrepair, e.g. dilapidated roofs or degraded timbers.

Existing reports: The local planning portal was searched for nearby ground related reports however, none were found that inform the geological sequence below the Site and so have not been referenced herein.

An existing Mining Risk Assessment (desk-based) has been prepared by Dunelm in May 2021 (ref. D10386/MRA/Rev1). This report recommended that confirmatory drilling was completed to confirm the geology beneath the Site.

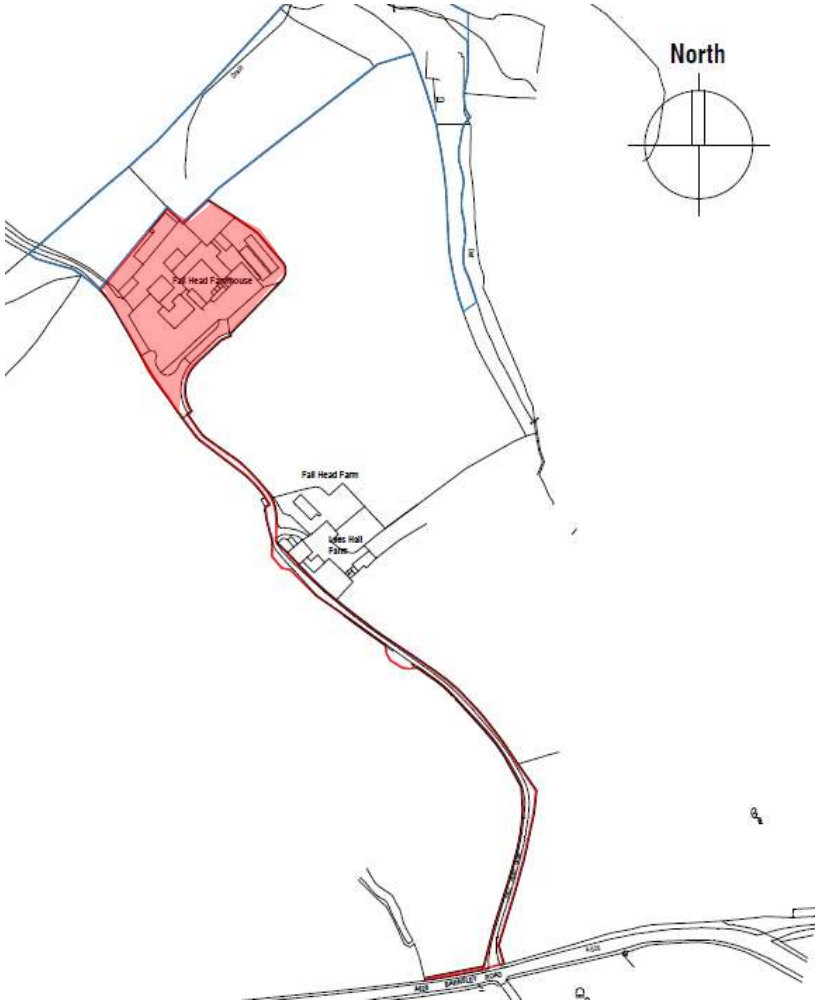


Figure 1: Site location plan
> *Extract from appended 'Location Plan'.*
> *Development Site shaded red.*

1.2 The Development

Development proposals are understood to comprise the refurbishment, reconstruction or replacement (including some limited new footprint areas) of the outbuildings associated with Fall Head House (Figure 2).

An appreciation of the construction processes is essential for development-focused risk assessments given the groundworks stand to significantly alter the risk rating, e.g. outcropping coal seams being exposed.

To enable this development, the following groundworks are likely to be required, N.B. listing is outline only and not exhaustive.

> Preparation and demolition: Site clearance across proposed development areas.

> Utility Excavations: Excavation of any drainage and other utility alignments if and where required.

> Foundations: Construction of sub-structures (foundations) followed by super-structures.

  At this stage, foundation design proposals are unknown but are likely to favour a shallow spread foundation solution.

> Surfacing: Formation of new hard and soft-landscaping areas (limited).



Figure 2: Development plan

> *Extract from appended 'As Proposed Identification Plan'.*
> *Development Site boundary illustrated by red line with proposed developments shaded light blue.*

2.0 Background to this Report

As noted within Section 1.1 an existing Mining Risk Assessment (desk-based) was prepared by Dunelm in May 2021 (ref. D10386/MRA/Rev1).

This Report (the Coal Mining Risk Assessment {intrusive}) builds on this earlier report and it is therefore recommended that they are read in conjunction with one another.

The Dunelm report is considered to offer a generally good desk-based insight into the mining geology beneath the Site. Various additional comments are added below that are relevant to the Site setting and risk assessments:

> History of the Site: No commentary on the history of the Site is provided with the house reported (by the Client) to date back to the 1760s with the farm buildings understood to have been added to the plot in the 1860s.

The date of the property is relevant given workings are less likely to have undermined the Site at shallow depth after its construction with a probable 'wayleave' in place or else any nearby (unrecorded) mine workings being worked/owned by the property itself.

> Presence of a well: The presence of a well on Site is not referenced; a feature that the property would have expected to have needed at this elevation. It is noted that a site walkover is not commonly undertaken as part of a desk-based mining risk assessment however, the recorded depth of the well likely intercepts the two shallow coal seams (depth recorded as at least 31 m below ground level as part of the intrusive investigation).

The well will have intercepted coal when advanced and potentially acted as a mine entry point (mine shaft). Conversely, wells are generally sunk remote or separate from mine entries given the potential for minewater to foul supplies.

> Coal seam thicknesses: The stated coal seam thicknesses are considered to be possible under-estimates. It is noted that coal seam thicknesses are variable across geological mapping records.

The Middleton Little and Middleton Main coal seams are recorded to be 0.30 to 0.60 m and 0.80 to 0.90 m thick respectively based on the thicknesses quoted on the 1:10,000 British Geological Survey (BGS) mapping. Greater thicknesses are quoted on the 1:50,000 BGS mapping (0 to 3.9 m and 0 to 3.1 m respectively). Both seams are considered to be of extractable quality and thickness and are worked extensively elsewhere in the Yorkshire coalfield.

Establishing accurate seam thicknesses is crucial for the assessment of stability risk at the surface.

> Dip angle: The dip of the coal seams is noted to be *"north-easterly"*. The structural geology locally to the Site is defined by a 3.5 to 4.6 degree north-easterly dip direction based on recorded mine workings beneath or locally to the Site[1].

> Faulting: The mining report makes reference to 1:10,000 BGS mapping for the Site, offering a clearer definition of fault positions. Two faults are indicated to be present east and south of the Site with the smaller scale 1:50,000 mapping suggesting the fault to the south intersects the Site's southern boundary as illustrated on the Exploratory Hole Location Plan (appended).

[1] http://mapapps2.bgs.ac.uk/coalauthority/home.html

> Site reconnaissance: As noted previously, whilst site reconnaissance is not commonly completed as part of desk-based mining risk assessments, the walkover of the local area as part of the intrusive investigation revealed the presence of possible mining features within the woods to the north-west of the Site (~100 m from the Site and discrete, localised undulations or a 'lunar landscape' poorly captured by photo opposite). These features appear to be generally consistent with 'bell-pits' or 'day-holes' that are individual mine entries into underground cavities that were generally advanced, unsupported as far as was deemed safe leading to a 'bell' shape, hence the name. They commonly date to the 13th to 17th century but were advanced after these dates. Evidence for these features is in the form of an undulating ground surface (partially obscured by ground vegetation at the point of inspection) and angular shale deposits across the footpaths that cut through the woods (photo opposite). These features may have resulted from a single mine entry (spoil heaps) that would be more consistent with 'modern' mine workings, i.e. after the 1700s, however no records are available (it only becoming a legal duty after 1872) and the likely shallow depth of the coal seams (Middleton Little and/or Middleton Main) is considered more supportive of the idea these are 'old' (pre-1872) workings.

