



EARTH ENVIRONMENTAL
& GEOTECHNICAL

Coal Mining Risk Assessment

Arthur Lane

Ainsworth

July 2022

On behalf of

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COAL MINING RISK ASSESSMENT
FOR
MACMARSHALS RURAL AND CHARTERED SURVEYORS
ON BEHALF OF
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CONTENTS

1.0	INTRODUCTION.....	1
	Appointment	1
	Objective	2
	Sources of Information	2
2.0	SITE LOCATION AND DESCRIPTION.....	3
3.0	ASSESSMENT OF DATA.....	5
	Geological Information	5
	British Geological Survey Published Data Assessment.....	5
		6
	Coal Authority Records	7
	Historical Information.....	9
4.0	COAL MINING RISK ASSESSMENT	10
	Scope of Coal Mining Risk Assessment.....	10
	Data Limitations.....	10
	Coal Mining Risks.....	10
	Conclusions.....	11
	Proposed Mitigation Strategy	11

FIGURES

Figure 1	Development Layout Plan
Figure 2	Site Location Plan
Figure 3	Aerial Photograph
Figure 4	Geology Map Extract 1:50,000
Figure 5	Coal Authority Interactive Viewer Extract
Figure 6	Coal Authority Map Extract
Figure 7	OS Map Extract 1888-1913

APPENDICES

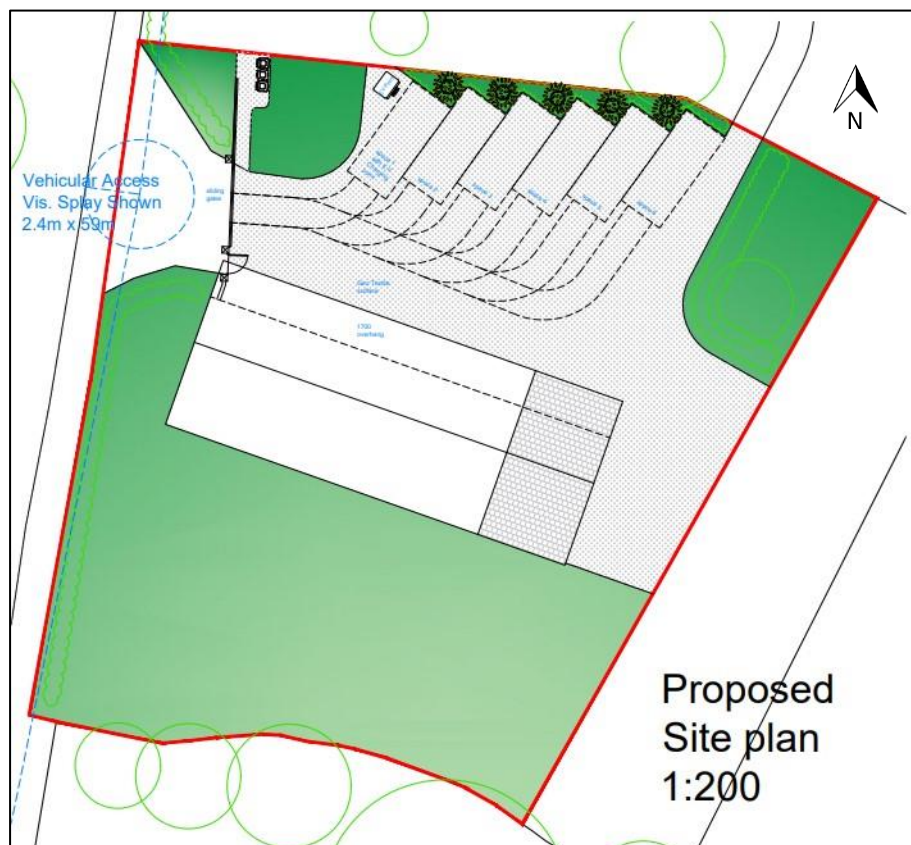
Appendix 1	Coal Authority Consultants Mining Report
Appendix 2	Report Limitations

