# Coal Mining Risk Assessment

## Thorncliff Social Club, Kirkburton

**Reference** : 20049-R-001-V01
**Date** : 29 October 2020

SOIL AND STRUCTURES

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Thorncliff Social Club, Kirkburton

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## Report Status

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## Executive Summary


In conclusion, the Coal Mining Risk Assessment finds that;

> The risk rating of the Site is assessed as Moderate to Low at worst but generally Low or no hazards identified. No further assessment is recommended.

> Establishing response plans for unforeseen hazards is recommended.

Recommended follow-on work includes:

1. Review of risk register presented herein;
2. Submission of the Coal Mining Risk Assessment to the local planning authority and the project design team;
3. Response plans being established for hazards that are not indicated to be present but may nonetheless be unexpectedly encountered.

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

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## Appointment

Soil and Structures Ltd were instructed by Stonehouse & Co Ltd on behalf of Thorncliff Social Club Limited (the Client), in October 2020 to prepare a Coal Mining Risk Assessment (this Report). The Report was commissioned in support of a small extension to the existing Thorncliff Social Club building (the Site).

## 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 Annex 1.

## References

The Coal Mining Risk Assessment has been written with reference to various sources of information. These are either appended or listed within Section 5.0 and referenced throughout this report in brackets, e.g. (**M1**).

## 1.0 Introduction

### 1.1 The Site

*Location and size:* The Site comprises parcel of land approximately 0.4 Ha in size located immediately north of Pump Lane (off Thorncliff Lane), Kirkburton, Kirklees.

*Access:* The Site is accessed on foot or by car off Thorncliff Lane.

*Topography:* The surface topography of the Site rises gently o the east from circa 187.50 to 192.00 mAOD. Locally to the site the topography falls to from east to west with a valley feature circa 150 m west of the Site that falls to the north-west.

*Existing structures:* The existing social club building is the only permanent structure on Site and dates back to at least the 1850s (former Public House).

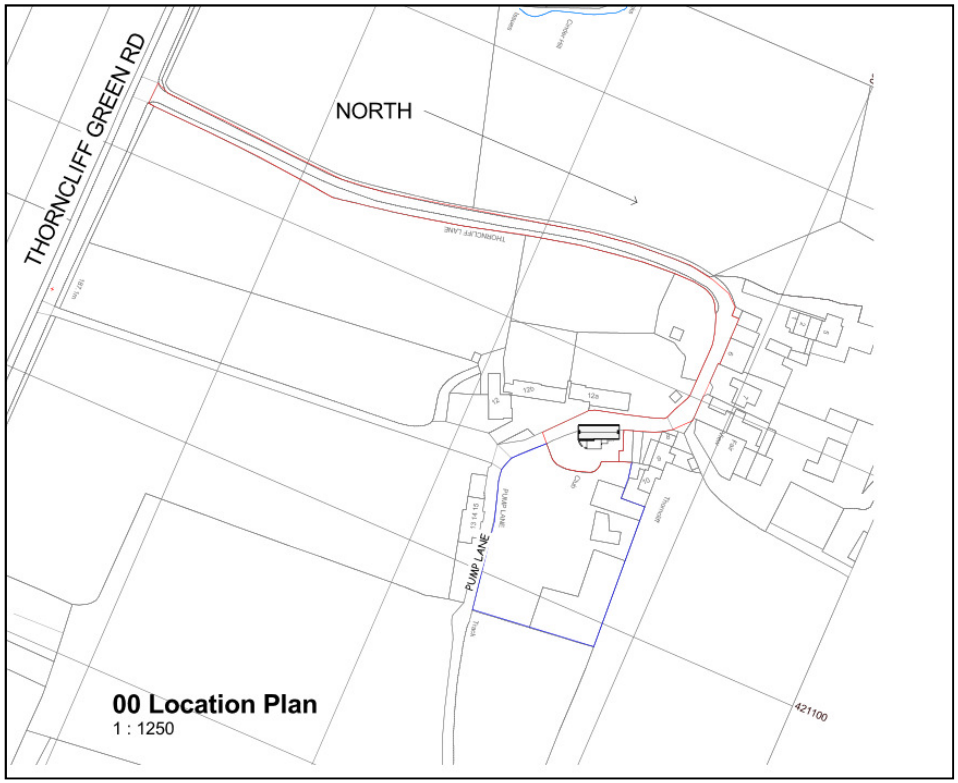


**Figure 1:** Site location plan

> *Extract from appended Stonehouse & Co 'Site Location Plan'.*
> *Red line illustrates planning boundary*
> *Blue line illustrates ownership boundary.*

### 1.2 The Development

Development proposals include for the construction of single storey extension to the existing social club building (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: Site clearance across proposed extension site.

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

> Foundations: Construction of foundations followed by super-structure.

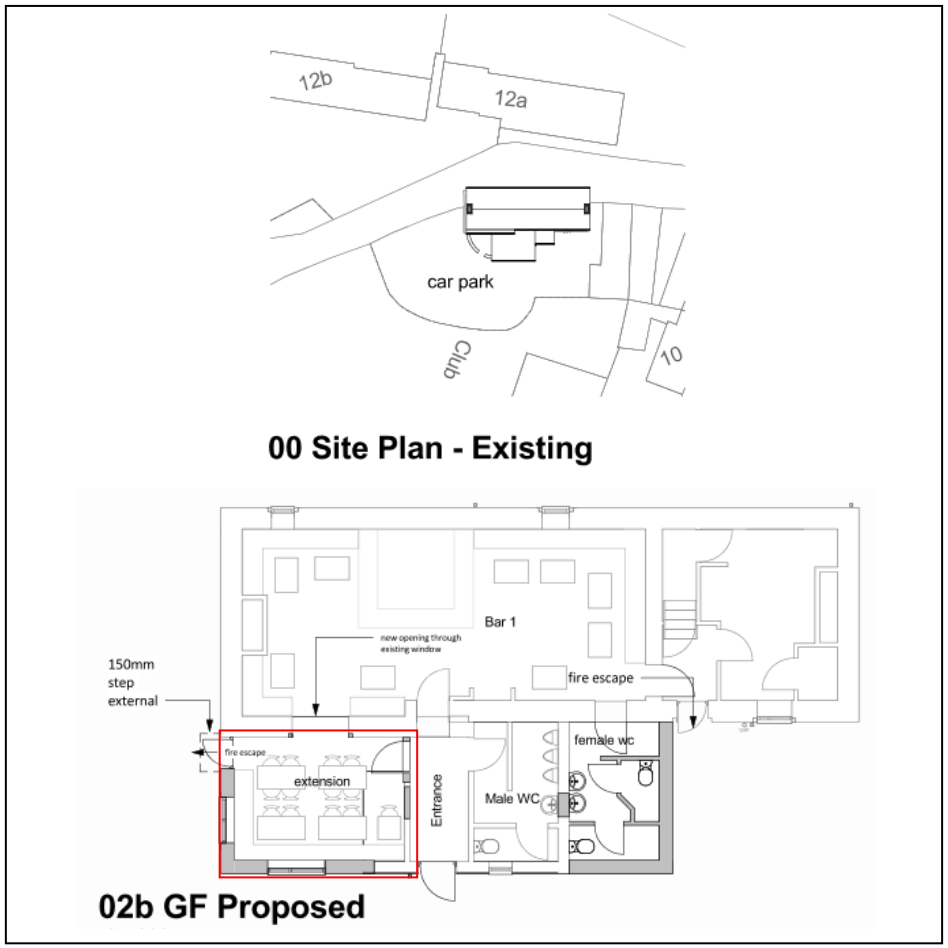


**Figure 2:** Development plan extracts.

> *Extract from appended Stonehouse & Co 'Development Plan'*

> *Proposed extension illustrated by red box.*

## 2.0 Site Characterisation

### 2.1 History

The Site has been subject to a single recorded use since 1850s (the date of the earliest available ordnance survey mapping available from various online sources):

> The first phase: occurred between the 1850s until the present day when the Site was in use as a Public House before seeing a change-of-use to a Social Club around the 1960s.
>
> No evidence of coal mining features, e.g. old shafts or soughs, is recorded on the Site over this phase. Within 250 m of the Site, an 'old coal pit' is recorded around 200 m south-west of the Site in the 1850s and various 'pumps' recorded around the Thorncliff hamlet (likely where the name 'Pump Lane' is derived). Further afield small and large collieries are noted, e.g. Thorncliff Green Colliery c. 350 m south-east of the Site. No other extraction / sub-surface features are recorded within 500 m of the Site.