The Dunelm mining risk assessment concludes by recommending that rotary drilling to a depth of 20 m below ground level was completed to confirm the geology beneath the Site.





3.0 Intrusive Investigation

The intrusive investigation (Table 1) was designed in general accordance with reference to the development plan, guidance for site investigation[2], guidance for coal mining investigations[3], responding to the revealed ground conditions and in accordance with a Coal Authority permit (ref. 24796; appended).

The locations of the exploratory holes are illustrated on the appended drawing ref. 20163-D-001-V02. Copies of the exploratory hole logs are also appended.

Table 1: Scope and Rationale of the Intrusive Investigation

Activity	Rationale
3 No. open hole 'micro' rotary (37 mm diameter) boreholes. (BH101 to BH103 or BH01 to BH03)	To investigate geology across the Site to depths of 30 m (BH01) and 21 m (BH02, BH03) Sealed with bentonite on completion.
Logging of drill response and flush cuttings from exploratory holes.	'Drillers logs' to support assessment of geological sequence below the Site and assess presence / absence of mine workings
Gas monitoring (multi-gas)	Health and safety measure for operatives and property occupants (monitor located within Fall Head House) and to assess presence / absence of mine workings and/or mine gas.

[2] *Code of practice for site investigations. BS 5930 (2015)*
[3] *Guidance on managing the risk of hazardous gases when drilling or piling near coal (www.gov.uk)*

Exploratory hole positioning: The locations of the exploratory holes were selected to offer general coverage of the planned development footprint (whilst avoiding existing service alignments). BH02 (BH102) was positioned 2 m from BH01 (BH101) to offer further investigation of the loss of flush (recorded within BH101) and to offer a 'cluster' of investigation positions as well as the wider coverage of the development area (BH103). Clustered and spaced holes generally offer equal 'opportunity' for unrecorded mine workings to be intercepted.

Exploratory hole findings: In summary, each of the boreholes confirmed a very similar geology with consistent depth intervals of the bedrock surface and the two probable coal seams recorded beneath the Site (as expected based on the recorded north-easterly dip). The boreholes also confirmed:

> The confirmed presence of a shallow seam of coal around 6.5 m below ground level that is indicated to be around 0.50 m thick that is consistent with the recorded thickness of the Middleton Little coal seam;

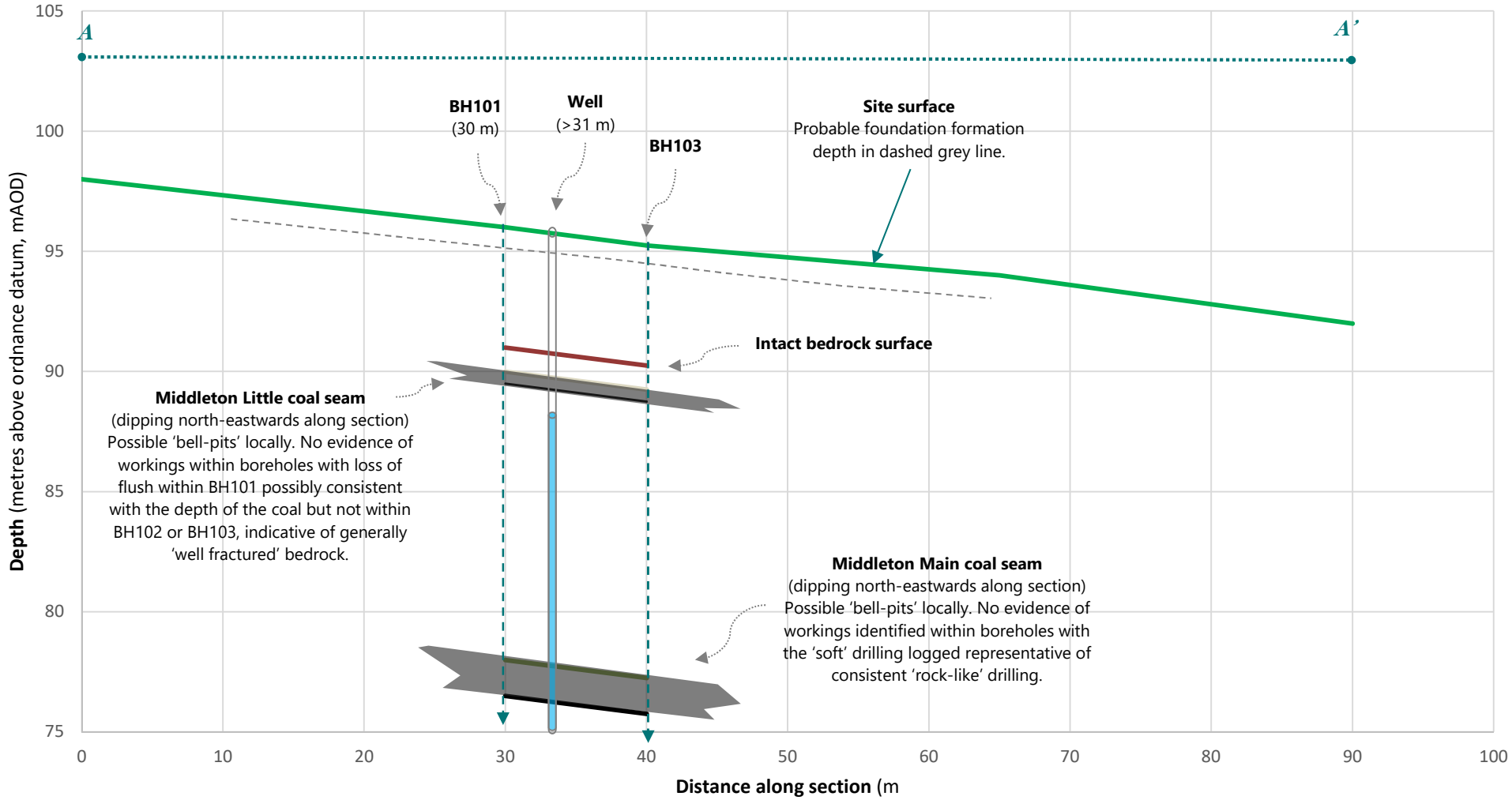
> The suggested presence (based on markedly different drilling rates; logged as 'soft ground') of a second, deeper seam of coal around 18.0 m below ground level that is indicated to be around 1.50 m thick that is consistent with the recorded thickness of the Middleton Main coal seam;

> No evidence of mine workings on the drill response, e.g. 'blocky' or 'very soft' drilling;

> Losses of flush in each hole, not associated with any variation in the drilling consistency, e.g. broken ground;

> No evidence of mine gas within the boreholes or within the property (before, during and immediately after the drilling works).

4.0 Ground Model (dip aligned illustrative cross-section through Site)



5.0 Hazard Screen and Preliminary Risk Assessment

The Hazard Screen (Table 2, 3 and 4) is first stage of risk management – establishing whether a hazard exists (that could present a risk). These hazards cover seven main categories further detail on which is presented in Annex 2.

Preliminary Risk Assessment is the second stage of risk management – establishing if the risk presented by the identified hazard is acceptable or not and, if not, what action is required to either further assess or reduce this risk. This assessment adopts the risk ratings and classifications of CIRIA C552[4]. Referencing 'background threat' (Annex 2) as part of the Preliminary Risk Assessment is intended to support transparency; offering further detail on the hazards as well as an indication of the relative threats they pose.

Figure 3 illustrates the sequential stages of risk management.

Lines of evidence are used to inform the assessment across both stages. These lines of evidence relate to both the Site itself, the inherent hazards in the ground, and also the proposed development. For example, an outcropping coal seam may be present on Site but if development isn't planned over this area then, whilst a hazard, the risk is likely be acceptably low.

Unexpected encounters can arise even where lines of evidence indicate a hazard is not present, these will need to be responded to in a safe and appropriate manner. The appointed Contractor is advised to have in place response plans. Outline advice on these is given in the following tables.

The following tables (Table 2, 3 and 4) are intended to feed into the project **risk register** and to inform Construction Phase Plans for follow-on works.