1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd have been commissioned by MacMarshals Rural and Chartered Surveyors and Planning Consultants, on behalf of Mr Paul Brown (the client), to undertake a Coal Mining Risk Assessment for a proposed development on land to the south of Sunnybank, Arthur Lane, Ainsworth.
- 1.2 The client wishes to apply for a change of use for the site, converting a stable block to an office and gym with a partial basement. The site is within a green belt, West Pennine Moors and Special Landscape Area.
- 1.3 This Coal Mining Risk Assessment has been prepared to assist with a planning application to Bury Council, following a concern that the site falls partially within a High Development Risk Area.
- 1.4 A preliminary development layout plan is provided below as Figure 1

Figure 1 Development Layout Plan



Objective

- 1.5 The purpose of the Coal Mining Risk Assessment is to collate available geological, mining, and historical data to assess the potential for the site to be affected by underground mining.
- 1.6 This report has been drafted in accordance with the Coal Authority (CA) Guidance Risk Based Approach to Development Management, Version 4, 2017.

Sources of Information

- 1.7 The Coal Mining Risk Assessment compiles a review of the following information sources:
- British Geological Survey of England, Sheet 85 Manchester, 1/50,000 scale, 2010 edition.
 - British Geological Survey of England, SD71SE, 1/10,000 2007 edition.
 - British Geological Survey of England, Lancashire 87SE, 1929 edition.
 - Coal Authority Interactive Map Viewer.
 - Coal Authority Mining Report.
 - British Geological Survey online borehole records.
 - Google Earth imagery.
 - Online Historical Ordnance Survey maps.
 - Site Investigations in Areas of Mining Subsidence, FG Bell, 1975.
 - The threat of abandoned mines on the stability of urban areas, Barry Clarke, IAEG2006 Paper Number 379, The Geological Society of London, 2006.
 - The collapse of shallow coal mine workings, Durham theses, Durham University, Garrard, 1981.
 - Construction over abandoned mineworking's, CIRIA Special Publication 32, 2002.
 - Abandoned Mineworking's Manual, CIRIA 2019.
 - Manchester & S.E. Lancashire Coal Field 1931.
 - A brief History (ainsworthhistorysociety.org).
 - Bury Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located on the east side of Arthur Lane, 0.3 miles from the centre of Ainsworth, a village near Bury, Greater Manchester. The site lies at an elevation of 160mAOD (centre of site).
- 2.2 The approximate National Grid Reference for the centre of the site is SD 75895 10396 (X: 375895, Y:410396) with the closest postcode being BL2 5PN.
- 2.3 The site is a roughly quadrangular shaped plot, approximately 850m², currently occupied by a stable block. It is fenced on all sides, with an access from Arthur Lane. To the south of the site Arthur Lane joins the B6196 (Bury Old Road) connecting Bolton and Bury.
- 2.4 The area is rural residential, Ainsworth being surrounded by open pastureland with a number of reservoirs and occasional deciduous copses. The topography is undulating, with Brown Hill rising gently from Ainsworth to 175mAOD to the north of the site.