The surrounding area is characterised by historical land uses consistent with agricultural land use within the coalfield region of the industrialised north of England. Locally to the Site, the villages of Emley and Flockton give their names to major sandstone and coal seams that are of regional significance.

### 2.2 Geology

No exploratory hole records are available for the Site or the immediate locality to verify the geological sequence beneath the proposed extension however, two main materials are expected within the ground, the sequence of which will vary across the different portions of the Site.

Made Ground deposits likely dominated by engineering products, e.g. crushed stone (beneath the external hard-standing)

Subsoil or superficial soils are not recorded on the geological mapping (Figure 3) for the Site with soils underlying the Made Ground likely to comprise fully decomposed bedrock. These are likely to be dominated by clays and silts (mudstone and siltstone) but with possible localised areas of sand and gravel (sandstone).

Bedrock deposits across the entire Site are Pennine Lower Coal Measures characterised by '*sandstone interbedded with mudstone and siltstone with sub-ordinate seatearth, ironstone, marine bands and coal*'. Locally to the Site these are recorded dipping at a very shallow angle 2 - 3 degrees in a generalised north-easterly to easterly direction (**M1** and Figure 3). The structural geology locally to the Site is also varied / complex and includes a fault recorded around 50 m south-west of the Site running in a north-west to south-east direction and others in the local area (Figure 3 and 4). This complexity makes predicting the exact geological sequence beneath the Site difficult however cross-correlating mining and geological records is the most reliable means to evaluate this. Of particular significance to the Site is the presence of the Top Beeston (BN/BSNT), Blocking (BK/BLBC), Top Lousey (TL/TLOU) and Trub (Tr/TBCtop) coal seams (in sequential order; youngest to oldest) that are recorded outcropping locally to the Site (Figure 4 and Consultants Coal Mining Report). These seams are discussed in more detail in the following section.

Exploratory hole records from the locality are considered too far away to be representative of the geological sequence on Site.

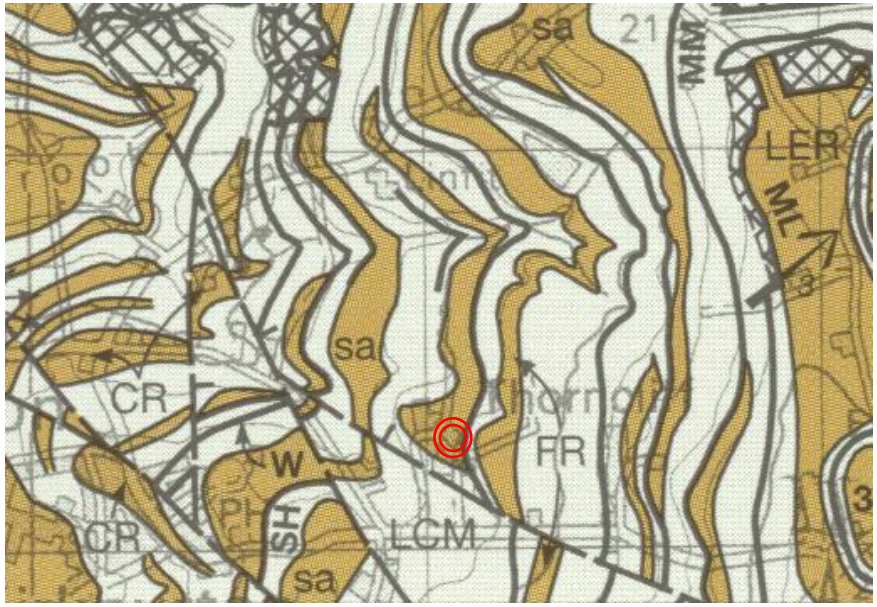


**Figure 3:** Geology of site and surrounding area

> *Extracted from the BGS 1:50,000 map for Huddersfield (Sheet 77) Solid and Drift Edition, under open government licence.*
> *Site identified by red circle.*
> *Insert: vertical geological section from BGS mapping (above).*

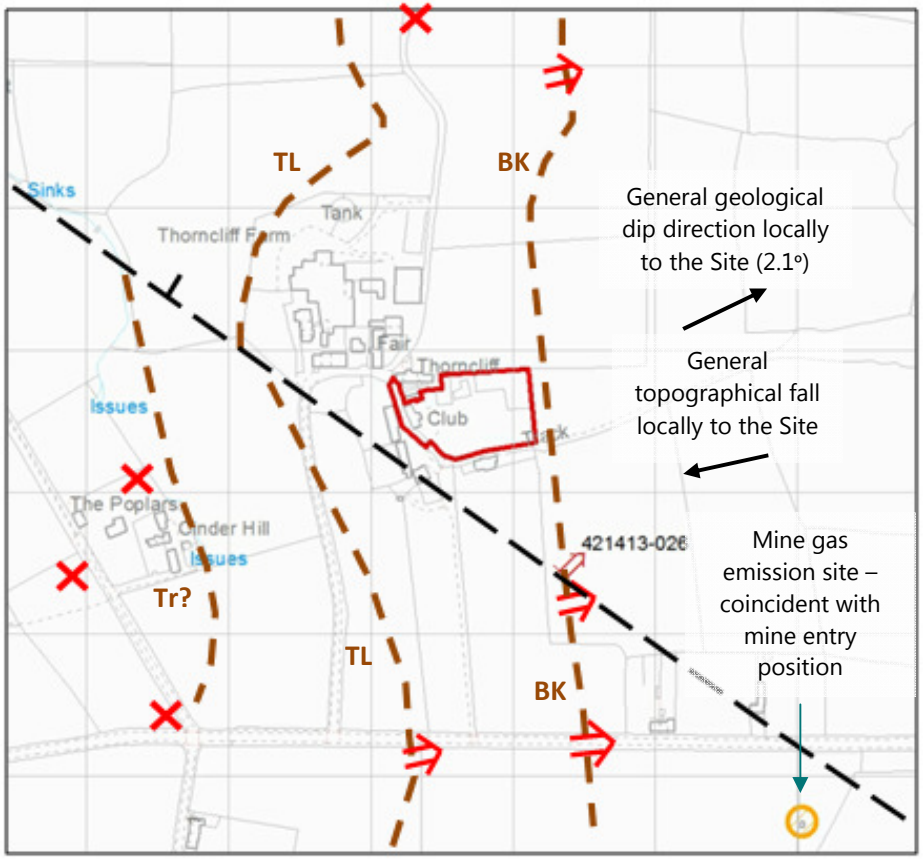


**Figure 4:** Local coal mining related features

> *Site boundary (ownership and planning) illustrated in red.*
> *Fault illustrated by black dashes with downthrow indicated.*
> *Coal seams illustrated by brown dashed lines with labels.*
> *Mine entries – shafts – (approximate positions) illustrated by red crosses.*
> *Mine entries – adits – (approximate positions) illustrated by red arrows.*
> *Mine entries – with reference number – mapped position on large scale plan.*

### 2.3 Mining Geology and Mine Workings

Beneath the Site there are various mineral resources that had the potential to be extracted historically. Of these mineral resources, those significant to the development include (in descending order within the geological sequence):

- The Top Beeston (BN/BST) coal seam (three seams of coal make up the Beeston Group with the Linfit Lousey Coal being the 'Top' seam and 0.00 to 1.30 m thick) with workings (56 cm extraction) in this seam recorded at 43 m depth beneath the Site (Coal Mining Consultants Report).
- The Top Lousey (TL/TLOU) coal seam (0.00 to 0.80 m thick) recorded outcropping around 100 m west of the Site, on the other side of the recorded fault (Figure 4). The action of the fault will be resulting in the sequence, and this seam, being downthrown further with this distance being a conservative estimate of the relative distance the seam outcrops from the Site. *"The term 'Lousey' is also given in West Yorkshire to any seam of coal of inferior quality...."; "...the Top Lousey is seldom of any value..."*; and, *"A still higher coal (also known as the Top Lousey) is present at Emley, Overton, Thorncliff, and Linfit. It occurs 50 to 70 ft. below the Blocking Coal and is usually only a few inches thick. In the Thorncliff Green shaft it attained its maximum thickness of 1 ft. but was apparently not worked."* (**M3**).

  This coal seam's base is anticipated to lie at a depth of around 18 m below ground level beneath the proposed extension. These predictions are based on a coal seam projection the reasoning of which is laid out within Appendix C. At this depth, sensitivity analysis on the various parameters is not considered necessary with the conservatism inherent within the assessment.

  There is no direct evidence of workings being present in this coal seam.