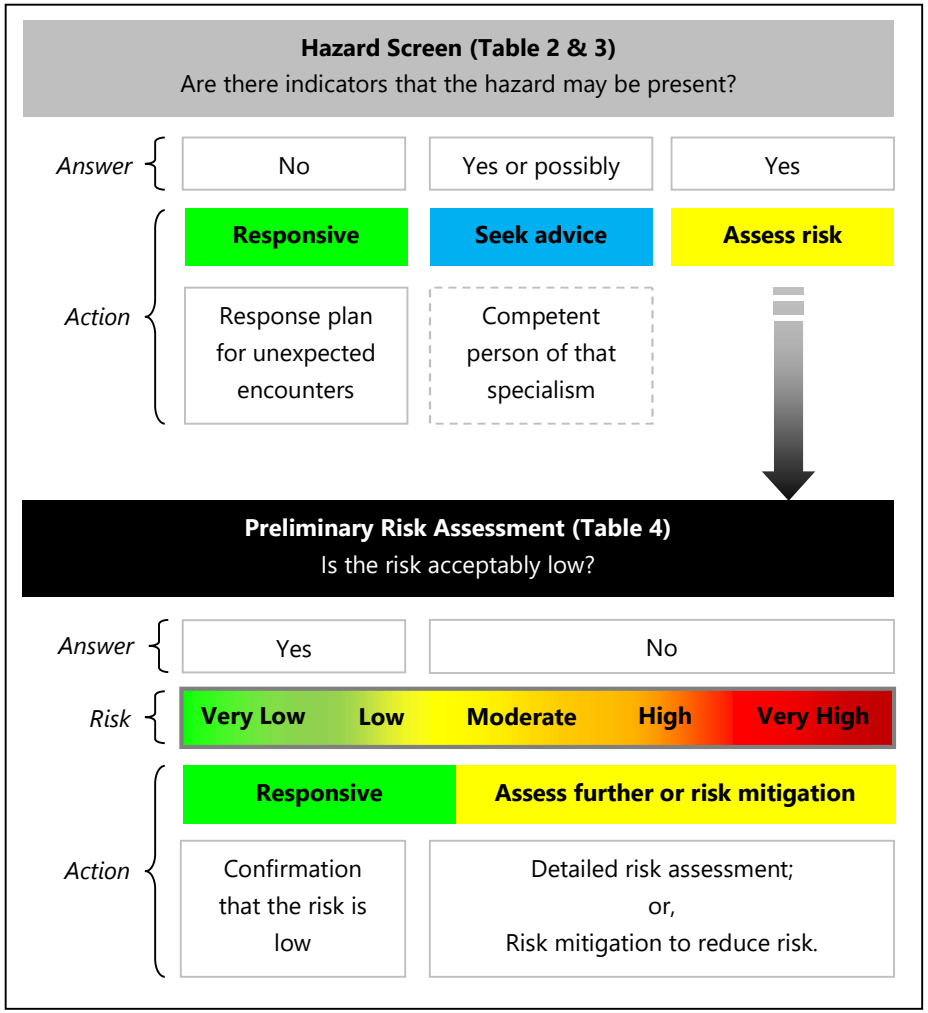


Figure 3: Decision making flowchart for risk management

[4] *CIRIA Report C552 Contaminated land risk assessment - a guide to good practice (2001)*

Table 2: Hazard Screen

	Indicators?	Commentary		Action
Mining Hazards				
Mine entries	No	No mine entries recorded on Site – **Dunelm MRA report & Section 2.0**	>	Responsive
Mine workings (shallow)	No	No workings recorded within 30 m of Site surface - **Dunelm MRA report**	>	Responsive
Mine workings (probable)	Yes	No workings recorded within 30 m of Site surface but local evidence present	>	Assess risk
Mine workings (surface)	No	No opencast workings recorded on Site - **Dunelm MRA report**	>	Responsive
Mine gas sites and areas	No	Mine gases are always a potential hazard in mined areas but no evidence recorded on Site - **Section 2.0**	>	Responsive
Coal outcrops and sub-crops	No	Very shallow coal but no coal seams recorded cropping beneath the Site - **Section 2.0**	>	Responsive
Geological features	No	No faults recorded on Site or within 50 m - **Section 2.0**	>	Responsive

Table 3: Hazard Screen – Action Summary

	Action	**Outline detail of action** (where 'responsive' action is recommended, confirm the suitability of response plan with the Engineer)
Mining Hazards		
Mine entries	Responsive	Notify Engineer of any evidence of **circular or square changes of ground conditions** (colour, composition, 'softness')
Mine workings (shallow)	Responsive	Notify Engineer of any evidence of **marked changes of ground conditions** (colour, composition, 'softness')
Mine workings (probable)	Assess risk	**Refer to Table 4**
Mine workings (surface)	Responsive	Notify Engineer of any evidence of **marked changes of ground conditions** (colour, composition, 'softness')
Mine gas sites and areas	Responsive	Notify Engineer of any evidence of **bubbling groundwater or odours**
Coal outcrops and sub-crops	Responsive	Notify Engineer of any evidence of **coal deposits in bedrock**
Geological features	Responsive	Notify Engineer of any evidence of **linear marked changes of ground conditions** (colour, composition, 'softness')

Table 4: Preliminary Risk Assessment

	Background Threat		Consequence	Likelihood	Risk		Action
Mining Risks							
Mineworkings (probable)	**Moderate**	>	**Medium** *Harm:* falls into open or partially open crown-hole features, burial and crushing (low background threat) *Other impacts:* Rapid and large ground movement with accompanying distortion / damage of structures or void presentation at surface (crownhole).	**Low likelihood** Two coal seams are recorded beneath the Site that are considered to be within influencing distance of the surface. The Middleton Little (ML) coal seam is the shallowest seam beneath the Site and is predicted to lie at depth of around c. 6.5 m below the surface based on the coal seam projection detailed in Section 3.0. This seam was mined historically within the local area and the wider Yorkshire coalfield with possible evidence of 'old' workings within the woods 100 m north-west of the Site. The proximity of these features and the expected continuity of the coal seam indicate it is possible that these working extend below the Site however: i) the very shallow presentation of this seam (1.5 m below intact bedrock) would have likely resulted in instability already manifesting if and where workings were present; ii) the property dates back to the 1760s suggesting that mining operations would have either ceased at the boundary ('way-leave') or been known to or owned by the property; and, iii) no evidence of mine workings was recorded within the three rotary boreholes advanced on Site (comment on flush loss noted in Section 2.0). The Middleton Main (MM) coal seam is the second shallowest seam beneath the Site and is indicated to lie at depth of around c. 18.0 m below the surface based on the coal seam projection detailed in Section 3.0.	**Moderate / Low**	>	**Responsive** Notify Engineer of any evidence of **marked changes of ground conditions** (colour, composition, 'softness')

Table 4: Preliminary Risk Assessment, continued

	Background Threat		Consequence	Likelihood	Risk		Action
Mining Risks							
Mineworkings (probable), ***continued from previous page***	**Moderate**	>	**As above**	With the exception of the depth of the coal, the same lines of evidence for the Middleton Little coal seam apply. With respect to the depth, at the recorded depth and thickness (1.50 m), if and where unrecorded workings were present within this coal seam (balance of evidence against this) then they would have the potential to influence surface stability with 'marginally less' than 10 times (10t) of competent cover lying above the coal seam (competent cover is geology that is likely to arrest any collapses). Taken together the likelihood of unrecorded mine workings existing in either of these seams is considered **low**. **Note on the 10t rule-of-thumb:** This rule-of-thumb relates to the potential for localised 'crownhole' propagation to occur and is considered appropriate at this stage of assessment in this geological setting with no obvious indicators prompting increasing this ratio[5]. It is acknowledged that there is the potential for pillar failure to occur that could result in more widespread and significant ground movement to occur. However, the background threat of this failure mechanism is considered relatively low compared to localised crownhole formation that result from progressive roof collapse between pillars of intact coal (left in for support).	**Moderate / Low**	>	**As above**

[5] *CIRIA Report C758 Abandoned Mine Workings Manual (2019)*

6.0 Conclusion and Recommendations

Based on the available information the Site's mining legacy is considered to be well-characterised (within the scope of this reporting) and whilst unforeseen conditions always remain possible, e.g. unrecorded mine entries, these are considered a low likelihood.

