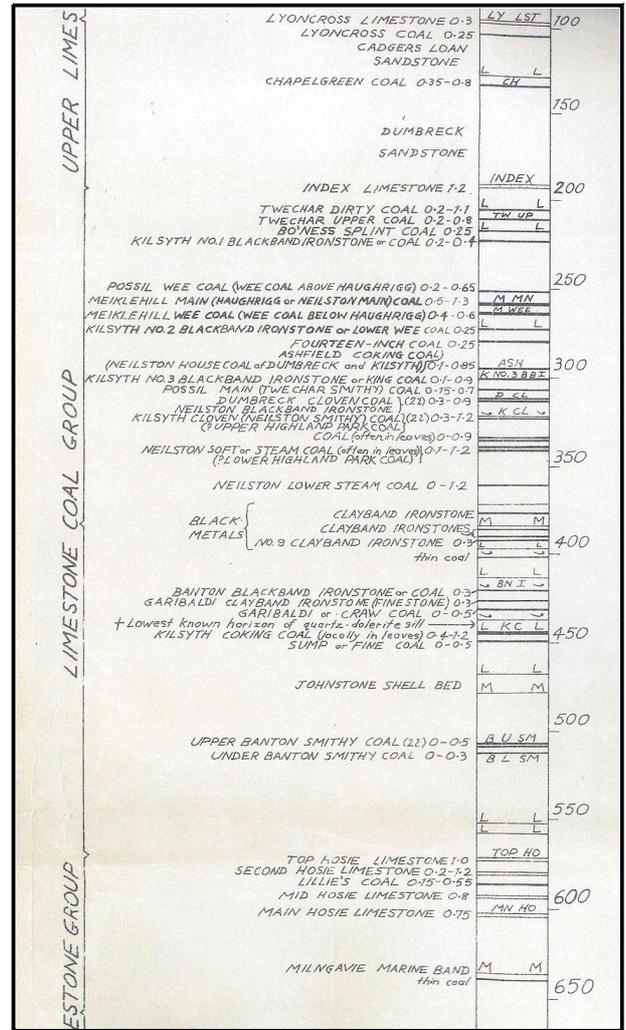


SEDIMENTARY	
CARBONIFEROUS	
Namurian	
LST COAL COAL IS	Upper Limestone Group {sandstones, siltstones and mudstones with limestones and coals}
	Limestone Coal Group {sandstones, siltstones and mudstones with coals and ironstones}
Dinantian	
LST	Lower Limestone Group {sandstones, siltstones and mudstones with limestones, ironstones and loams}
BGN	Ballagan Formation {mainly grey silty mudstones with some grey dolomitic limestone (cement)}
DEVONO-CARBONIFEROUS	
KNW	Kinnesswood Formation {white and red cross-bedded sandstones, red-brown siltstones and nodules and beds of 'cornstone'}
IGNEOUS	
EXTRUSIVE	
Clyde Plateau Volcanic Formation	
miB	Unclassed microporphyrritic basalt
B <sup>J</sup>	Basalt of Jedburgh type
B <sup>M</sup>	Basalt of Markle type
B <sup>CK</sup>	Basalt of Craiglockhart type
Z	Tuff and agglomerate
INTRUSIVE	
Permo-Carboniferous	
Q <sup>D</sup>	Quartz-dolerite
Lower Carboniferous	
K <sup>D</sup>	Basalt, dolerite or tholeiite (undefined)
D <sup>J</sup>	Olivine-basalt of Jedburgh type
D <sup>D</sup>	Olivine-basalt of Dalmeny type
D <sup>M</sup>	Olivine-basalt of Markle type
Basalt and dolerite types:	
Microporphyrritic (phenocrysts < 2 mm)	
Jedburgh - plagioclase phenocrysts	
Dalmeny - olivine phenocrysts	
Hillhouse - olivine and augite phenocrysts	
Macroporphyrritic (phenocrysts > 2 mm)	