- The 'possible' Trub (Tr/TBC) coal seam (0.00 to 0.50 m thick) is recorded around 200 m west of the Site. The Trub coal seam is that *"Near Shelf {18 km as the crow-flies from Site) this coal attains its greatest thickness, 22 in., and consists of cannel."; "...trub is a local term for a shaly stone coal."*; and, *"The Trub Coal is sufficiently developed to have been worth working; it is represented as a fairly good quality stone coal."* (**M3**).

  This coal seam's base is anticipated to lie at depths greater than the Top Lousey coal seam.

- Very old / simple mining methods may be present where shallow seams of coal and other coal-related minerals are recorded. Shallow mining is suggested to have taken place in the local area (**C1** & **SP2**) with shallow mine shafts sunk in the local area surrounding the Site (**M1**). The depth of the shallowest coal seam beneath the Site (Top Lousey) would have not made it viable for extraction by bell-pits.
- Non coal mine workings within the local geological sequence would include sandstone, ironstone (commonly presenting as nodules within an iron-rich shale/mudstone) and fireclay/seatearth. Whilst the Sandstone Unit (Sa) is a viable resource, it is not considered to be a viable resource locally to the site that makes underground mining of this mineral less viable/likely.
- Mining records including the Coal Authority's online interactive mapping and, the Consultants Coal Mining Report (Appendix B). Key points from these resources have been discussed in this section and the previous section (Section 2.2). Historical ground investigations and reporting available related to other nearby developments on the planning portal offer limited information that can be reliably related to the Site, i.e. too distant or lacking requisite information.

## 3.0 Hazard Screen and Preliminary Risk Assessment

The Hazard Screen (Table 1 and 2) 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 (Table 3) 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 (**C2**). 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 5 illustrates the sequential stages of risk management.

Lines of evidence are used across both stages to inform the assessment. 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 1, 2 and 3) are intended to feed into the project **risk register** and to inform Construction Phase Plans for follow-on works.

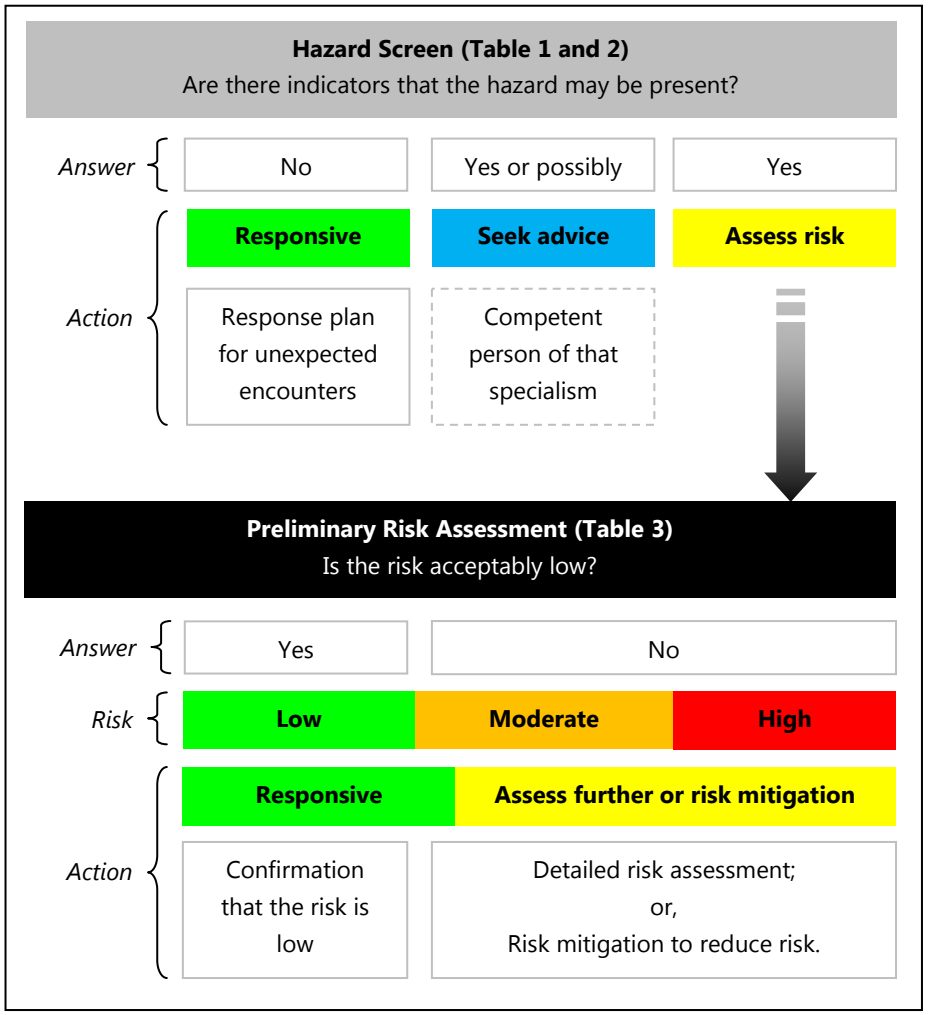


**Figure 5:** Decision making flowchart for risk management

## **Table 1:** Hazard Screen

| | Indicators? | Commentary | | Action |
|---|---|---|---|---|
| **Mining Hazards** | | | | |
| Mine entries | No | None recorded on Site. (Appendix B) | > | Responsive |
| Mine workings (shallow) | No | None recorded within 30 m of Site surface. (Appendix B) | > | Responsive |
| Mine workings (probable) | Yes | Probable shallow mine workings recorded. (Appendix B) | > | Assess risk |
| Mine workings (surface) | No | None recorded on Site. (Appendix B) | > | Responsive |
| Mine gas sites and areas | Possible | None recorded on Site but probable shallow workings and mine gas incident 316 m from Site. (Appendix B) | > | Assess risk |
| Coal outcrops and sub-crops | No | Coal seam outcrops recorded locally. (Appendix B) | > | Responsive |
| Geological features | No | None recorded on Site. (Appendix B) | > | Responsive |

## **Table 2:** 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 marked changes of ground conditions occurs particularly where circular or square and dark grey |
| Mine workings (shallow) | Responsive | Refer to "mine workings (probable)" below |
| Mine workings (probable) | Assess risk | **Refer to Table 3** |
| Mine workings (surface) | Responsive | Notify Engineer of any evidence of marked changes of ground conditions (colour, composition, 'softness') |
| Mine gas sites and areas | Assess risk | **Refer to Table 3** |
| 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 marked changes in bedrock or broken rock (breccias) |

**Table 3:** Preliminary Risk Assessment

| | Background Threat | | Consequence | Likelihood | Risk | | Action |
|---|---|---|---|---|---|---|---|
| **Mining Risks** | | | | | | | |
| Mine workings (probable) | **Moderate** | > | **Medium**<br>Rapid and large ground movement with accompanying distortion of structures or void presentation at surface (crownhole). | **Unlikely**<br>Two coal seams are recorded beneath the Site that may be considered to be within influencing distance of the surface.<br><br>The Top Lousey (TL) coal seam is the shallowest seam and is predicted to lie at depth of around c. 18 m below the surface of the proposed extension (Appendix C). This coal is recorded as being generally of poor quality and the Coal Authority does not hold formal records of it being worked beneath the Site or within the immediate vicinity. The presence of structures in the Thorncliff hamlet since the 1850s, including the Site itself, will have further limited the potential for undermining of this area.<br><br>Coal seam projection (Appendix C) has been undertaken based on an outcrop presentation using best available estimates of distances, thicknesses and angles. A maximum or 'worst-case' seam thickness has been adopted). If and where this seam was worked beneath the surface of the proposed extension, any ground movement resulting from collapses in the workings is **unlikely** to have manifest at the surface.<br><br>**Note on the rule-of-thumb:** This rule-of-thumb (10t) is considered appropriate in this geological setting with no obvious indicators prompting increasing this ratio. 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). | **Low** | > | **Responsive**<br>If any local variances in soils or rocks beneath the Site are observed, e.g. areas of comparably looser/softer or irregularly sorted/bedded material, then the advice of a suitably qualified Engineer should be sought. |

**Table 2:** Preliminary Risk Assessment, continued

| | Background Threat | | Consequence | Likelihood | Risk | | Action |
|---|---|---|---|---|---|---|---|
| **Mining Risks, continued** | | | | | | | |
| Mine gas sites and areas | **High** | > | **Severe**<br>Ingress and accumulation of asphyxiant, toxic or explosive gases into occupied spaces. | **Unlikely**<br>Coal workings are potentially present beneath the Site at shallow depths (Top Lousey). Where cavities remain and are unflooded mine gas is likely to have accumulated making them a potential source of mine gas. Whilst one mine gas incident is recorded within 500 m of the Site this is coincident with a mine entry that is a more direct pathway for mine gas emissions to the surface (Figure 4).<br><br>The Top Lousey coal seam is considered to be of poor quality locally and unlikely worked beneath the Site and therefore exists as either; a diminished source (very shallow presentation making de-gassing more likely) or, not serve as a direct, on Site source of mine gas (where unworked).<br><br>The presence of a nearby fault (within Figure 4) serves as a potential, higher permeability zone through which mine gas may escape to the near-surface. Whilst the pathway is viable the distance from the Site makes it less likely that any mine gases migrating through the fault are emitted beneath the proposed extension.<br><br>Based on the lines of evidence above it is considered **unlikely** that mine gas would impact the proposed development. | **Moderate / Low**<br>(the lowest rating for the severity) | > | **Responsive**<br>If any local variances in soils or rocks beneath the Site are observed, e.g. areas of comparably looser/softer or irregularly sorted/bedded material, then the advice of a suitably qualified Engineer should be sought. |

## 4.0 Conclusion and Recommendations

Based on the available information the Site's mining legacy is considered to be generally 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 rating of the Site is assessed as Moderate to Low at worst but generally Low or no hazards identified. No further assessment is recommended.