In conclusion, the Coal Mining Risk Assessment finds that:

> The risk of coal mining related hazards affecting the Site is considered moderate to low at most but generally, low (no hazard indicators); and,

> No further assessment or risk mitigation is recommended

Concluding remarks: Two shallow (within 30 m of the surface) seams of coal are present beneath the property that are likely to have been known to the former owners / developers of Fall Head House as a result of the advancement of a well on Site, if not due to local knowledge of the coal seams. Given the date the property was constructed; it is probable that a 'wayleave' was put in place to ensure the continued stability of the property.

Whilst of 'good' quality and extractable thickness, the coal is recorded being bisected by two local faults that, even if mined, would have made mining locally less favourable (still possible), as the coal seams 'ran out' within the fault faces.

Nearby, evidence of possible mine workings (in the woods to the north-west) is suggestive of local mining operations having taken place at some point in the past. However, again, no evidence of these workings continuing beneath the Site was encountered with the loss of flush within the investigation boreholes considered more likely a result of natural fissures and discontinuities within the bedrock rather than flows of water into mining cavities.

The loss of flush was recorded across all three borehole positions and not consistent with the coal seams themselves.

Whilst the presence of coal mine workings beneath the Site cannot be discounted (local, unrecorded mine workings may encroach beneath the Site), the lack of evidence recorded as part of this investigation and other lines of evidence indicates that there is a low likelihood of the hazard affecting the development (or 'no indicators' of the hazard being present; Table 2.0).

It is also confirmed that:

> The intrusive investigation was completed in accordance with the Coal Authority permit ref. 24796; and,

> Sealing of investigation boreholes was undertaken in line with current good practice[6].

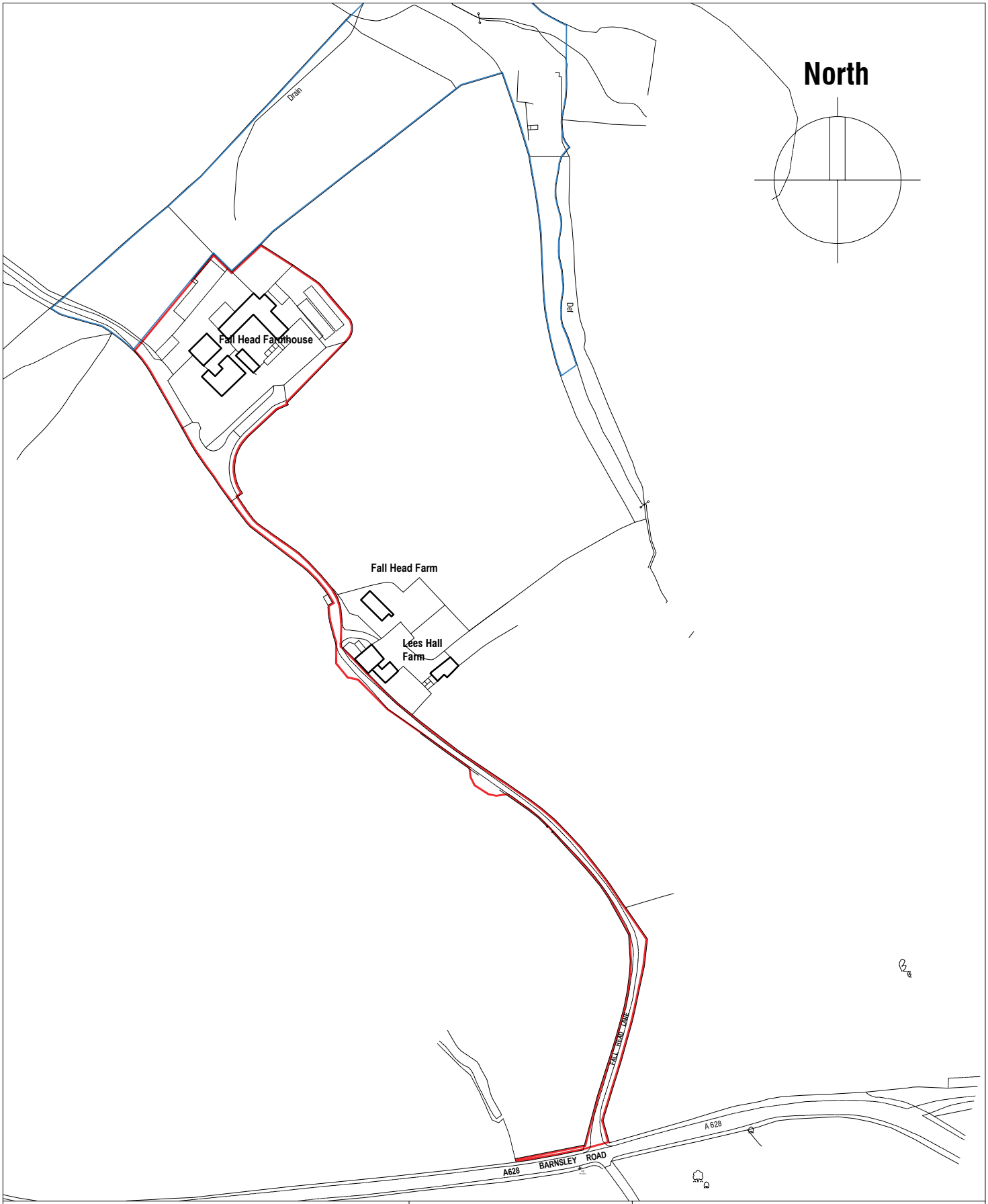
Recommended follow-on work includes:

1. Review of risk register (Table 1 and 2) presented herein;
2. Submission of the Coal Mining Risk Assessment to the local planning authority and the project design team; and,
3. Response plans for hazards that are not indicated to be present but may nonetheless be unexpectedly encountered. The appointed Contractor is advised to have in place plans for dealing with such occurrences. Outline advice is given in Table 2.

Cross-referencing these recommendations with those of any other ground-related reporting is also recommended.

[6] *Guidance on managing the risk of hazardous gases when drilling or piling near coal (www.gov.uk)*

It is further noted that, whilst further assessment or mitigation are not recommended, certain construction methods offer inherent protection against mining hazards. These include but are not limited to; the provision of reinforcement to foundations that would offer inherently increased tensile / spanning strength and the provision of a ventilated void and / or well-sealed damp proof membrane that would offer inherent protection against the ingress and accumulation of ground gases (including mine gas).



FALL HEAD FARMHOUSE
FALL HEAD LANE
SILKSTONE
BARNSLEY
S75 4LB

LOCATION PLAN

Scale 1:2500@A4

Date February 2021

Ref 19.33

Drwg No OS1

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NORTH

Existing sw drain taking surface water and treated effluent to watercourse in woodland.

Existing sw drain

Stock proof timber post and rail fence to outer boundary.

Agricultural Land

Replace surface water drainage within development and reconnect to existing outfall.

Timber post and rail fence to rear gardens with native mixed thorne hedge as shown.

Retain/repair dry stone wall to outer boundary and provide stock proof fence above.

Tree planting subject to landscape design but incorporate native species such as oak, ash, field maple rowan and fruit trees.

Remove existing concrete bases and self sewn low value trees to rear G2 and G4 and replace with landscape tree and wild flower planting, subject to landscaping design.

PW/FE

Existing surface water outfall drain

T5 - Remove

Garden

New Klargester sewage treatment tank serving the development.

New hedge planting

Field boundary comprising timber stock proof timber post and rail fence.

SW1 Sampling chamber

Existing Klargester BA 6 person sewage treatment tank serving the Farmhouse.

