



The Coal
Authority

Coal Mining Risk Assessment

For development at:

Fosters Bakery, Towngate, Mapplewell, Barnsley, S75 6AS

For proposal:

2No. two-storey office extensions

Assessment Summary

Assessment Result	MEDIUM RISK
Recommended Further Work	INTRUSIVE GROUND INVESTIGATION

The Coal Authority works to resolve the impacts of mining by growing its expertise, innovation, organisational capability and efficiency.

It manages the effects of past coal mining, including subsidence damage claims which are not the responsibility of licensed coal mine operators and is an executive non-departmental public body, sponsored by the Department of Business, Energy and Industrial Strategy. This report is valid for 90 days.

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Version	Compiled	Checked	Date
1.1	HB	PB	28/02/19

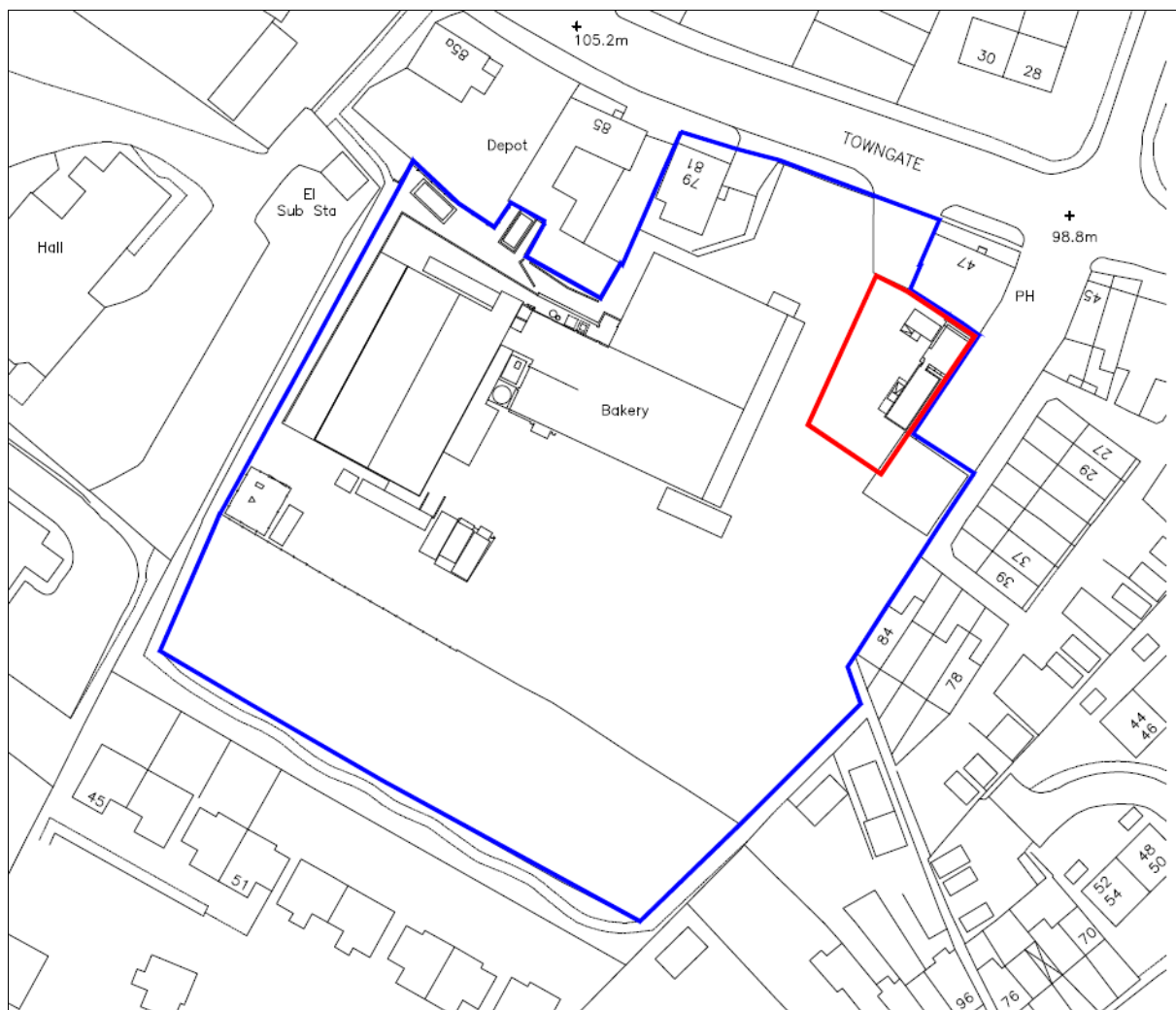
Section 1 – Description of site and proposed development

a) Site location and Description

The Coal Authority has been commissioned to prepare a Coal Mining Risk Assessment Report for a proposed development at Fosters Bakery, Towngate, Mapplewell, Barnsley, S75 6AS (see Figure 1), in order to provide the Local Planning Authority with information on coal mining and an assessment of its impact on land stability.