Figure 2 Site Location Plan



Figure 3 Aerial Photograph



3.0 ASSESSMENT OF DATA

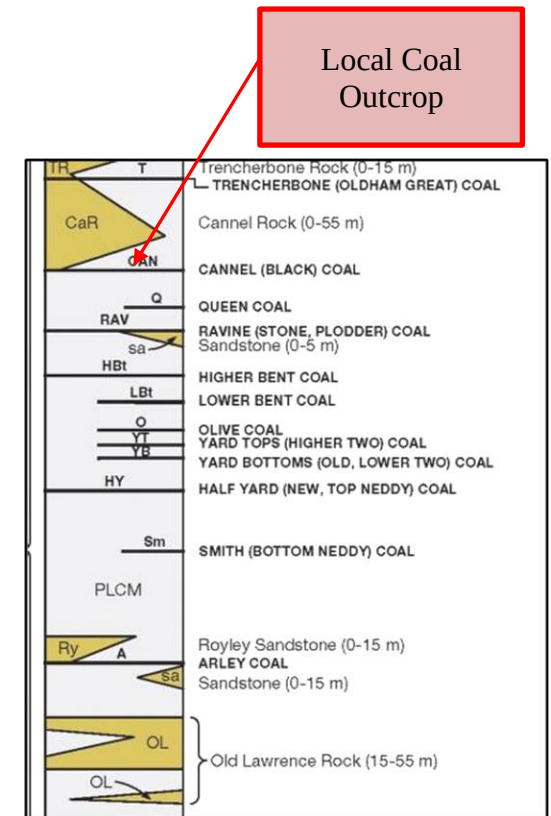
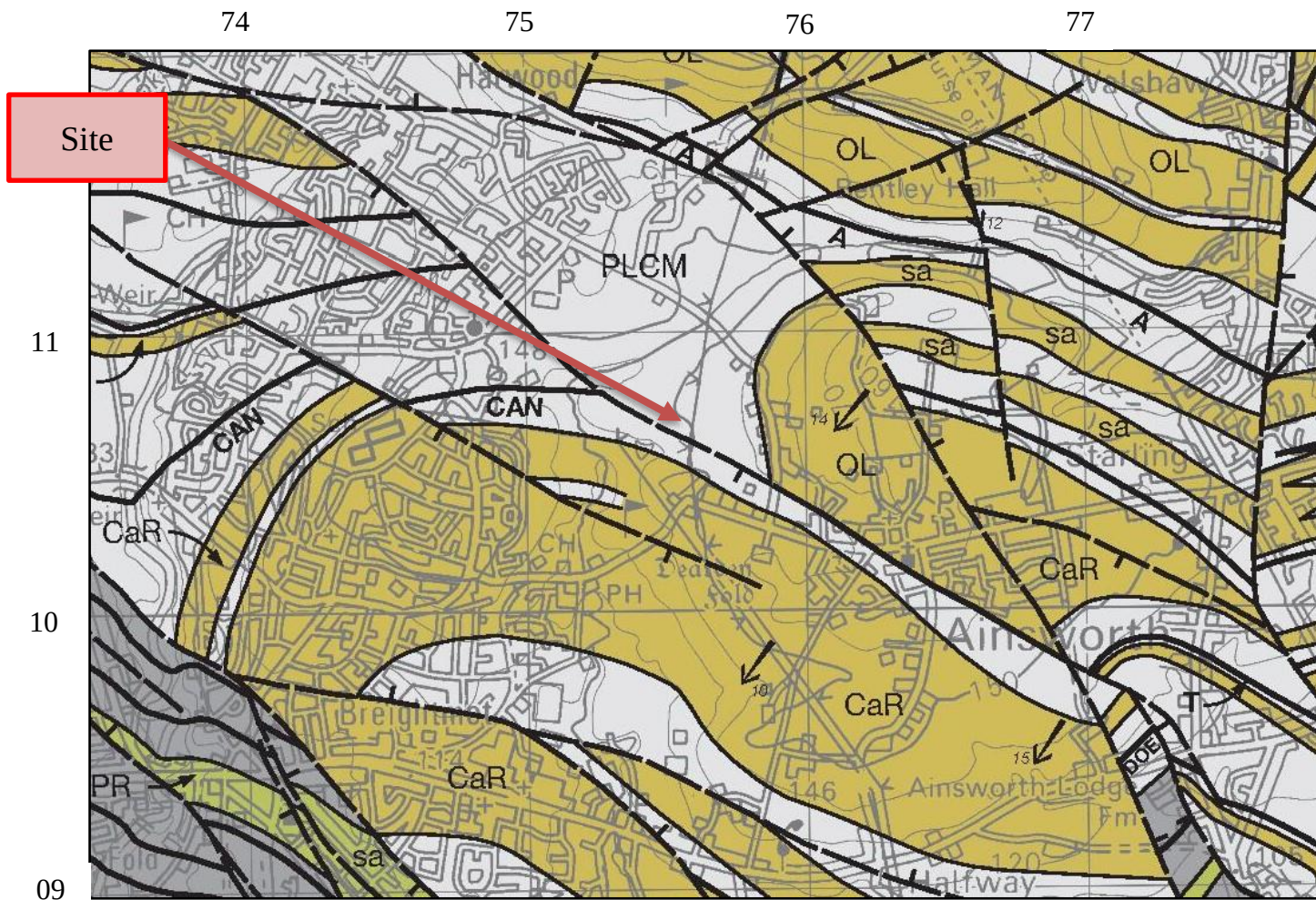
Geological Information

- 3.1 The geology of the site has been determined from geological maps for the area and examination of Coal Authority (CA) records.