Remove existing agricultural shed.

Remove existing lean-to.

Existing foul drain

Unit 1 BARN B

Unit 2 BARN C

Unit 3 BARN D

Unit 4 BARN D

Unit 5 BARN E

Existing field boundary fence.

PUBLIC FOOTPATH

Remove T6

Remove existing steel prefabricated building and replace with agricultural storage building incorporating bat loft.

BARN A

Stile in fence giving access to public footpath along fence boundary within field.

Existing overgrown hedge bondary to lane.

Outbuilding

VCP

Courtyard
Tarmac planings

Link Extension

DOWER HOUSE
FL 97.720

Oil

Well

GARAGE

Retain existing access to lane.

Terrace

Path

Garden

Remove existing outbuildings.

T1 - Remove

Parking Court

Existing Hedge

Retain existing hedge to boundary.

Agricultural Land

Gate

Allow for access to agricultural land.

Grade levels and build low drystone retaining wall with hedge above.

T7

T12 - Remove

T11

T8

T9

T10

T3

Retain existing hedge.

Access Road
Tarmac planings

Access road in compaced tarmac planings over Type 1 compacted stone base on 2 layers of geotextile membrane. Roads to have 150x50mm pc conc pin kerb edgings in conc race finished flush to road surface allowing grass verges to grow over and soften the road edges.

Field boundary comprising outer fence of stock proof timber post and rail and inner fence of timber post and wire fence with species rich native mixed thorne hedge and occasional heavy standard trees subject to Landscape Design.

Bin store

Turning Area
Free draining tarmac

Turning area to be surfaced in free draining open textured tarmac on compacted Type 1 hardcore base. Roads to have 150x50mm pc conc pin kerb edgings in conc race finished flush to road surface allowing grass verges to grow over and soften the road edges.

Existing Access Track

Key:

- Approved artificial or natural stone flags flush pointed with slight falls for natural drainage.
- Sharp brown chippings rolled and compacted over Type 1 hardcore base on geo-textile membrane.
- Tarmac planings over Type 1 hardcore base on geo-textile membrane.
- Open textured free-draining tarmac on compacted Type 1 Sub-base on geo-textile membrane.
- Timber post and wire fence
- Stock proof timber post and rail fence
- New tree and hedge planting subject to detailed landscaping design.
- T3 — Existing tree and reference number corresponds to Tree Report; root protection are shown hatched.
- × 98.00 — Existing ground levels
- VCP — 6No vehicle charging points; allowance of 1No per dwelling and one additional point within the proposed Outbuilding to remain in the ownership of the Farmhouse.

Rev B 08.02.2021 - Updated for planning submission.
Rev A 01.02.2021 - Layout amended.

FALL HEAD FARMHOUSE
AND BARNS
FALL HEAD LANE
SILKSTONE
BARNSLEY S75 4LB

AS PROPOSED

SITE PLAN

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Scale	1:200 @ A1	Drawn	MJB
Date	JAN 2021	Ref.	19.33
Dwg No.	**P01**	Rev.	**B**

0cm 2cm 4cm 6cm

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NORTH

Application site boundary

Public Footpath

Buildings to be retained.

Buildings to be removed 1-7 shown hatched. TOTAL 448.1sqm

New buildings 8-12. TOTAL 197.1sqm

1	Steel framed outbuilding	59.4sqm	8	Agricultural outbuilding	84sqm
2	Dutch hay barn	251.6sqm	9	Single storey Lean-to	22.8sqm
3	Lean-to dutch barn	81.5sqm	10	Single storey building	28.0sqm
4	Brick outbuilding (now removed)	excluded	11	Single storey building	38.0sqm
5	Store and wc	12.7sqm	12	Single storey link extension to dwelling.	24.3sqm
6	Pig sty's	30.0sqm			
7	Single storey storage	12.9sqm			

Rev A 08.02.2021 - Updated for planning submission.

FALL HEAD FARMHOUSE AND BARNS FALL HEAD LANE SILKSTONE BARNSLEY S75 4LB

AS PROPOSED

IDENTIFICATION PLAN

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Scale	1:500 @ A1	Drawn	MJB
Date	JAN 2021	Ref.	19.33
Dwg No.	**P07**	Rev.	**A**

0cm 2cm 4cm 6cm

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Dimensions for setting out in existing buildings are to be checked and verified on site.



THE DOWER HOUSE
FALL HEAD FARM
SILKSTONE
BARNSLEY

AS EXISTING

SITE PLAN

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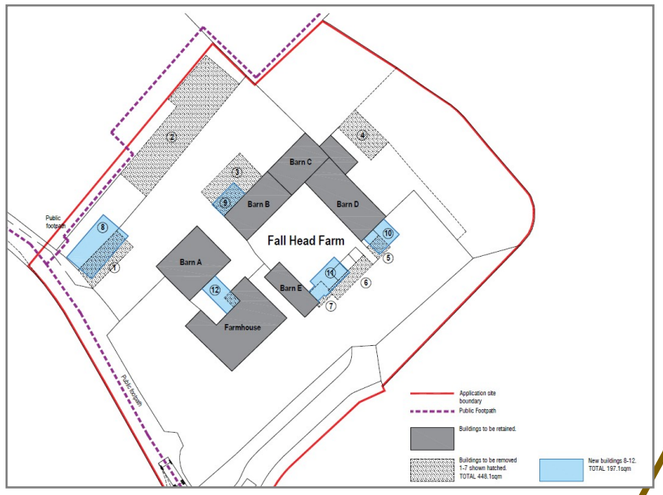
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Date	Aug 2020	Ref.	19.33
Dwg No.	**S01**	Rev.	

0cm 2cm 4cm 6cm

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Exploratory Hole Location Plan