> Establishing response plans for unforeseen hazards is recommended.

Recommended follow-on work includes:

4. Review of risk register (Table 1, 2 and 3) presented herein;
5. Submission of the Coal Mining Risk Assessment to the local planning authority and the project design team;
6. Response plans being established for hazards that are not indicated to be present but may nonetheless be unexpectedly encountered.

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

## 5.0 References

**Core guidance**

***C1:*** *CIRIA Report C758 Abandoned Mine Workings Manual (2019)*

***C2:*** *CIRIA Report C552 Contaminated land risk assessment - a guide to good practice (2001)*

***Mining & geological references***

***M1:*** *http://mapapps2.bgs.ac.uk/coalauthority/home.html accessed 29/10/2020*

***M2:*** *https://www.bgs.ac.uk/Lexicon/ accessed 29/10/2020*

***Site specific references***

***SP1:*** *BGS 1:50,000 Mapping (Sheet 77 - Huddersfield).*

***SP2:*** *https://huddersfield.exposed/api/content/books/ocr/6954/ accessed 29/10/2020*

# Annex

## Context and Scope of the Coal Mining Risk Assessment

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### 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

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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.<br>• This risk, if realised, is likely to result in a substantial liability.<br>• 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.<br>• Realisation of the risk is likely to present a substantial liability.<br>• 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.<br>• 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

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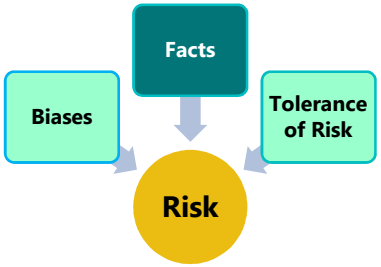
This annex offers further reading and background information relating to the referencing of 'background threat' within the risk assessment process.

### 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<br><br>*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.<br><br>**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.<br><br>**Harm:** With confirmed and possible links to recent injuries and fatalities, the threat of harm is considered **high**.<br><br>**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)<br><br>*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.<br><br>**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.<br><br>**Harm:** With no known fatalities but confirmed year on year incidents and potential for harm, the threat of harm is considered **moderate**.<br><br>**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)<br><br>*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.<br><br>**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)<br><br>*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)<br><br>**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.<br><br>**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**.<br><br>**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<br><br>*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.<br><br>**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.<br><br>**Harm:** With confirmed and possible links to recent injuries and fatalities, the threat of harm is considered **high**.<br><br>**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<br><br>*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.<br><br>**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.<br><br>**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**.<br><br>**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<br><br>*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.* | **Moderate** | **Harm:** none that are directly linked or obviously plausible. Indirectly, structural damage may result in harm.<br><br>**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.<br><br>**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**.<br><br>**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

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# 00 Location Plan
1 : 1250

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PURPOSE OF ISSUE
Planning

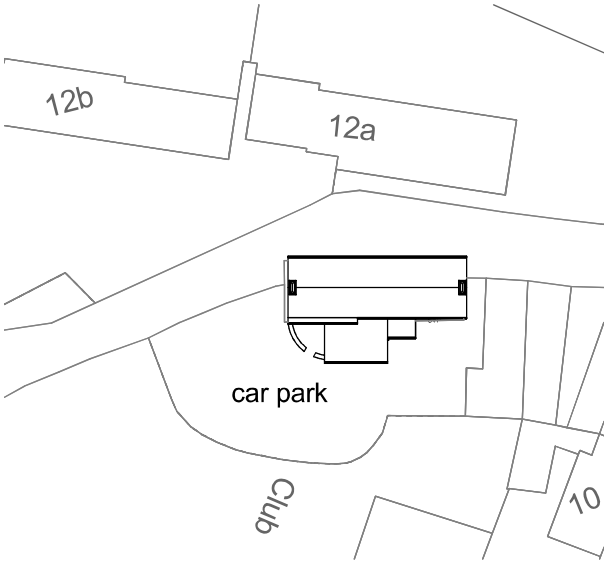
PROJECT
Thorncliff Social Club

SHEET
Location Plan

CLIENT
Thorncliff Social Club

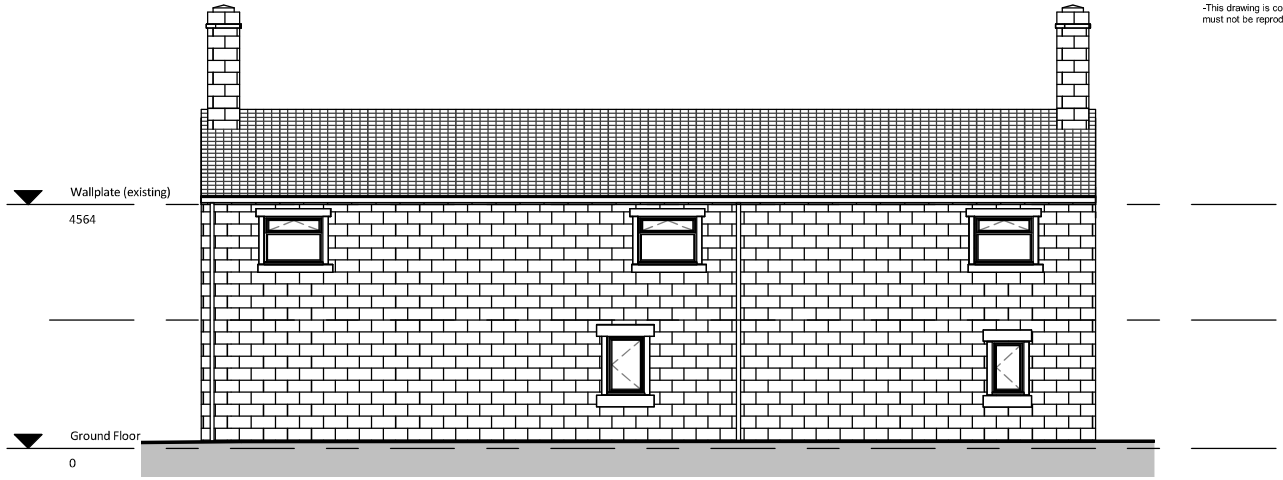
| Date | Project number | Scale (@ A3) |
|---|---|---|
| 11.06.20 | J20-057 | 1 : 1250 |

| Drawn by | DRAWING NUMBER | REV |
|---|---|---|
| Author | P00 | |



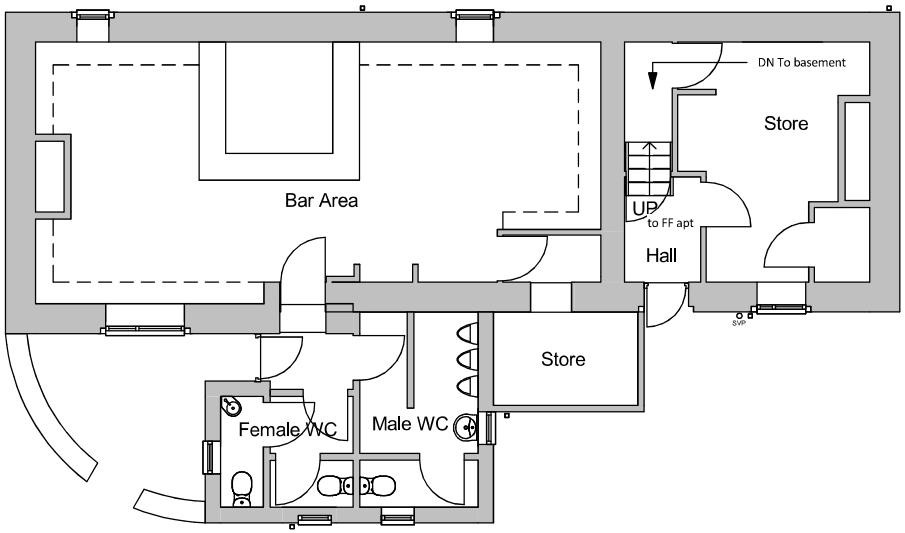

## 00 Site Plan - Existing

1 : 500




## 10 Front Existing

1 : 100




## 02a GF Existing

1 : 100

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PURPOSE OF ISSUE
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PROJECT
Thorncliff Social Club