British Geological Survey Published Data Assessment

- 3.2 The site is shown to be underlain by superficial deposits of Devensian Till (Boulder Clay).
- 3.3 The solid geology is mapped by the BGS as the Westphalian Pennine Lower Coal Measures Formation, consisting of interbedded grey mudstone, siltstone, and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part and more numerous and thicker coal seams in the upper part.
- 3.4 The regional geology shows the Coal Measures to be dipping 10-15 degrees southwest, with separately mapped sandstone units (Old Lawrence and Cannel Rock) displaced and truncated by a series of inferred, northwest-southeast trending faults. To the north of the site one of these faults downthrows the Cannel Rock and Coal Measures to the south of the fault against the older Old Lawrence Sandstone to the north. The closest coal seam in the fault block underlying the site is the Cannel Black Coal Seam.
- 3.5 There are no BGS borehole records identified within 250m of the site. The closest is SD71SE108, approximately 400m north of the site at Arthur Lane Nurseries. Drilled in 1991 for a water well. No detailed log is available.
- 3.6 An extract from the most recently published 1:50,000 geological map showing the approximate site location and key local geological features is presented below in Figure 4 overleaf.

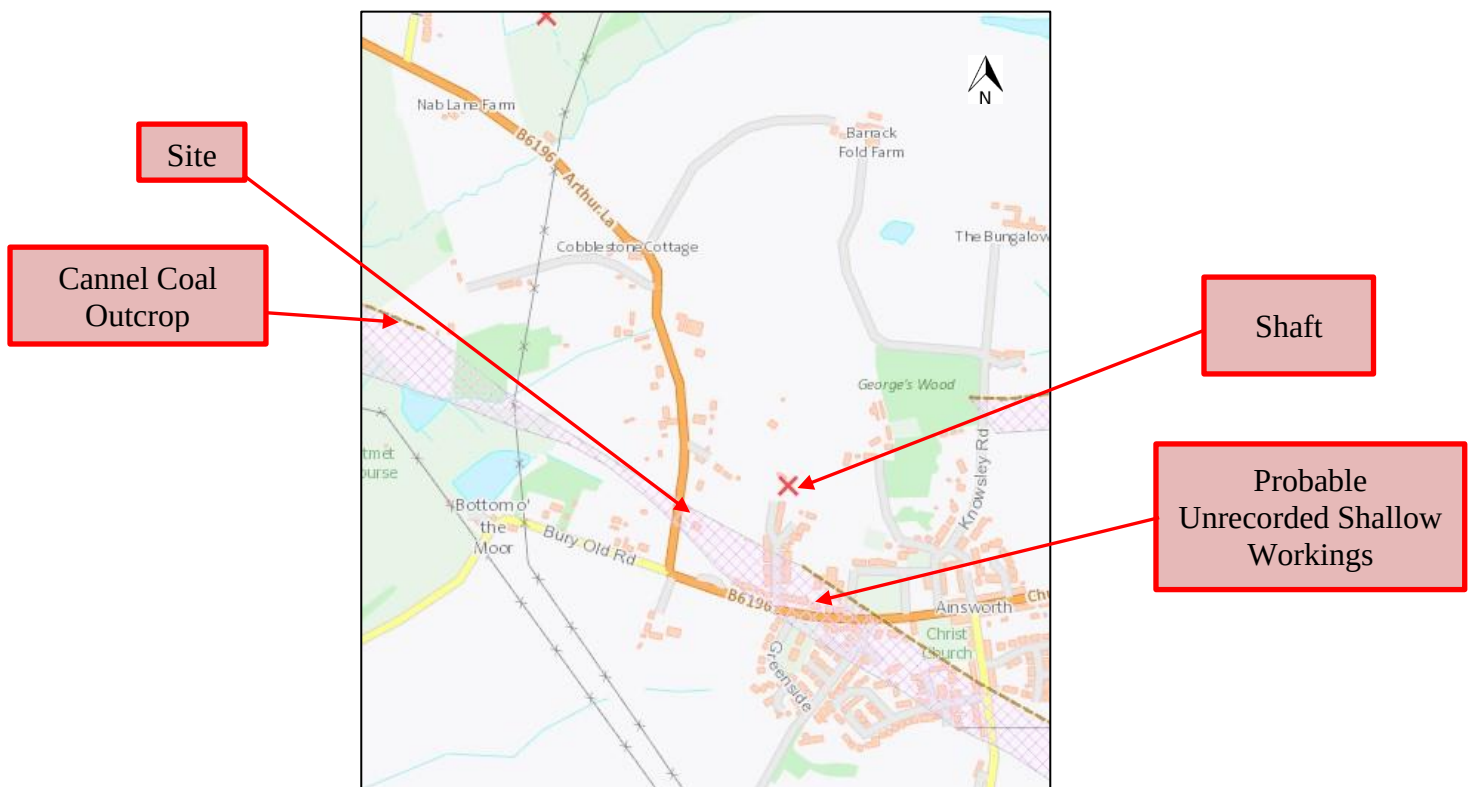
Figure 4 Geology Map Extract 1:50,000



Coal Authority Records

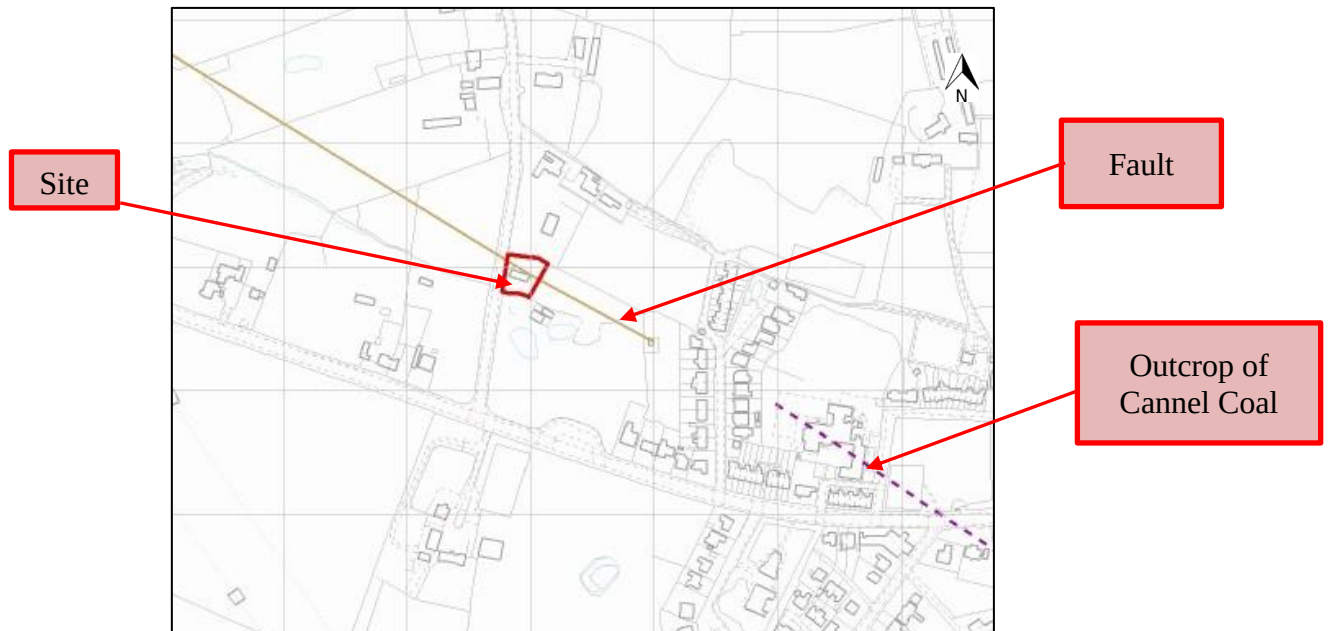
- 3.7 Reference to the Coal Authority Online Interactive Viewer shows the site to be located within a Development High Risk Area and an area of probable unrecorded Shallow Workings. (Figure 5).
- 3.8 The Cannel Coal is shown outcropping approximately 500m to the west of Arthurs Lane, faulted out near the site and recurring 200m to the southeast near Ainsworth. This would indicate that a continuation of the Cannel Coal Seam is possible beneath the site.
- 3.9 A shaft is indicated approximately 152m to the northeast of the site, north of Delph Lane. This is recorded as being untreated with an assumed diameter of 2.5m and a departure (positional accuracy) of 5m.