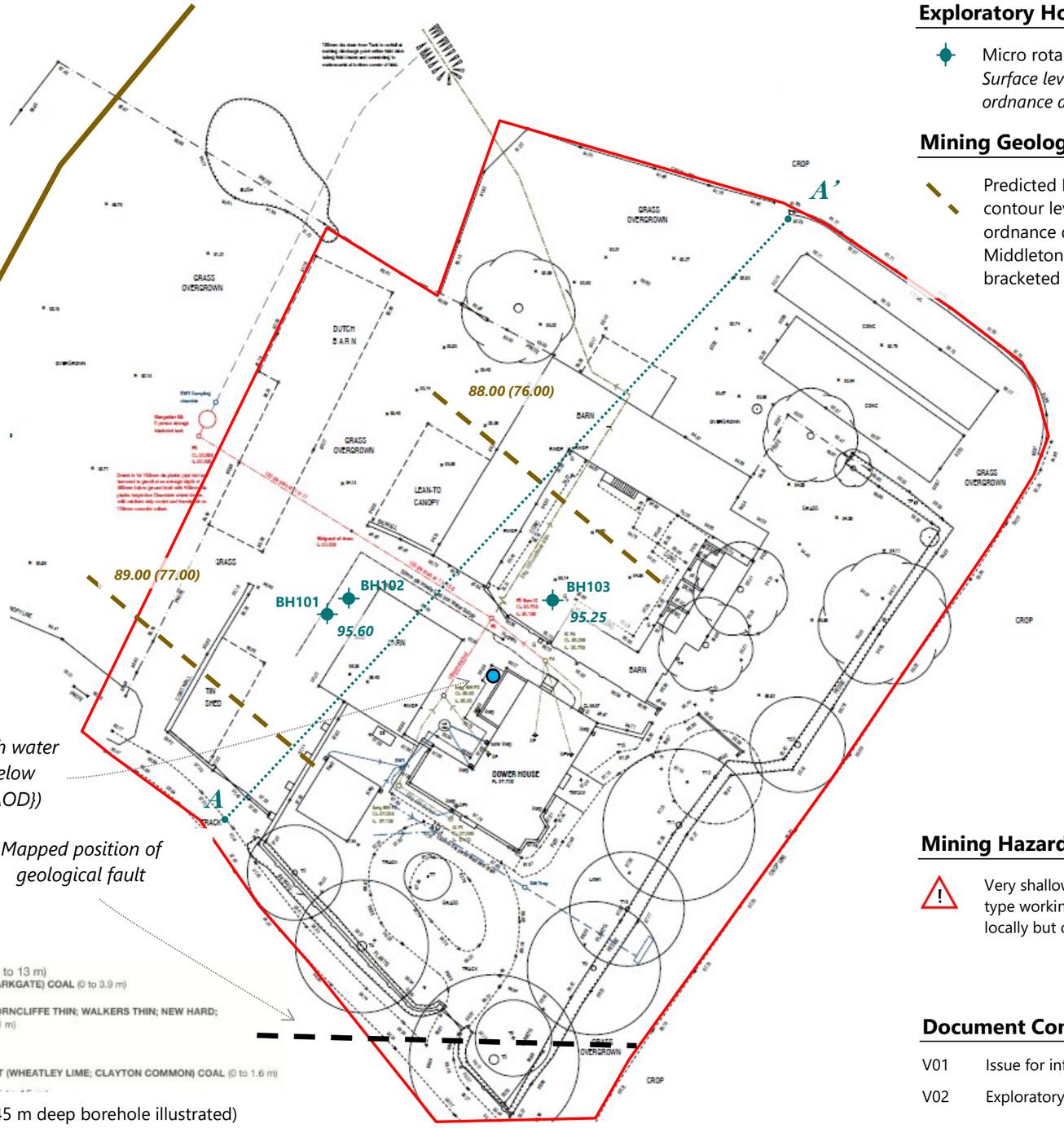
Fall Head House, Silkstone



Insert: Development Plan Extract

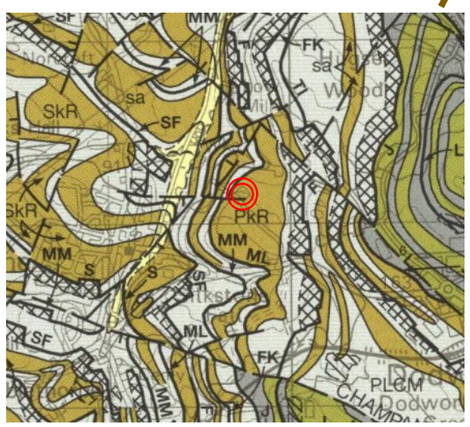
> *Proposed new buildings in blue*

Mapped outcrop of the Middleton Little coal seam 'wrapping' around local slope contour



Well (>31 m deep with water resting at 8.45 m below ground level {88 mAOD})

Mapped position of geological fault



Insert: British Geological Survey mapping and section extracts (hypothetical 45 m deep borehole illustrated)

> *Open government license v3.0*

Exploratory Hole Key

Micro rotary borehole
Surface level in meters above ordnance datum (mAOD)

Mining Geology Key

Predicted Middleton Little coal seam contour levels in meters above ordnance datum (mAOD) with the Middleton Main coal seam contours bracketed afterwards

3.5-4.6°
Dip angle

42-68°
Bearing

Bedrock Geometry

Mining Hazards

Very shallow coal seam present. Bell-pit type workings not indicated to be present locally but cannot be discounted.

Document Control

V01	Issue for information
V02	Exploratory hole positions confirmed

SOIL AND STRUCTURES
office@soilandstructures.co.uk
07500 346 541

Drawn by:	RGB	**Drawing ref:**	> **Do not scale from this drawing** > **Dimensions in metres unless stated otherwise**
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Scale:	NTS		

Rotary Borehole Log

BH101

Project Details

Name	Fall Head House, Silkstone
Client	Emma Prichard-Selby

Dates & Weather

Start	14/04/2022
End	14/04/2022
Weather	Clear and 10-15 deg

Plant and Personnel Details

Rig	Berretta
Crew	D Beal ,L Unwin , R Pachalko
Logger	D Beal

Driller's Log

Depth (mbgl)	Depth (mAOD)	Flush	Material	Description	Casing	Coring TCR	Coring SCR	Coring RQD
0.00	95.60			Brown clay	2m			
5.00	90.60	Lost		Suspected mudstone - slow, constant drilling				
6.00	89.60			Suspected coal - fast, constant drilling				
6.50	89.10			Suspected mudstone - slow, constant drilling				
		Gain						
		Lost						
18.00	77.60			Suspected coal - fast, constant drilling				
19.50	76.10			Suspected mudstone - slow, constant drilling				
30.00	65.60							

Exploratory Hole Details

Diameter	37	mm
Easting		
Northing		
Angle	Vertical	

Notes

Ground Gas	None detected throughout full depth
Groundwater	Water flush - no evidence of strike
Termination	Engineer request
Backfill	Bentonite

Comments

No gas detected in property

(C) DSI Underground UK Ltd

16/05/2022

Rotary Borehole Log
BH102

Project Details

Name	Fall Head House, Silkstone
Client	Emma Prichard-Selby

Dates & Weather

Start	14/04/2022
End	14/04/2022
Weather	Clear and 10-15 deg

Plant and Personnel Details

Rig	Berretta
Crew	D Beal ,L Unwin , R Pachalko
Logger	D Beal

Driller's Log

Depth mbgl	Depth mAOD	Flush	Material	Description	Casing	Coring TCR	Coring SCR	Coring RQD
0.00	95.50			Brown clay	2m			
5.00	90.50			Suspected mudstone - slow, constant drilling				
6.00	89.50			Suspected coal - fast, constant drilling				
6.50	89.00	Lost		Suspected mudstone - slow, constant drilling				
18.00	77.50			Suspected coal - fast, constant drilling				
19.50	76.00			Suspected mudstone - slow, constant drilling				
21.50	74.00							

Exploratory Hole Details

Diameter	37	mm
Easting		
Northing		
Angle	Vertical	

Notes

Ground Gas	None detected throughout full depth
Groundwater	Water flush - no evidence of strike
Termination	Engineer request
Backfill	Bentonite

Comments

No gas detected in property

(C) DSI Underground UK Ltd

16/05/2022

Rotary Borehole Log
BH103

Project Details

Name	Fall Head House, Silkstone
Client	Emma Prichard-Selby

Dates & Weather

Start	14/04/2022
End	14/04/2022
Weather	Clear and 10-15 deg

Plant and Personnel Details

Rig	Berretta
Crew	D Beal ,L Unwin , R Pachalko
Logger	D Beal

Driller's Log

Depth (mbgl)	Depth (mAOD)	Flush	Material	Description	Casing	Coring TCR	Coring SCR	Coring RQD
0.00	95.25			Brown clay	2m			
5.00	90.25			Suspected mudstone - slow, constant drilling				
6.00	89.25			Suspected coal - fast, constant drilling				
6.50	88.75	Lost		Suspected mudstone - slow, constant drilling				
18.00	77.25			Suspected coal - fast, constant drilling				
19.50	75.75			Suspected mudstone - slow, constant drilling				
21.50	73.75							

Exploratory Hole Details

Diameter	37	mm
Easting		
Northing		
Angle	Vertical	

Notes

Ground Gas	None detected throughout full depth
Groundwater	Water flush - no evidence of strike
Termination	Engineer request
Backfill	Bentonite

Comments

No gas detected in property

(C) DSI Underground UK Ltd

16/05/2022

The Coal Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 24796

Name and Address of Permit Holder:

The Vesta Group Ltd
Aizlewood's Mill
Nursery Street
Sheffield
S3 8GG

Site Location:

Fall Head House
Fall Head Lane
Silkstone
Barnsley
S75 4LB

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Ground investigation by three boreholes to 30m to assess depth and condition of shallow coal seams/mine workings

within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of 12 months from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings) is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH_4, CO_2, O_2, H_2S at borehole and rig. Additional gas monitoring within the onsite properties before and after works.*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Helen Day Granted Date: ***30th March 2022***

For and on behalf of The Coal Authority

Nominated Representative: Helen Day, Permitting Manager;
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637450; E-Mail: permissions@coal.gov.uk

The Coal Authority

Granted Permit Boundary

Permit Ref: 24796

Permit Boundary:



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Annex

Context and Scope of the Coal Mining Risk Assessment

SOIL AND STRUCTURES

Context

The purpose of site investigation is to reduce uncertainty in the ground.