SHEET
Existing Sht 1

CLIENT
Thorncliff Social Club

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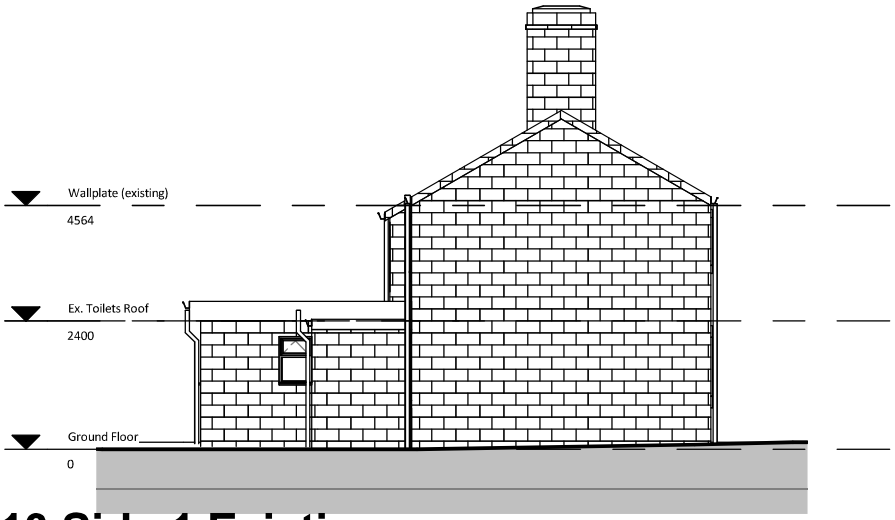


# 10 Side 1 Existing
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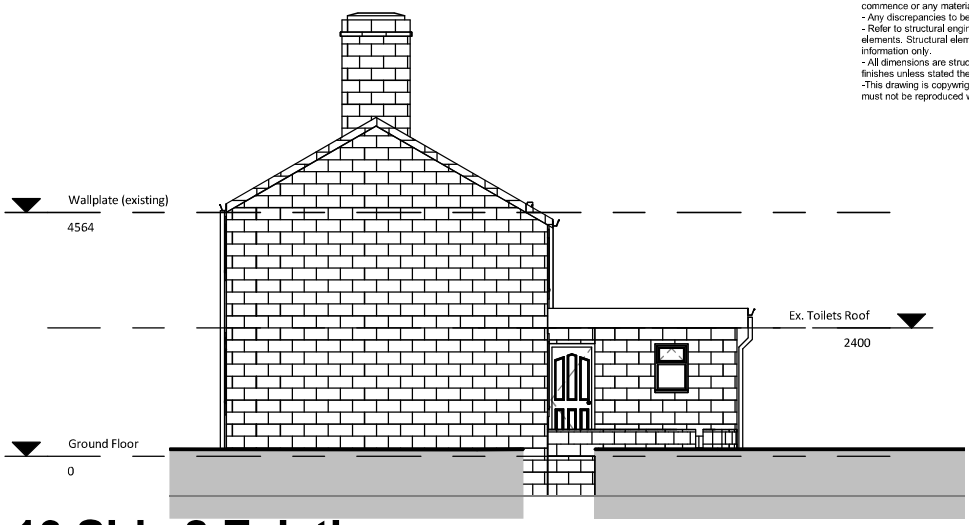


# 10 Side 2 Existing
1 : 100




# 10 Rear Existing
1 : 100

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Planning

PROJECT
Thorncliff Social Club

SHEET
Existing Sht 2

CLIENT
Thorncliff Social Club

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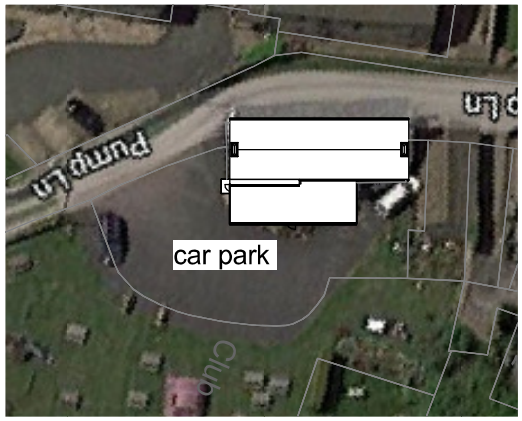
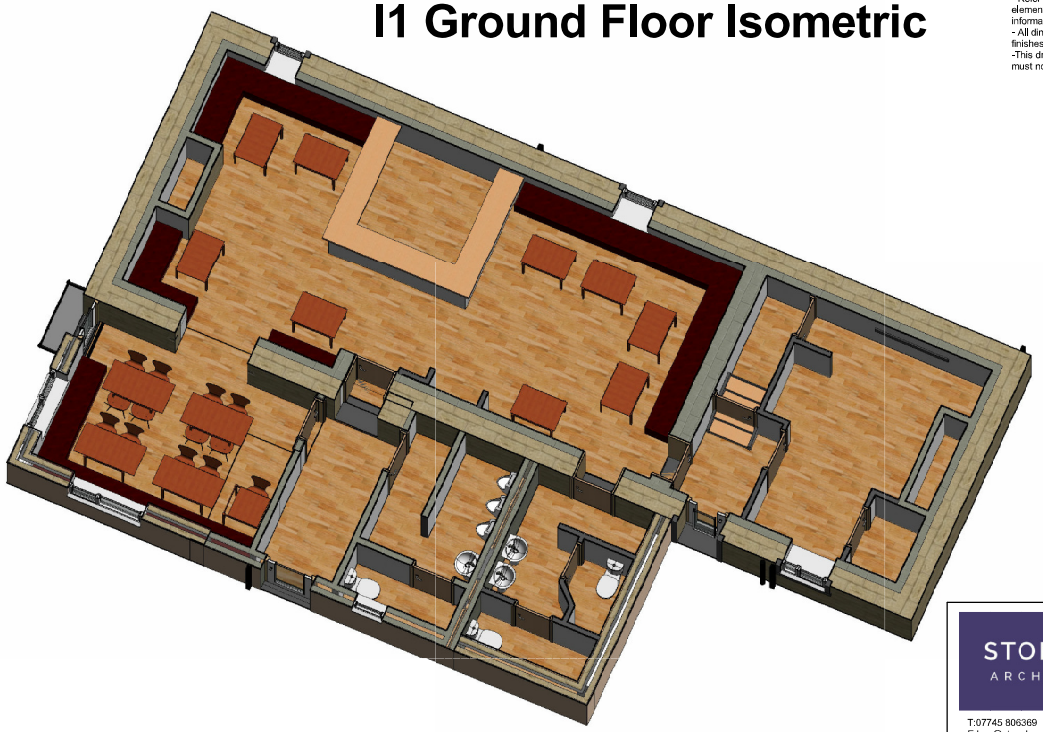
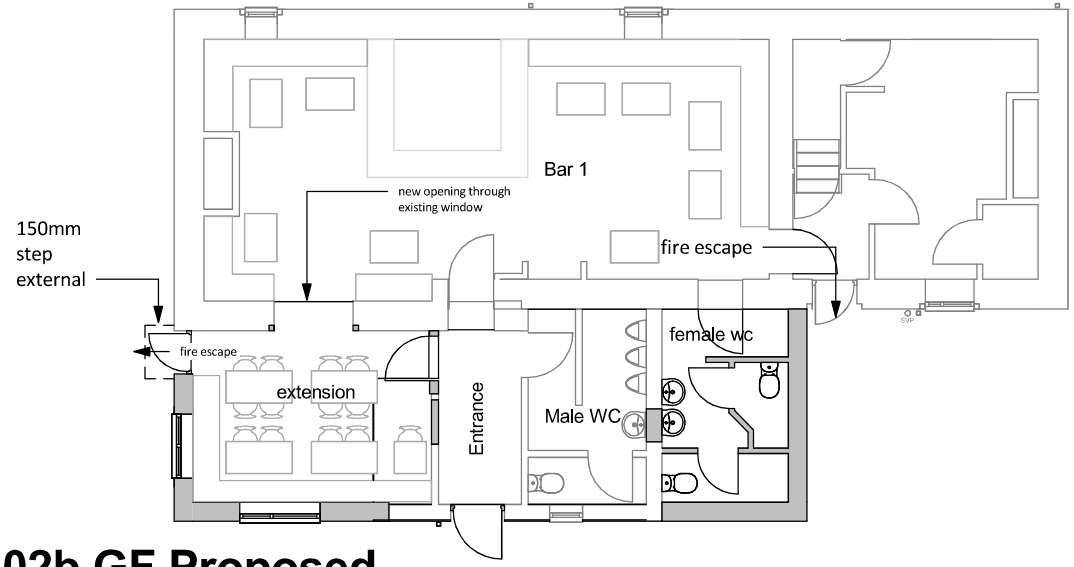