Figure 5 Coal Authority Interactive Viewer



- 3.10 A Coal Authority Mining Report (extract shown as Figure 6) has been acquired for the site which displays the fault transecting the property and an outcrop of the Cannel Coal 215.9m to the southeast of the site.

Figure 6 Coal Authority Map Extract

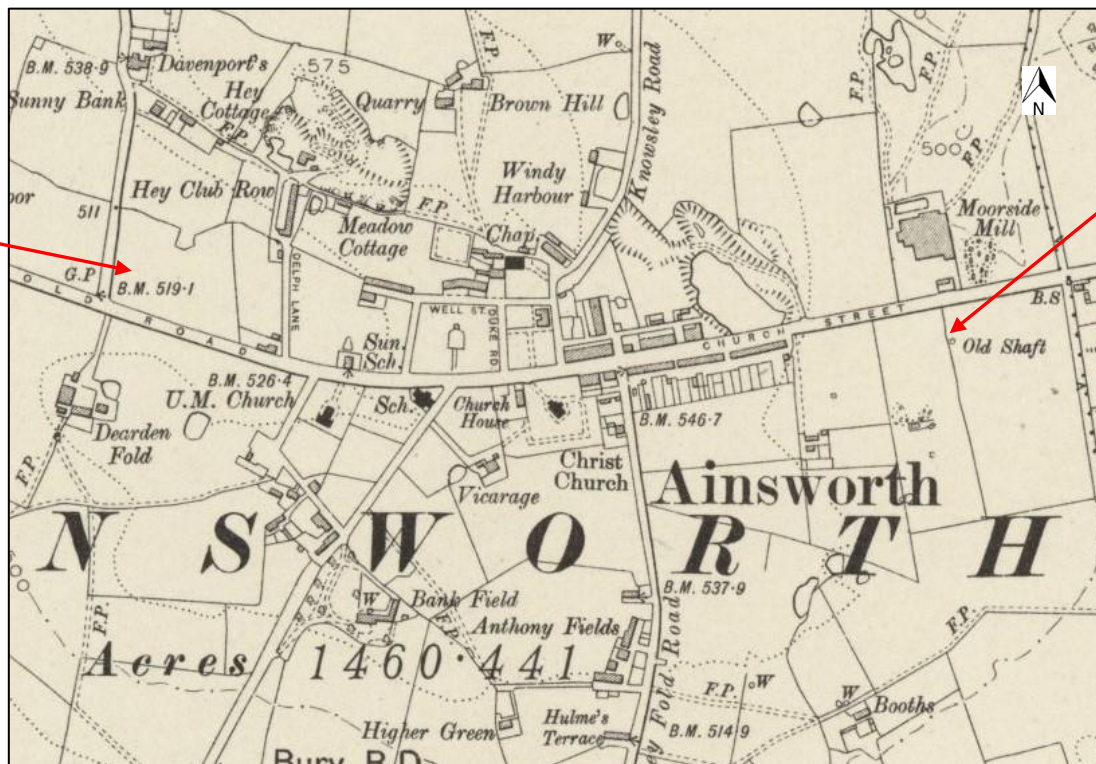


- 3.11 The Coal Authority shows no record of historical underground workings beneath the site, however states that there are probable unrecorded shallow workings.
- 3.12 There are no mine entries within 100m of the site however the site boundary does intersect with an abandoned mine plan (16820).
- 3.13 There are no records of any previous site investigations, subsidence, or remediated sites within 50m of the site boundary.
- 3.14 There are no mine water treatment schemes or mine gas recorded within 500m of the site boundary.
- 3.15 There are no Coal Authority managed tips or opencast mines within 500m of the site boundary.