For all site investigations the legal imperative for reducing uncertainty is primarily governed by health and safety law; identifying hazards and, where present, limiting their potential for harm. In addition, the reduction of uncertainty also applies to: various environmental laws (relating to the prevention of pollution and harm); as well as, the commercial risk of potential abnormal groundwork costs.

Current UK planning policy, the National Planning Policy Framework (NPPF)[1], makes reference to the need to ensure that '*a site is suitable for its proposed use taking into account of ground conditions and any risks arising from land instability and contamination*' (Paragraph 178). The NPPF also makes reference to the need to adopt Mineral Safeguarding Areas (Paragraph 204).

In practice, this policy is implemented through planning conditions. Where applied, these conditions compel the developer to demonstrate the site is 'suitable for its proposed use' with respect to contamination and, in former mining areas, with respect to stability. Within Mineral Safeguarding Areas, planning conditions may also compel the developer to evaluate the viability of prior-extraction of a mineral before a development 'sterilises' the ground.

The assessment of other ground-related hazards, e.g. slope stability or collapsible soils, is typically not conditioned (unless a specific hazard locally) but rather an inherent part of the engineering design.

Scope

The first stage of a 'coal mining site investigation' is invariably a desk-based exercise and can either be part of a broader-focused Desk Study or, more commonly, a standalone report; the Coal Mining Risk Assessment . The scope of this first stage includes both: i) an assessment of coal and non-coal mining related risk; as well as, ii) preliminary advice relating to ground engineering that may be influenced by coal and non-coal mining hazards.

The assessment of risk is guided by a series of international standards including ISO 31000:2018[2] 'Risk Management – Guidelines'. The Coal Mining Risk Assessment is developed with reference to this guidance and other additional UK and sector-specific guidance that includes; the Construction (Design and Management) Regulations (2015)[3] and, the Coal Authority's online guidance[4].

The preliminary advice relating to ground engineering covers three engineering disciplines; structural, civil and mechanical. The inclusion of this advice is designed to offer practical advice and, alongside a description of the development design earlier in the Coal Mining Risk Assessment, a fuller picture of the likely changes that the site's ground will undergo. This feeds into the risk assessment with the groundworks invariably changing a site's risk profile.

The value of a desk-based Coal Mining Risk Assessment is in the early identification and assessment of mining hazards. A well-undertaken Coal Mining Risk Assessment is the most cost-effective way to reduce uncertainty.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

[2] https://www.iso.org/iso-31000-risk-management.html

[3] http://www.hse.gov.uk/construction/cdm/2015/index.htm

[4] https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments

Annex

Context and Scope of the Coal Mining Risk Assessment

SOIL AND STRUCTURES

Risk is rated with respect to the routine detailed within *CIRIA C552 – Contaminated Land Risk Assessment; a guide to good practice (2001).*

The following tables are adapted from CIRIA C552 and serve as the routine by which risk is assessed within the Report and the corresponding definitions of the different classifications.

Risk is assessed with respect to the condition of the Site at the point of issue that can therefore be subject to change over time.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Likelihood	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Very High	• There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. • This risk, if realised, is likely to result in a substantial liability. • Urgent investigation (if not already undertaken) and risk mitigation is likely to be required.
High	• Harm is likely to arise to a designated receptor from an identified hazard. • Realisation of the risk is likely to present a substantial liability. • Urgent investigation (if not already undertaken) is required and risk mitigation may be necessary in the short term and is likely to be required over the longer term.
Moderate	• It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that such harm would be severe, of if any harm were to occur, it is more likely that the harm would be relatively mild. • Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some and risk mitigation may be necessary in the longer term.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would be mild at worst.
Very Low	There is a low probability that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Annex

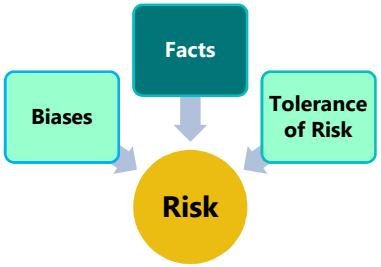
Background Threat and Risk for Coal Mining Hazards

SOIL AND STRUCTURES

This annex offers further reading and background information relating to the referencing of 'background threat' within the risk assessment process.

Introduction

Risk is an inherent part of all decisions and everyone has an appreciation of risk. How risk is assessed by both individuals and organisations is guided by three main influences; facts, biases and tolerance of risk.



Acknowledgement of this interplay is important given that, as well as informing the assessment; it also informs the response to risk – the practical outcome of the theoretical process. To support greater ownership of the assessment and any recommended actions, risk assessments should therefore aim to be; clear, proportionate and transparent (evidence-based).

Risk Assessment Influences

Biases: There are many types of biases that affect decisions or judgements including: i) *commercial bias*; does a given risk rating confer commercial opportunities or benefits on the person undertaking the assessment?; or, ii) *confirmation bias*; has the assessor not encountered any problems in similar scenarios and therefore generalised or under-assessed the risk rating.

Facts: The most important and ideally, guiding factor for the assessment of risk. Facts need to be evidenced clearly and assessed by a competent person[1].

Tolerance of Risk[2]: Is informed by both societal and individual factors. Societal factors may include: is the hazard acceptable at all, e.g. locating nuclear power stations within urban areas; or, balancing scientific and technological advances with possible burdens to society and the economy. An example of this for coal mining hazards are recent mine gas and mine instability incidents that will temporarily influence tolerances of risk. Individual factors may include: how a given risk affects them, their family and their values; or, accepting a higher risk for a greater reward.

Background Threat

Referencing 'background threat' as part of the Coal Mining Risk Assessment is intended to offer further detail on the hazards as well as an indication of the relative threats they pose. This aims to support; clarity, transparency and proportionality and help the reader better contextualise the risk and through this, have greater ownership of the risk and any recommended actions.

Within the following tables, details on plausible routes or 'exposure pathways' by which a hazard may result in harm or other outcomes are detailed together with commentary on the assigned 'background threat' levels. The rating of 'background threat' is traffic-lighted between; high, moderate and low, with the nuances of the rating drawn more fully out within the commentary provided.

[1] http://www.legislation.gov.uk/uksi/2015/51/contents
[2] http://www.hse.gov.uk/risk/theory/r2p2.pdf

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks			
Mine entries *Includes: mine shafts (vertical), adits (off-horizontal) and bell-pits that are characterised by voided or partially voided ground.*	**High**	**Harm:** falls from height, burial and crushing; and, ingress and accumulation of asphyxiant, toxic or explosive gases into occupied spaces. **Other impacts:** no-build zones; time-delays; and, damage to plant, structures and sub-structures.	Aggregated incident data for harm and other impacts is not readily available however whilst considered a low likelihood, there are recent examples of mine-entries resulting in harm[3] and possible harm[4]. Other impacts are likely to be frequent though generally non-reportable (some exceptions[5][6]) as they're dealt with through the development process, e.g. mine entry filling, capping and no-build zones. The very rapidly developing nature of the hazard means that it does have an innate threat. Mine entries can occur anywhere throughout the UK where underground mineral extraction took place. Public perception of the threat 'mine shafts' pose is high[7] given its perceived threat. **Harm:** With confirmed and possible links to recent injuries and fatalities, the threat of harm is considered **high**. **Other impacts:** With potentially large time and cost implications (on a site-by-site basis) for responding reactively to the adverse affects of collapsible soils the threat of other impacts is also considered **high**.