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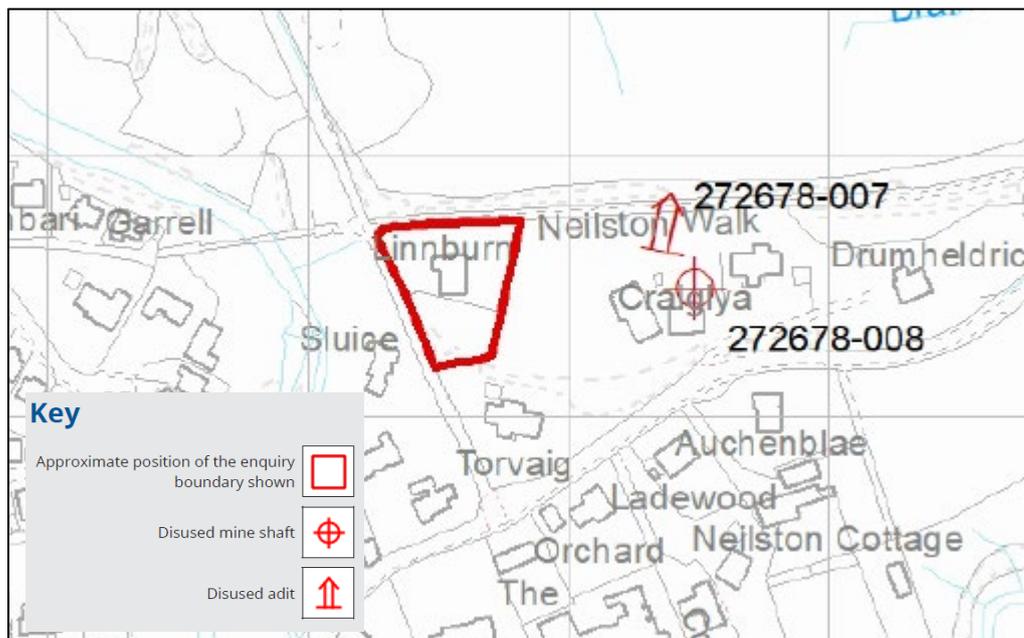
The Piazza, 95 Morrison Street, Glasgow, G5 8BE

client details:		MR HUGH HAGGERTY LINNBURN, TAK MA DOON ROAD KILSYTH, G65 0RS	
project title:		HILL ROAD LINNBURN	
drawing title:		EXTRACT FROM PUBLISHED GEOLOGICAL SURVEY MAP (SOLID EDITION)	
project no:	drawing no:	revision:	date:
P21/392	P21/392/CMRA/R/03		21.10.21
drawn by:	approved by:	scale:	
MB	IC	Not to Scale	

## 4.2 Mining

- 4.2.1 As previously discussed, the Kilsyth Coking Coal seam was indicated to underlie the site at potentially significant depths.
- 4.2.2 Consultation with the Coal Authority (Consultants report included in Appendix A) confirmed the presence of past underground mining within the Kilsyth Coking Coal beneath the site. These workings were noted at 119 mbgl, 121 mbgl and 386 mbgl. The seams worked at depths of 119 mbgl and 121 mbgl were recorded to be dipping between 5.2° and 5.8° to the east and the worked seam at 386 mbgl was recorded to be dipping at 36.6° to north-west. The report also highlights the probable presence of unrecorded shallow mine workings within the site area. However, no evidence of shallow mining has been noted in historic borehole logs from the surrounding area.
- 4.2.3 The 'The Economic Geology of the Central Coalfield: Area 1 Kilsyth and Kirkintilloch' also confirmed that the Kilsyth Coking Coal has been worked extensively in this area. Based on the available information it does not appear that the shallower coal seams in the sedimentary sequence have been extensively worked in this area.
- 4.2.4 It is conjectured that the Clayband Ironstones may underlie the site at potentially shallow depths, however, based on the available documentary information we consider it unlikely that these have been worked beneath the site. While the BGS has indicated that there are significant areas of ironstone mining in the local area, none are note to the north of the Milngavie-Kilsyth Coal which lies to the south of the site (Appendix D).
- 4.2.5 The Coal Authority also states that there are two recorded mine entries within or within close proximity to the site boundary as shown in the plate below. The mine entry is identified as the Neilston No. 2 pit by the BGS Geological survey map. However, neither of these mine entries were recorded within or immediately adjacent to the site. Therefore, these identified entries were not considered to pose a risk to the proposed development site.