# 00 Site Plan - Proposed

1 : 500

# I1 Ground Floor Isometric






# 02b GF Proposed

1 : 100

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PURPOSE OF ISSUE
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PROJECT
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SHEET
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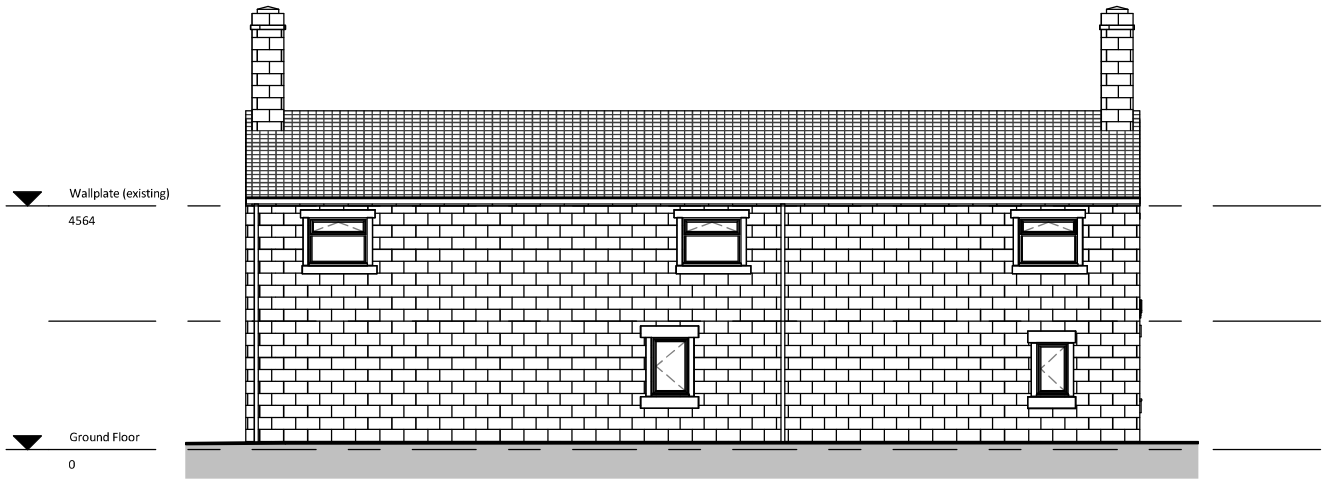


# 11 Front Proposed
1 : 100




# 11 Rear Proposed
1 : 100

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PURPOSE OF ISSUE
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PROJECT
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SHEET
Proposed 2

CLIENT
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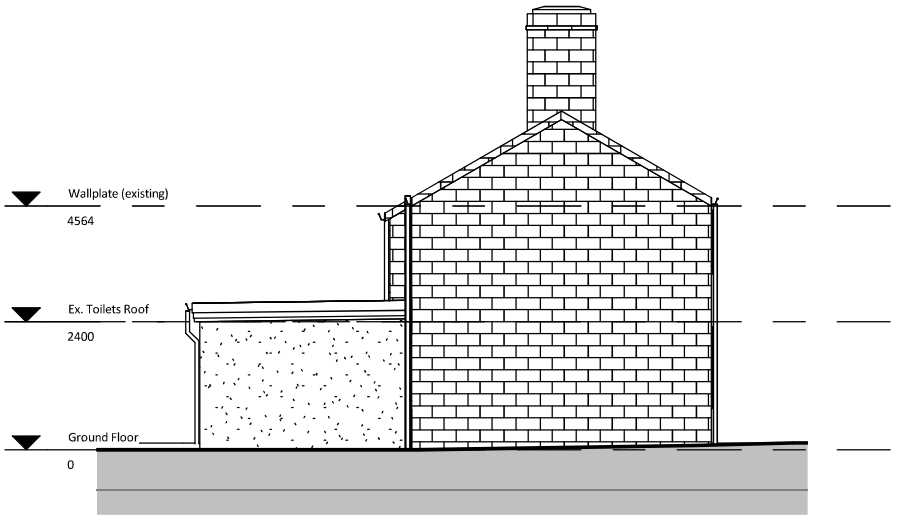
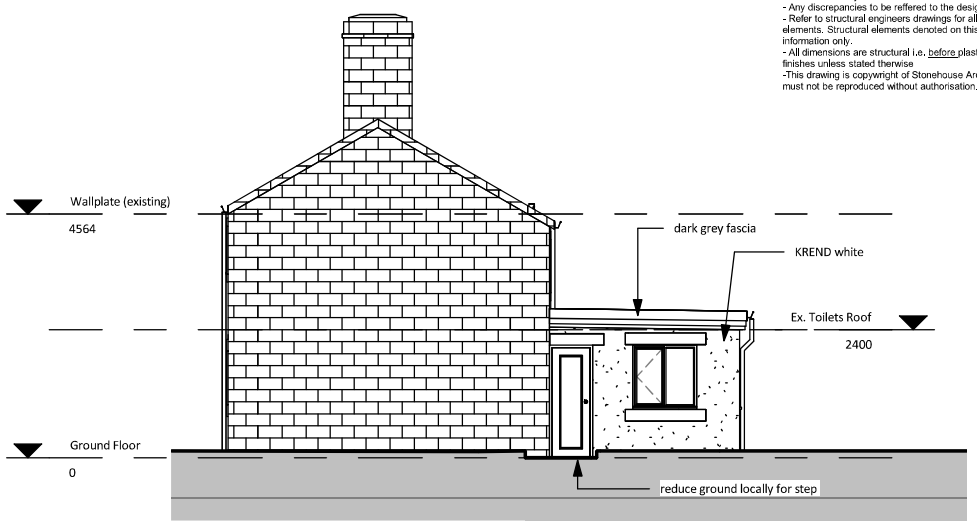
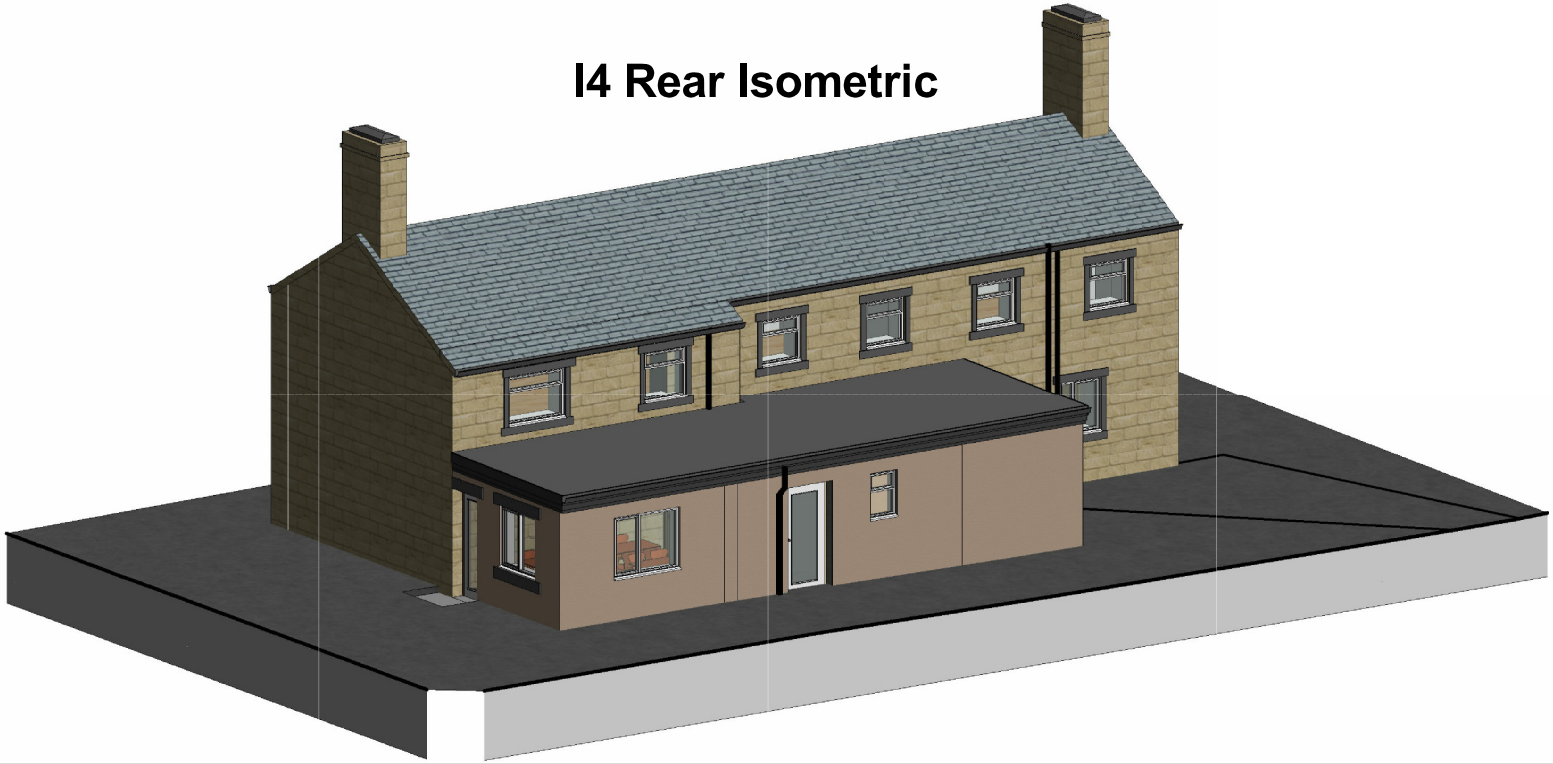