[3] https://www.scotcourts.gov.uk/search-judgments/judgment?id=eca78aa6-8980-69d2-b500-ff0000d74aa7
[4] https://www.birminghammail.co.uk/news/local-news/couple-were-killed-by-fumes-from-old-27517 (possible unrecorded mine entry permitting mine gas emissions)
[5] https://www.manchestereveningnews.co.uk/news/local-news/two-middleton-bungalows-built-over-7644082
[6] https://www.gov.uk/government/news/coal-authority-completes-works-to-secure-gosforth-mineshaft
[7] https://hansard.parliament.uk/Commons/2016-05-26/debates/16052643000001/CoalAuthority%28CompensationProcedures%29

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks, continued			
Mine workings (shallow) *Includes: recorded coal mine workings either within 50 m or 30 m of the ground surface within which collapses (via various mechanisms) may result in ground movement at the surface.*	**Moderate**	**Harm:** falls into open or partially open crown-hole features, burial and crushing. **Other impacts:** time-delays and damage to plant, structures and sub-structures.	Aggregated incident data for harm and other impacts is not readily available however, overall there are a low number of recorded public or non-coal mining workforce fatalities and incidents relating to shallow mine workings. Other impacts do occur on a more frequent basis[8] with the Coal Authority responding to and dealing with around 250 cases of coal mining related subsidence substantiated per year[9]. The rapidly developing nature of the hazard means that it does have an innate threat. Shallow mine workings can occur anywhere throughout the UK where underground mineral extraction took place. Public perception of the threat 'mine workings' pose is likely varied given its technical nature. **Harm:** With no known fatalities but confirmed year on year incidents and potential for harm, the threat of harm is considered **moderate**. **Other impacts:** With potentially high time and cost implications (on a site-by-site basis) for responding reactively to the adverse affects of shallow mine workings the threat of other impacts may be deemed high however, with the overall low frequency, is considered **moderate**.
Mine workings (probable) *As for shallow mine workings but 'unrecorded' either due to the lack of records.*	**Moderate**	**Harm:** falls into open or partially open crown-hole features, burial and crushing. **Other impacts:** time-delays and damage to plant, structures and sub-structures.	Probable mine workings carry **the same background threat as shallow mine workings** (above) albeit the assessment of this hazard needing to be more in-depth given that direct records of mining activities are unlikely to exist.

[8] https://www.gov.uk/government/publications/coal-authority-technical-guidance-note-tgn012019
[9] https://www.todaysconveyancer.co.uk/partner-news/associated-risks-with-coal-mining-subsidence/

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks, continued			
Mine workings (surface) *Includes: open cast mine workings, one common type of which is open cast coal sites (OCCS), that have been backfilled or left open.*	**Moderate**	**Harm:**, none that are directly linked or obviously plausible (unless present as open excavations/quarries where falls from height and other pathways may manifest) **Other impacts:** time-delays and damage to plant, structures and sub-structures.	Incident data for harm is not readily available however the generally slow developing nature of the hazard (unless via inundation that occurs under very specific conditions) means that it doesn't have an innate threat. Other impacts are recorded as case-studies within technical guidance[10] that have resulted in significant remedial costs. Public perception of the threat of 'quarries' is relatively high but the perception of 'buried' open cast coal sites likely low. **Harm:** The slow onset of this hazard means it is more likely to be observed before a threat of harm can develop and is therefore considered **low**. **Other impacts:** With potentially large time and cost implications (on a site-by-site basis) for responding reactively to the adverse affects of surface mineworkings, the threat of other impacts is considered **moderate**.

[10] Building on fill: geotechnical aspects 3rd edition 2015 (FB 75)

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks, continued			
Mine gas *Includes: carbon dioxide (from natural degradation and underground fires); carbon monoxide (from underground fires); methane (from natural degradation); hydrogen (from fossil fuel deposits including coal); and hydrogen sulphide (from natural processes and underground fires).*	**High**	**Harm:** ingress and accumulation of asphyxiant, toxic or explosive gases into occupied spaces. **Other impacts:** damage to structures and sub-structures.	Aggregated incident data for harm and other impacts is not readily available however there are recent examples of mine-gases resulting in harm[11][12][13] and possible harm[14] that indicate the hazard is a present threat. Other impacts are likely to be frequent though generally non-reportable as they're dealt with through the development process, e.g. installation of gas protection. The very rapidly developing nature of the hazard means that it does have an innate threat. Mine gases can arise anywhere throughout the UK where underground mineral extraction took place with 'coal mine gases' being particularly prevalent and potent. Public perception of the threat of 'mine gas' is likely varied given the technical nature but tending to be high given the association with 'gas hazards' in general. **Harm:** With confirmed and possible links to recent injuries and fatalities, the threat of harm is considered **high**. **Other impacts:** With potentially large time and cost implications (on a site-by-site basis) for responding reactively to the adverse affects of mine gas the threat of other impacts is also considered **high**.

[11] https://www.constructionnews.co.uk/archive/pipe-layers-valiant-rescue-bid-turned-to-tragedy-after-he-succumbed-to-deadly-gas-bravery-of-son-who-gave-his-life-for-dad-03-06-1999/
[12] https://www.birminghammail.co.uk/news/local-news/couple-were-killed-by-fumes-from-old-27517
[13] https://www.bbc.co.uk/news/uk-scotland-edinburgh-east-fife-27905611
[14] https://www.birminghammail.co.uk/news/local-news/couple-were-killed-by-fumes-from-old-27517 (possible unrecorded mine entry permitting mine gas emissions)

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks, continued			
Coal outcrops *Includes: all mineral outcrops but with particular reference to coal with the potential for spontaneous combustion and also degradation.*	**Moderate**	**Harm:** explosion or emission of asphyxiant, toxic or explosive gases. **Other impacts:** time delays and damage to plant, structures and sub-structures.	Incident data for harm and other impacts is not readily available however there are recorded instance of underground fires[15] and instances of spoil heap fires (a related phenomenon)[16]. The rapidly developing nature of the hazard means that it does have an innate threat. Coal or mineral outcrops can occur anywhere in the UK however, given the greater threat posed by coal outcrops (potential for burning) it generally relates to the former coalfield regions. Public perception of the threat of 'coal outcrops' is likely low given the technical nature. **Harm:** The potentially rapidly developing nature of the hazard means the threat of harm is considered high with the relatively low likelihood of incidents reducing this to **moderate**. **Other impacts:** With potentially high time and cost implications for responding reactively to the adverse affects of coal outcrop the threat of other impacts may be deemed high however, with the overall low frequency, is considered **moderate**. For other impacts, basis engineering design, e.g. not founding on coal deposits, can mitigate against ground movement associated with degradation of the coal; a lesser but none-the-less important pathway.

[15] https://www.bbc.co.uk/news/uk-england-stoke-staffordshire-28244420
[16] http://www.dmm.org.uk/news19/9370327m.htm

	Background threat	Exposure pathway	Rationale for assigned level of threat (Incident data, public perception and general commentary on harm and other impacts)
Mining Risks, continued			
Geological features *Includes: faults that can be re-activated when the hydrogeological / groundwater regime changes, generally a historical hazard when deep mine pumps were stopped (primarily in coal mines) – that have largely all ceased in the UK.*	**Low**	**Harm:** none that are directly linked or obviously plausible. Indirectly, structural damage may result in harm. **Other impacts:** damage to structures and sub-structures.	Incident data for harm and other impacts is not readily available however nationally significant incidents have taken place that are not known to result in direct harm but significant other impacts[17]. However, the frequency with which this hazard manifests is considered to be low particularly in current context of very limited deep mines and actively managed / pumped closed mines. Public perception of the threat of 'faults' is likely varied given the technical nature but tending to be high given the association with seismic activity. **Harm:** The rapidly developing nature of the hazard means the threat of harm is considered high however the low frequency of incidents (none known to have been recorded in recent decades) reduces this to **low**. **Other impacts:** With potentially high cost implications for responding reactively to the adverse affects of geological features the threat of other impacts is considered high however the low frequency of incidents reduces this to **low**.

[17] https://pubs.geoscienceworld.org/qjegh/article-abstract/39/1/5/114636/A-review-of-coal-mining-induced-fault-reactivation?redirectedFrom=fulltext