**Plate 2: Extract from the Coal Authority Consultants Report**



### 4.3 Mining Methods

4.3.1 The methods of mining historically adopted in the area were the 'stoop and room' and 'longwall' systems of extraction. We envisage that variations of both systems of mining could have been undertaken beneath the site. The stoop and room mining operations involved partial excavation of the mineral, with the seam recovered from 'rooms' and the roof supported by retained 'stoops' or 'pillars' of mineral. The pillar or stoops widths varied depending on the depth and the condition of the roof. For seams of the thicknesses involved here, the stoops would typically be rectangular or square with a typical minimum dimension of 4 metres by 4 metres. Where more slender stoops were left, often by 'robbing' of the edges of the stoop, additional support to the roof was often provided by artificial props, which would usually be timber.

4.3.2 In the 'longwall' method of mining, extraction was virtually total with the seam face accessed via supported roadways. It is unlikely that this system was employed in the seam here. In the areas from which the seam had already been removed, the roof was generally allowed to collapse behind the face, or was partially supported by spoil or 'waste' deposited within the works. While the workings would be generally closed on abandonment with the withdrawal of roof support, roadways would be expected to remain open and artificially supported long after the operations had ceased. A variation of the longwall method is the technique commonly used in deep mining today but was generally only applied to the recovery of ironstones or coals of restricted thickness in the nineteenth century.

4.3.3 Opencast mining is a more recent method generally when improved plant allowed large scale excavations to be opened up with seams recovered and the mines subsequently backfilled with rock and soil arisings. Such operations rarely exceeded 50 m in depth. The depth of the excavations and backfill would normally increase in the direction of the strata dip.

### 4.4 General Principles of Surface Instability for Underground Mineworkings

4.4.1 It is generally accepted that old abandoned mineworkings are susceptible to collapse. This is generally the consequence of on-going deterioration within the mines and failure can occur a considerable time after abandonment. The mechanisms of collapse are varied and complex, but generally involve either a yield in the roof of the mine between supports, or collapse as a direct result of failure of the supports. Except in instances where the mineworkings are very shallow for example, less than 10 m deep, the stability is comparatively unaffected by enhanced loadings from buildings or by vibrations from heavy traffic. Progressive deterioration within the workings can, however, advance to a stage where instability is reached and collapses occur. In most cases, however, it is impossible to predict with any degree of accuracy if, and when, such movements will take place.

4.4.2 The subsidence assessments consider various elements of the geological and mining configuration. These include the nature and thickness of the rock and soil overburden, the extracted height of the workings and the typical mine configuration. Assessments typically seek to achieve a rock/overburden cover thickness of 10 times the seam extraction height. This is consistent with a number of recent studies in the field of mining stability assessment.

#### 4.5 **Current Mineral Extraction**

- 4.5.1 The Coal Authority indicated that the site is not within a surface area that could be subject to underground mining at present.

#### 4.6 **Potential for Future Mineral Extraction**

- 4.6.1 We would advise that we have not carried out detailed research of the potential for future resource extraction beneath or within close proximity of the site. While we consider the likelihood of future extraction remote, the mineral ownership should be checked by the client's legal advisors.

## 5.0 IDENTIFICATION AND ASSESSMENT OF SITE SPECIFIC COAL MINING RISKS

### 5.1 Mason Evans Risk Assessment Process

5.1.1 We have developed a qualitative approach in risk assessment to determine the potential impact on the proposed development. It is based on three categories of 'High', 'Moderate' and 'Low' risk. These are defined as follows:

- a) High Risk – where records exist which indicate a significant impact requiring mitigation for development to proceed. In the case of mining subsidence, it will be determined by an expectation of seams which are known, or strongly suspected to have been mined within depths of potential influence on the surface. Where mine entries are indicated, they will be considered high risk unless information exists to suggest that these have been adequately secured. In every case where mineworkings are known or suspected, gas emissions are considered to be of 'high risk'. In each instance, investigations are advised and mitigation likely.
- b) Moderate Risk – where coal seams are suspected to lie at shallow depth, but may not be worked. In the case of gas emissions, a moderate risk is considered where there is uncertainty on the existence of former mineworkings. In each instance, investigations are necessary, but mitigation may not be necessary.
- c) Low Risk – where coal seams are not indicated at shallow depths or are known to be unworked. For mine entries, a low risk would be interpreted where stabilisation is known to have taken place to an adequate specification. For gas emissions, this category relates to areas known to be clear of mineworkings.