## 11 Side 1 Proposed
1 : 100




## 11 Side 2 Proposed
1 : 100

## I4 Rear Isometric



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PURPOSE OF ISSUE
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SHEET
Proposed 3

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# VIEW FROM EXISTING BAR

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PURPOSE OF ISSUE
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PROJECT
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SHEET
Proposed 4

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| 11.06.20 | J20-057 | |

| Drawn by | DRAWING NUMBER | REV |
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| Author | P06 | |

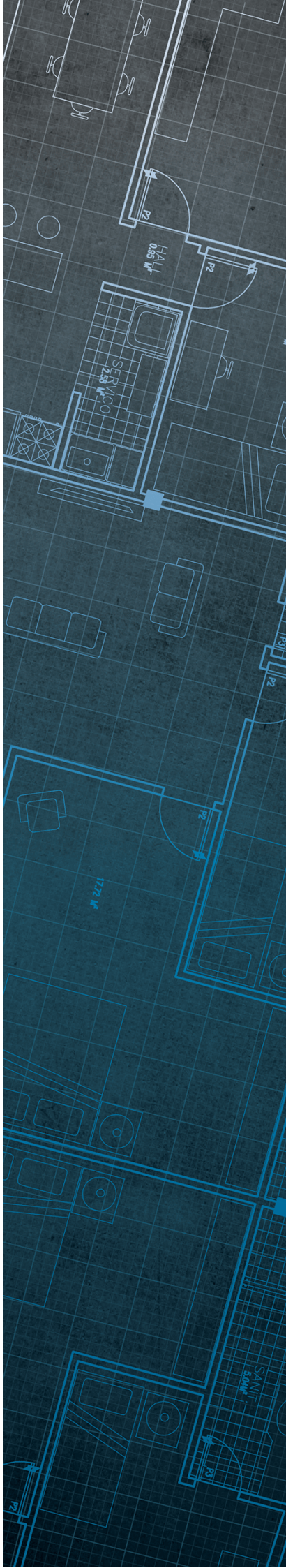
The Coal Authority

# Consultants

## Coal Mining Report

Thorncliffe Working Mens Social Club
Thorncliffe
Thorncliff Lane
Kirkburton
Huddersfield
Kirklees
HD8 0UG

| | |
|---|---|
| Date of enquiry: | **27 October 2020** |
| Date enquiry received: | **27 October 2020** |
| Issue date: | **27 October 2020** |
| Our reference: | **51002317334001** |
| Your reference: | **S&S-20-088** |



# 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**

Russell Bowman

**Enquiry address**

Thorncliffe Working Mens Social Club
Thorncliffe
Thorncliff Lane
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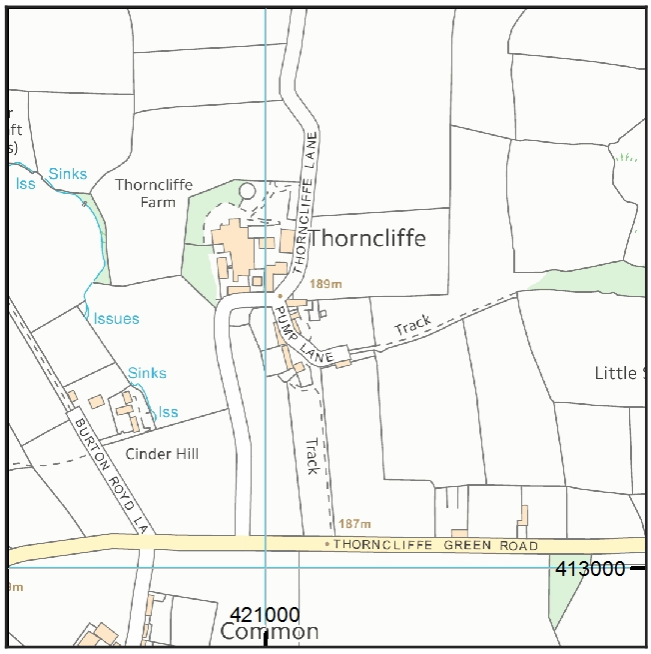
Huddersfield
Kirklees
HD8 0UG




Approximate position of property

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/company/the-coal-authority
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/thecoalauthority

# 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 |
|---|---|---|---|---|---|---|---|---|---|
| unnamed | TOP BEESTON | Coal | 62VW | 43 | Beneath Property | 2.1 | East | 56 | 1890 |

## 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 | 421413-026 | 421134 413141 | | Coal | |

## Abandoned mine plan catalogue numbers

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

| | | |
|---|---|---|
| NE766 | FGB194 | FGB706 |
| FGB245 | FGB708 | FGB320 |
| 6837 | 8210 | FGB237 |

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.

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### 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

| Distance to gas incident/remediation (m) | Direction |
|---|---|
| 316.1 | South-East |

See Section 4 for further information.

### Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

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# 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.

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# 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.

### Mine gas remedial works

The site is within an area of previous interest. It is close to where the Coal Authority has investigated and subsequently remediated the effects of mine or ground gas emissions following specific reported hazards.

The site requires further investigation and may influence your risk assessment. We recommend that you order the **Coal Authority Mine Gas Emission Report**, which will include more information about the hazard.

**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.**

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# Section 5 – Data definitions

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

### Past underground coal mining

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

### Probable unrecorded shallow workings

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

### Spine roadways at shallow depth

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

### Mine entries

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

### Abandoned mine plan catalogue numbers

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

### Outcrops

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

### Geological faults, fissures and breaklines

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

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### 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.

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### 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.