The approximate site centre co-ordinates are E432864, N410023. The proposed development area requires access via Towngate. The site has an approximate elevation of 100m AOD.

Figure 1: Site location plan



b) Description and layout of proposed development

The Coal Authority understands that the developer plans the construction of 2No. two-storey office extensions (see Appendix A).

c) Scope of coal mining risk assessment

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

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

Any works that intersect coal mine workings, mine entries or coal seams may have implications for mine gas, spontaneous combustion and surface collapse. Coal Authority permission is required prior to any such works taking place. Further detailed advice can be provided upon request.

The Coal Authority's adopted policies regarding building over or close to mine entries and managing gas risks can be viewed at:

www.gov.uk/government/publications/building-on-or-within-the-influencing-distance-of-mine-entries

www.gov.uk/government/publications/guidance-on-managing-the-risk-of-hazardous-gases

Section 2 – Sources of information used to inform this report

Source reviewed	Yes	No	Remarks
Coal mining report	X		Non-Residential Coal Mining Consultants Report (see Appendix B)
Other mining records	X		Abandonment plans – NE1037 'Woolley/Redbrook Colliery', NE158 (6 of 11) 'Woolley Barnsley and North Gawber' Rationalised plans – 44 3210 and 44 3209
Geological plans	X		County Geological Sheet Yorkshire 262SE (1932), British Geological Survey England and Wales Sheet 87 Barnsley (2008)
BGS Boreholes	X		SE30NW547, SE30NW9/C and SE30NW9/A
Other	X		BGS Geoindex

The above information sources have been used to provide an assessment of the potential mining risk within the remainder of the report.

Section 3 – Identification and assessment of site specific coal mining related risks

The Coal Authority's search of its detailed coal mining information identifies the following site specific coal mining legacy risks to the site.

Coal mining issue	Reported		Risk assessment	
	Yes	No	Rating	Comment
a) Underground coal mining (recorded at shallow depths)		X	Low risk	None recorded
b) Underground coal mining (probable at shallow depths)	X		Medium risk	Probable unrecorded shallow workings in the Kent's Thin and Kent's Thick/Mapplewell seams
c) Mine entries (shafts and adits)		X	Low risk	None recorded
d) Coal mining geology (faults and fissures)		X	Low risk	None recorded
e) Record of past mine gas emissions or potential	X		Medium risk	The Barnsley seam is known to be liable to spontaneous combustion. All mine workings pose a potential gas risk which should be considered in any future investigations and development
f) Recorded coal mining surface hazard		X	Low risk	None recorded
g) Surface mining (opencast workings)	X		Low risk	Opencast extraction areas greater than 130m from the site boundary

A desk based study of the coal mining information has been used to risk assess the coal mining features above. A summary of the risk posed by these features is summarised after thorough analysis of the information sources. Comment on each specific coal mining issue follows below:

a) Underground Coal Mining (recorded at shallow depths)

Coal mining at depths shallower than 30m beneath ground level can typically pose challenges to ground stability at the surface. The magnitude of this effect depends upon the exact depth of any workings, the thickness of competent rock cover and the extraction thickness of any coal mine workings.

The Coal Authority Coal Mining Consultants report in Appendix B shows that the development site is not in an area of recorded shallow coal mine workings. The Consultants Report indicates that the site is underlain by, or is in proximity to, workings in seven seams of coal at between 81m and 379m bgl. The shallowest of these is the Barnsley seam, recorded to have been worked beneath the development area at 81m bgl with an extraction thickness of 3.32m and last worked in 1861.

The rationalised sheet 44 3210 NY210K (Barnsley seam) indicates workings across the site area. The closest date on this plan indicates workings were undertaken in 1861 and a section thickness of 332cm is indicated for the majority of this plan, including the site area, which corroborates the Consultants Report. The workings beneath the site are shown on abandonment plan NE158 (1 of 6) as being pillar and stall workings, however no levels are recorded for workings in this area. Two sections for the Barnsley seam shown on this plan generally indicate an upper (softs) and lower (hards) set of coal horizons, separated in both sections by a clay/dirt horizon, with total seam thickness including clay/dirt bands of 2.99-3.32m, corresponding with the seam thickness indicated in the Consultants Report.