5.1.2 Table 3 has been derived from the researches, highlighting the risk relating to shallow mine workings at the property. The risk is shown by the orange colouration in the boxes.

**Table 3: Coal Mining Issues Risk Assessment**

Coal Mining Issue	Yes	No	Risk Assessment
Underground coal mining (recorded at greater depths)			Low
Underground coal mining (possible at shallow depths)			Low to moderate
Mine entries (shafts and adits)			Low – two mine entries were in close proximity to the site. However, these were not located within the proposed development area and as such were considered to pose a low risk to the site. It should be noted, however, that unrecorded mine entries may be present within the site area.
Coal mining geology (fissures)			Low
Record of past mine gas emissions			Low
Surface mining (opencast workings)			Low

5.1.3 Consultation of BGS maps and Coal Authority Records infer the Kilsyth Coking Coal has been worked beneath the site at depths of greater than 119 mbgl. It is considered that given the depth of the recorded workings that the risk to site stability posed by these workings is low.

- 5.1.4 However, while the risk of shallow mine workings being present beneath the site is considered to be low, the presence of unrecorded shallow mineworkings cannot be ruled out via desk top researches. The probable presence of shallow unrecorded mining beneath the site was highlighted by the Coal Authority Consultants Report.
- 5.1.5 In addition, while two mine entries were recorded to be present within close proximity to the eastern site boundary, neither of these mine entries were recorded within the proposed site and as such were considered to pose a low risk to site stability.
- 5.2 **Mitigation Strategy Proposed**
- 5.2.1 Based upon the results of our researches, the Kilsyth Coking Coal has been worked beneath the site at depths of between 119 mbgl and 386 mbgl. However, the risk of shallow unrecorded mining cannot be fully ruled out via desk top researches.
- 5.2.2 Additionally, while two mine entries were recorded to be present within close proximity to the eastern site boundary, neither of these mine entries were recorded within the proposed site.
- 5.2.3 As such, it is considered that mine workings below the site in the Kilsyth Coking Coal posed a low risk to site stability. However, a mineral investigation is recommended to rule out the presence of shallow unrecorded mineworking's beneath the site.

We trust that this will meet with your current requirements. However, should you require any further information, please do not hesitate to contact us.



Jonathan Dunn  
Senior Geoscientist



Ian Cochrane  
Senior Associate

**Appendix A**

**The Coal Authority Consultants Report**



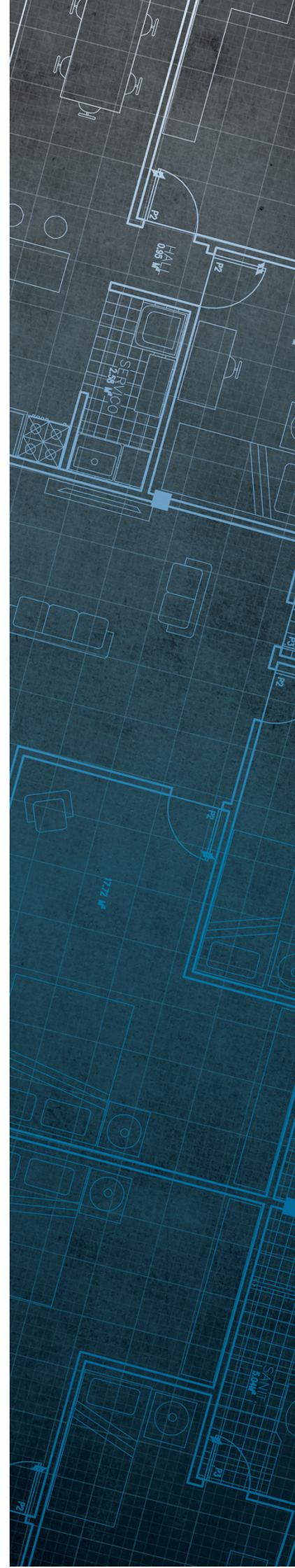
The Coal  
Authority

# Consultants Coal Mining Report

Site At 272050, 678460  
North Lanarkshire

Date of enquiry: 8 October 2021  
Date enquiry received: 8 October 2021  
Issue date: 8 October 2021