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# VAT receipt

| | |
|---|---|
| **Issued by** | The Coal Authority<br>200 Lichfield Lane<br>Mansfield<br>Nottinghamshire<br>NG18 4RG |
| **Tax point date** | 27 October 2020 |
| **Issued to** | RUSSELL BOWMAN<br>89 MOORHEAD LANE<br>SHIPLEY<br>BRADFORD<br>BD18 4JW |
| **Property search for** | THORNCLIFFE WORKING MENS SOCIAL CLUB<br>THORNCLIFFE<br>THORNCLIFF LANE<br>KIRKBURTON<br>HUDDERSFIELD<br>KIRKLEES<br>HD8 0UG |
| **Reference number** | 51002317334001 |
| **Date of issue** | 27 October 2020 |
| **Cost** | £112.13 |
| **VAT @ 20%** | £22.43 |
| **Total received** | £134.56 |
| **VAT registration** | 598 5850 68 |

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# Summary of findings

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Ordnance Survey Licence number: 100020315
Map data

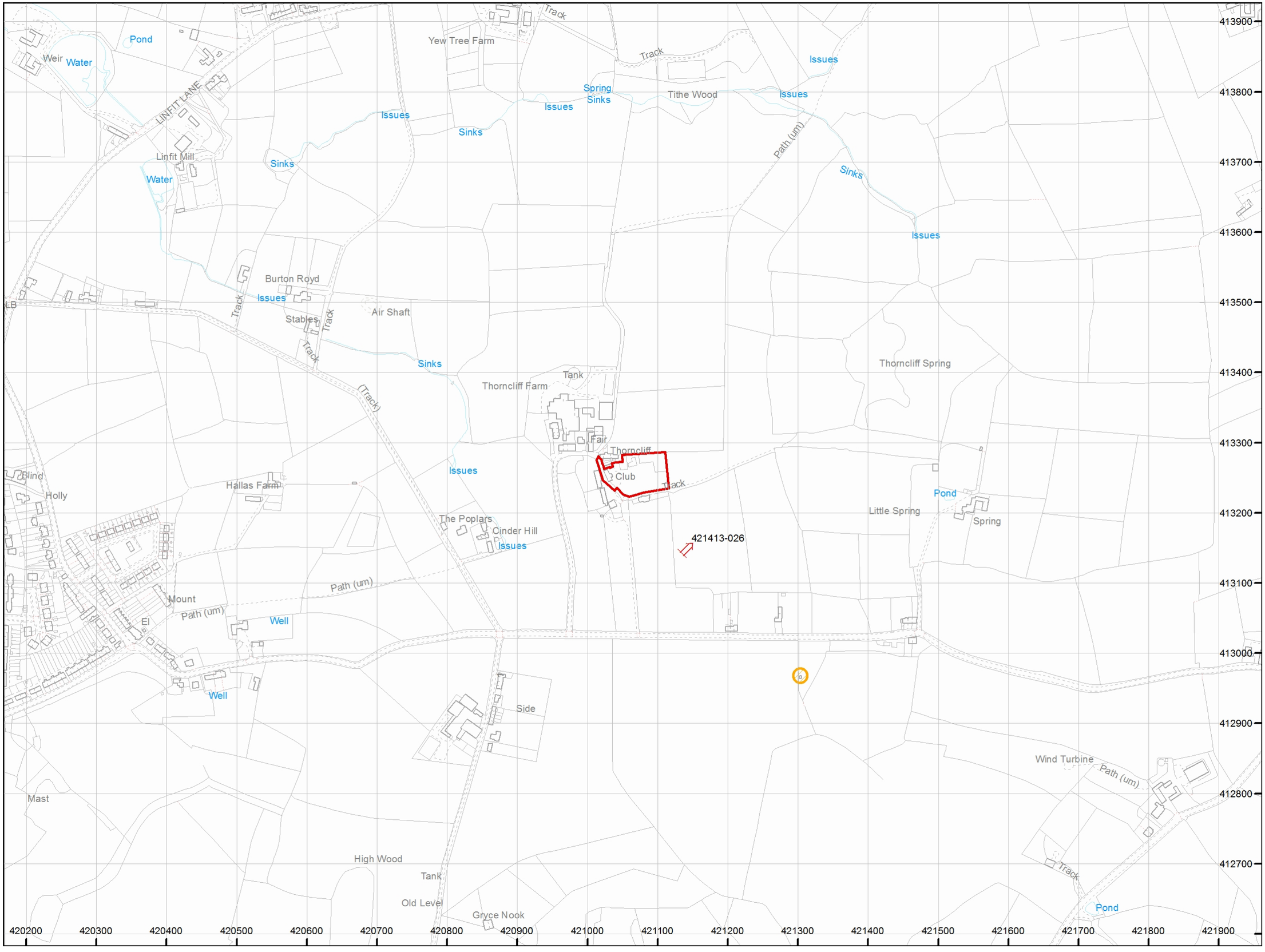
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

## Key

Approximate position of the enquiry boundary shown

Disused adit

Mine gas remedial works




**How to contact us**
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

# Calculation Sheet
Coal Seam Projection

SOIL AND STRUCTURES

## Project Details

| | |
|---|---|
| **Name** | Thorncliff Social Club, Kirkburton |
| **Reference** | 20049 |

## Competent Cover Summary

| | Seam Name | Seam Thickness (m) | Competent Cover (m) | |
|---|---|---|---|---|
| | | | Point 1 | Point 2 |
| **Coal Seam 1** | Top Lousey | 0.80 | 12.66 | N/A |
| **Coal Seam 2** | N/A | N/A | N/A | N/A |
| **Coal Seam 3** | N/A | N/A | N/A | N/A |
| **Coal Seam 4** | N/A | N/A | N/A | N/A |
| **Coal Seam 5** | N/A | N/A | N/A | N/A |

***Note:*** *Points relate to those illustrated on coal seam projection drawing within Coal Mining Risk Assessment*

| Key | | |
|---|---|---|
| **Less than -2.5 m** | **-2.5 to 2.5 m** | **More than 2.5 m** |
| **Likely insufficient** | **Marginal** | **Likely sufficient** |
| Competent cover not present | Competent cover may not be present | Competent cover present |


**Author** Russell Bowman
*BSc (Hons) MSc CEng CWEM MCIWEM*


**Signed** Redacted .....

**Calculation Sheet**
Coal Seam Projection

SOIL AND STRUCTURES

| Coal Seam 1 | Top Lousey |
|---|---|
| **Projection from:** | Outcrop |

| Coal Seam Details | Value | Units | Reliability [1] | | Lines of Evidence |
|---|---|---|---|---|---|
| **Ground level (at outcrop)** | 175.00 | mAOD | ✓✓ | Fair estimate | OS mapping |
| **Depth to top of coal seam (rockhead)** | 1.50 | mbgl | ✓✓ | Fair estimate | No superficial soils and shallow bedrock locally |
| | 173.50 | mAOD | | | |
| **Dip angle of coal seam** | 2.1 | deg | ✓✓ | Fair estimate | Consultants Coal Mining Report |
| **Dip direction of coal seam** | 90 | deg | ✓✓ | Fair estimate | Coal Authority Interactice Map Viewer |
| **Seam thickness** | 0.50 | m | ✓✓ | Fair estimate with safety | Local BGS boreholes and BGS min. thickness (+0.20m) |

| **On Site:** Point 1 | Value | Units | Reliability [1] | | Lines of Evidence |
|---|---|---|---|---|---|
| **Distance to crop** | 100.00 | m | ✓✓✓ | Fair estimate | OS mapping and Coal Authority Interactice Map Viewer |
| **Ground level** | 187.50 | mAOD | ✓✓ | Fair estimate | OS mapping |
| **Depth to rockhead** | 1.50 | mbgl | ✓✓ | Fair estimate | No superficial soils and shallow bedrock locally |
| | 186.00 | mAOD | | | |
| **Depth to top of coal seam** | 169.84 | mAOD | ✓✓ | Calculated | Data tabled above using trigonometry, accounting for topographical level differences |
| | 17.66 | mbgl | | | |
| **Depth to base of coal seam** | 169.34 | mAOD | ✓✓ | Calculated | Top of seam less the seam thickness |
| | 18.16 | mbgl | | | |
| **10t rule valid?** | >>> | >>> | >>> | **Yes, likely conservative** | Based on guidance within C758[2,3] |
| **Comptent cover (10t rule)** based on seam thickness | 12.66 | m | ✓✓ | **Likely sufficient** | Competent cover present |
| **Comptent cover (10t rule)** based on 1.50 m roadway | 2.66 | m | ✓ | **Likely sufficient** | Competent cover present |

| **On Site:** Point 2 | Value | Units | Reliability [1] | | Lines of Evidence |
|---|---|---|---|---|---|
| **Distance to crop** | | m | ✓✓✓ | | |
| **Ground level** | | mAOD | ✓✓ | | |
| **Depth to rockhead** | | mbgl | ✓✓ | | |
| | | mAOD | | | |
| **Depth to top of coal seam** | | mAOD | ✓✓ | | |
| | | mbgl | | | |
| **Depth to base of coal seam** | | mAOD | ✓✓ | | |
| | | mbgl | | | |
| **10t rule valid?** | >>> | >>> | >>> | | Based on guidance within C758[2,3] |
| **Comptent cover (10t rule)** based on seam thickness | | m | ✓✓ | | |
| **Comptent cover (10t rule)** based on 1.50 m roadway | | m | ✓ | | |

**Notes**
1. 'Reliability' assessed based on quality and accuracy of the lines of evidence with further discussion in report
2. Table 5.1 considering; dip angle, groundwater regime, extraction ratio, mutiple seams, available GI information and serviceability limits
3. Superficial soil bulking factor neglected and assumed to not offer any competent cover