Rationalised sheet 44 3209 NY210K (Barnsley seam) captures the extent of workings up to the national gridline approximately 10m south of the site. This plan shows workings in Mapplewell Colliery/North Gawber Colliery extending up to this gridline. Based on seam contours shown on the plan the Barnsley seam can be estimated to be present at approximately 17m AOD (83m bgl) adjacent to the proposed development site. An approximate rate of dip of 3.7° east can be estimated from this plan.

Based on the likely depth of workings in the Barnsley seam the risk to the proposed development is considered to be low.

b) Underground coal mining (probable at shallow depths)

Areas of probable shallow coal mine workings are identified as part of the Development High Risk Area for which no recorded plan exists, but where it is likely that workable coal at shallow depths has been mined before records were kept. The data has been estimated from available mining records by qualified mining surveyors. Since 1872 there has been a law that requires all coal mine operators to deposit working plans of the mine with the government following the cessation of operations. Prior to this date the plans were often destroyed or kept in private ownership.

Where the extraction of coal has occurred there is the potential for voids to remain long after mining has ceased. The depth of workings generally dictates the length of time that significant voids may remain, but other factors including the size of mine roof supports and the competency of overlying strata can influence the time for natural consolidation to occur. Waste material produced during mining was sometimes used to backfill abandoned sections of mine workings, therefore reducing the volume of open cavities or voids that remain. The method of backfilling workings is typically not recorded and cannot be relied upon as a satisfactory form of remediation.

The Coal Authority Coal Mining Consultants report in Appendix B shows that the development site is in an area of probable shallow coal mine workings. The Consultants report also indicates that the Kent's Thin seam outcrops approximately 32.3m southwest of the site and is of workable thickness.

The outcrop of the Kent's Thin seam is shown on the County Geological Sheet Yorkshire 262SE (1932) approximately 42m southwest of the site, striking approximately WNW-ESE. The plan indicates a rate of dip in the 'M' seam (suspected to be the Mapplewell seam) of 1 in 21 (2.7°) NE, approximately 470m northeast of the proposed development site. Based on this rate of dip and the Consultant's report outcrop position, the Kent's Thin seam can be estimated to be at shallowest 1.5m below rockhead.

The County Geological Sheet records the Mapplewell coal (thought to be an alternative name for the Kent's Thick coal) and Barnsley Rider Coal seams outcropping approximately 165m and 395m southwest of the site respectively. Based on the rate of dip of 2.7°NE, these seams would be present at approximately 7.7m and 18.6m below rockhead, respectively. There is however an annotation of a shaft located approximately 221m from the Mapplewell outcrop with a note of '98ft (29.8m) to Mapplewell coal', which would equate to a steeper rate of dip of approximately 7.7° from outcrop (once superficial deposits have been accounted for).

The shafts of North Gawber Colliery (BGS borehole records SE30NW9/C and SE30NW9/A located approximately 460m east of site) indicate local seam separations between the Kent's Thin, Kent's Thick/Mapplewell, Barnsley Rider and Barnsley seams of 21.12-21.54m, 40.38m and 25.7m, respectively. These separations are significantly greater than those estimated from the indicative dip rates above.

The rationalised plans NY190K and NY180K indicate the Kent's Thick and Kent's Thin seams to have local extraction thicknesses of 89cm and 61cm respectively and the North Gawber shafts mentioned above indicate the Kent's Thin, Kent's Thick and Barnsley Rider seams to have thicknesses of 0.61-0.76m, 0.99-2.38m and 0.46m, respectively. The British Geological Survey England and Wales Sheet 87 Barnsley (2008) sheet includes a Generalised Vertical Section (GVS), which gives the following indicative seam thicknesses for those seams between the Kent's Thin coal and Barnsley Coal: Kent's Thin (0-1.9m), Kent's Thick/Mapplewell (0.3-2.6m), thin unnamed coal, Barnsley Rider Coal (0-0.7m), thin unnamed coal, Warren House Coal (0-0.1m) and Barnsley Coal (0-3.9m).

Abandonment plan NE1037 for local workings in the Kent's Thick seam records a 23.3m separation between Kent's Thin and Kent's Thick from borehole U1, however it is not clear where this borehole is located. A section of the Kent's Thick seam on this plan shows coal 0.15m, seatearth 0.46m, coal 1.07m and seatearth of unknown thickness (total thickness of 1.68m excluding lower seatearth horizon).