Our reference: 51002686147001  
Your reference: 286017031\_1



# Consultants

# Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

## Client name

NLIS Hub

## Enquiry address

Site At 272050, 678460  
North Lanarkshire

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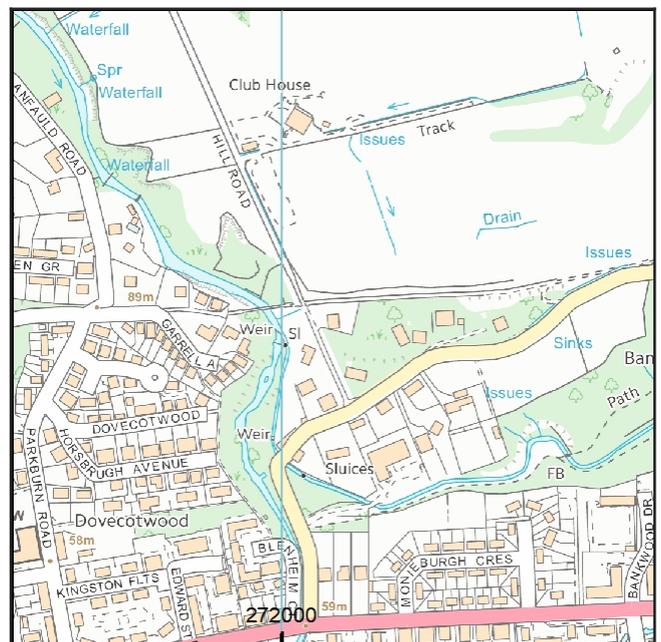
[www.groundstability.com](http://www.groundstability.com)

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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# Section 1 – Mining activity and geology

## Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
ALLANFAULD	KILSYTH COKING	Coal	6WEA	119	Beneath Property	5.2	East	102	1801
unnamed	KILSYTH COKING	Coal	68PK	121	North	5.8	East	102	1872
HAUGH	KILSYTH COKING	Coal	6WE6	386	South	36.6	North-West	102	1900

## Probable unrecorded shallow workings

Yes.

## Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

## Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Adit	272678-007	272135 678466		Coal	
Shaft	272678-008	272149 678449		Coal	

## Abandoned mine plan catalogue numbers

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

S4096	12103	S4341
S4234	807	S3320
8891	1813	S1439

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

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

## Outcrops

No outcrops recorded.

**Geological faults, fissures and breaklines**

No faults, fissures or breaklines recorded.

**Opencast mines**

None recorded within 500 metres of the enquiry boundary.

**Coal Authority managed tips**

None recorded within 500 metres of the enquiry boundary.

## Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

### Site investigations

None recorded within 50 metres of the enquiry boundary.

### Remediated sites

None recorded within 50 metres of the enquiry boundary.

### Coal mining subsidence

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

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

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

### Mine gas

None recorded within 500 metres of the enquiry boundary.

### Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

## Section 3 – Licensing and future mining activity

### Future underground mining

None recorded.

### Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

### Court orders

None recorded.

### Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

### Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

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

### Payments to owners of former copyhold land

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

## Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

### **Development advice**

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

**For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at [groundstability@coal.gov.uk](mailto:groundstability@coal.gov.uk).**

## Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at [groundstability@coal.gov.uk](mailto:groundstability@coal.gov.uk)**.

### Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

### Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

### Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

### Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

### Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

### Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

### Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

### **Opencast mines**

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

### **Coal Authority managed tips**

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

### **Site investigations**

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

### **Remediated sites**

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

### **Coal mining subsidence**

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

### **Mine gas**

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

### **Mine water treatment schemes**

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

### **Future underground mining**

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

### **Coal mining licensing**

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

### **Court orders**

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

### **Section 46 notices**

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

### **Withdrawal of support notices**

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

### **Payment to owners of former copyhold land**

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.