Based on the indicative seam separations mentioned above and the likely local thickness of these seams, it is possible that insufficient competent cover may exist above the Kent's Thin seam. It is also possible that there may be insufficient competent cover above the Kent's Thick/Mapplewell seam if the seam extraction thickness is at the greater end of the figures indicated and if the seam separation is at the lesser end of the figures indicated. It is likely that there will be sufficient competent cover above the Barnsley Rider Coal even if extracted at its maximum seam thickness, however the competency of overlying seams should be proven through ground investigations. Consequently it is considered that the risk to the proposed development from unrecorded shallow workings in the Kent's Thin and Kent's Thick/Mapplewell seams is medium.

c) Mine entries (shafts and adits)

The Coal Authority Coal Mining Consultants report in Appendix B shows no mine entries are recorded within 100m of the development site.

The development site sits within a historical mining area and therefore there is a residual risk of unrecorded mine entries to be present on site. All site operatives should be made aware of this potential risk and a watching brief should be maintained during site works.

d) Coal mining geology (Faults and fissures)

The development site sits upon the Pennine Middle Coal Measures Formation. The closest BGS borehole to the site, SE30NW547, located approximately 120m southwest of the site, records 10ft 8in (3.25m) of top soil and clay; however local ground deposits may vary.

No faults, fissures or break lines are known to affect the development site.

e) Record of past mine gas emissions or potential

The Barnsley seam is known to be liable to spontaneous combustion.

There are no recorded past gas emissions recorded in the surrounding area, however, coal seams and coal mine workings pose a potential gas risk which should be considered in any future investigations and development. At development sites with shallow coal workings, probable shallow coal mine workings, or pathway features such

as mine entries and geological disturbances on or nearby the site, the Coal Authority recommends that a more detailed gas risk assessment to be undertaken in accordance with relevant guidance.

f) Recorded coal mining surface hazard

None recorded.

g) Surface mining (opencast workings)

The Coal Authority Coal Mining Consultants report in Appendix B indicates two areas of opencast extraction approximately 130m and 450m southeast of the proposed development site, respectively. These sites are recorded on rationalised plan 44 3209 (Opencast Workings) and are annotated as 'North Gawber Colliery Sites'. The rationalised plan indicates that these sites and others locally have been sourced from an Opencast Executive Consultation Plan. This plan has been reviewed and whilst the site boundaries are recorded and coal is recorded to have been worked from them, no further information or source plans are given. Due to the recorded distance from the site boundary, the risk to the proposed development is considered to be low.

Section 4 – Proposed mitigation strategy

a) Site investigation and/or remediation

Due to the likely presence of unrecorded shallow mine workings in the Kent's Thick and Kent's Thin/Mapplewell seams, an intrusive site investigation will be required to prove the condition of, or sufficient competent cover above, these seams.

The site investigations will need to be carried out by a competent contractor, taking into account the findings of this report. The results should be interpreted by a qualified and competent person so that an appropriate remedial strategy can be developed.

Guidance on drilling or piling through coal can be found at:

www.gov.uk/government/publications/guidance-on-managing-the-risk-of-hazardous-gases

Due to the difficulties in identifying coal related gas hazards, it may be prudent to consider completing a gas risk assessment for the development site. This may recommend basic gas protection measures within the foundation design, which are resistant to permanent gases (carbon dioxide, methane, carbon monoxide) and comparable to that suggested in BR211, as commonly used to protect against radon in residential properties.

Where development is proposed over areas of coal or past coal workings at shallow depth, developers should consider wherever possible removing any remnant shallow coal. This will enable the ground to be stabilised and remove a hazard prior to construction of any foundations associated with the development. Prior extraction of surface coal requires an Incidental Coal Agreement from the Coal Authority. Further information can be found at:

www.gov.uk/get-a-licence-for-coal-mining

Concrete, cements and renders may be susceptible to attack from elevated levels of sulfates in the ground. The Building Research Establishment reports that most cases of sulfate attack occur in and adjacent to coal field areas and related industrial centres. It would be prudent for the issue of sulfate attack to be considered during the foundation design to ensure they comply with the Building Regulations 2010.

You may also wish to refer to the Construction Industry Research and Information Association (CIRIA) publication Special Publication 32 "Construction over Abandoned Mine Workings".

b) Coal Authority permit

Any intrusive activities, including initial site investigation boreholes and any subsequent treatment of coal mine workings/coal mine entries for ground stability purposes require the prior written permission of the Coal Authority. Application forms for Coal Authority permission and further guidance on this matter can be obtained from the Coal Authority's website at:

www.gov.uk/get-a-permit-to-deal-with-a-coal-mine-on-your-property

Follow on services can be requested using the details in the contacts section.

Section 5 – Conclusions

This report has identified that the proposed development site may have been subject to past coal mining activity, namely unrecorded shallow mine workings in the Kent's Thick and Kent's Thin/Mapplewell seams. The risk to the site from legacy mining features is medium.

Nevertheless, subject to the undertaking of appropriate site investigations and any potential necessary remedial measures as outlined in Section 4a of this report, the Coal Authority considers that the site may be made safe and stable for future development and the risk to the development reduced to low. The recorded coal mining legacy issues present within the site do not pose any particular implications for the layout of the proposed development.

The Coal Authority advises the developer undertake a detailed Gas Risk Assessment where proposed development occurs over shallow coal reserves as is the case here.

Section 6 – Contacts

Planning and Local Authority Liaison Service

Tel: 01623 637 119

Email: planningconsultation@coal.gov.uk

Website: www.gov.uk/planning-applications-coal-mining-risk-assessments

Surface Hazards Emergency Service

Tel: 01623 646 333 (open 24 hours a day, 7 days a week)

24-hour number for reporting public safety hazards and incidents associated with coal mining

Mining Reports Service

To purchase site specific coal mining information go to our website;

www.groundstability.com

Licensing and Permitting Service

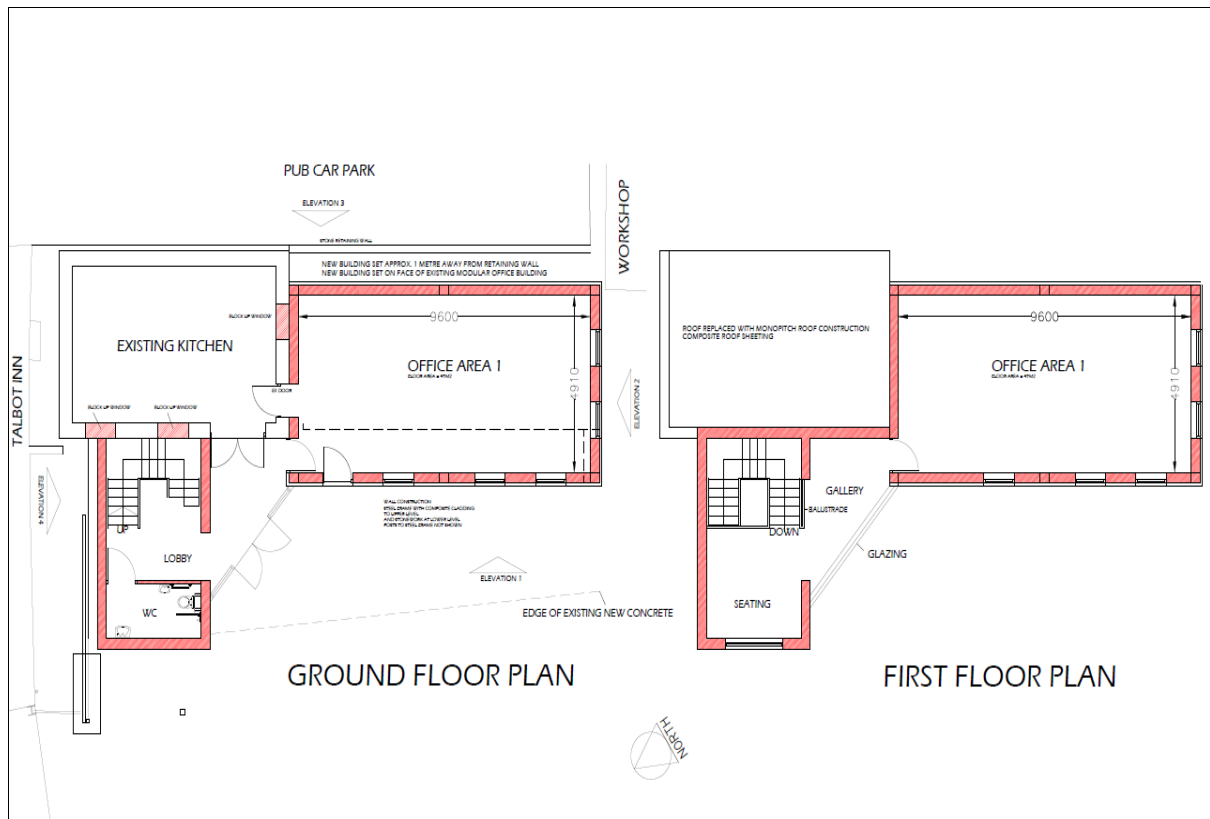
Email: permissions@coal.gov.uk

Tel: 01623 637 320

For permission to enter or disturb coal mine entries and coal seams.

Section 7 – Appendices

Appendix A – Plan showing proposed development layout



Appendix B – Non-Residential Coal Mining Consultants Report