Historical Information

- 3.16 The available historical plans dating back to 1885 show the area to be pastureland to the east of Arthur Lane, with a dwelling on the plot to the north. There is no evidence of mining activity in the immediate area of the site, however it is known that mining did take place in Cockey Moor area east of Ainsworth where evidence of old bell pits can still be seen. Cockey Moor Colliery, further afield at the junction of Bury/ Bolton Rod and Grindsbrook Road followed the Hinds Coal seam and was active through to the late 1800's.
- 3.17 By 1888 there are two sandstone (gritstone) quarries mapped on the southern slope of New Brown Hill, north of Bury Old Road. The quarry north of Delph Lane is the site of the shaft on the Interactive Viewer.
- 3.18 Review of more recent maps did not reveal any evidence of coal mining close to the site.

Figure 7 OS Map Extract 1888-1913



4.0 COAL MINING RISK ASSESSMENT

Scope of Coal Mining Risk Assessment

- 4.1 Objectives of the coal mining risk assessment are to provide a desk-based assessment of available geological and mining information relating to the site (and wider area) and to use this information to identify risks present to the development from the legacy of mining.
- 4.2 As part of the risk assessment, potential mitigation measures (if required) should be considered, including any necessary remedial works.
- 4.3 The outcome of the risk assessment should demonstrate to the Local Authority that the proposed development is or can be made safe (and stable) to meet the requirements of the National Planning Policy Framework (NPPF).

Data Limitations

- 4.4 It should be appreciated that it did not become a legal requirement to deposit coal mining abandonment plans until the 1870's and that this requirement was not rigorously enforced for some time after. Many shallow coal seams were worked prior to the introduction of first edition Ordnance Survey Maps and information on these workings is often not available. Therefore, if coal seams were accessible then there is the potential that they could have been worked by formal or informal means.
- 4.5 It is also possible that if unrecorded workings are present then unrecorded mine entries may be present.

Coal Mining Risks

- 4.6 The risks associated with coal mining are as follows:
- Collapse of relict workings beneath buildings causing damage to the building fabric and infrastructure.
 - Migration of mine gases from old mine workings and mine entries resulting in accumulation of flammable and asphyxiating gases in confined areas.
 - Consolidation of relict workings and overlying strata causing structural defects in building fabric and infrastructure.
 - Failure of mine entries causing loss of ground beneath building and external areas.
 - Spontaneous combustion of old mine workings.

Conclusions

- 4.7 The client wishes to apply for a change of use for the site, converting a stable block to an office and gym with a partial basement.
- 4.8 The site lies within a Coal Authority Development High Risk Area and indicates that there are probable shallow workings beneath the site
- 4.9 The site is mapped as being underlain by glacial till covering the Lower Pennine Coal Measures and the Coal Authority report indicates that there is a northwest-southeast trending fault running through the site. The Cannel Coal Seam which outcrops to the southeast and northwest of the site has been faulted out although may occur at depth.
- 4.10 The Coal Authority does not have records of mining beneath the site.
- 4.11 There is no evidence from historical maps of mining activity in the immediate area of the site.
- 4.12 The closest mine shaft is further than 100m from the site and therefore not considered a risk.

Proposed Mitigation Strategy

- 4.13 Evidence suggests that it is highly unlikely that the Cannel coal seam has been worked beneath the site due to the faulting, the superficial overburden, the dip of the seam and lack of mining features on historical OS maps. Therefore, it is concluded that no further action is required.
- 4.14 However, should any evidence of historical workings be uncovered during the excavation of the foundations or basement, work should cease until a professional evaluation has taken place.
- 4.15 This report should allow for planning permission to be granted with relevant conditions.

APPENDIX 1

COAL AUTHORITY MINING REPORT

APPENDIX 2

REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd based on a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

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The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

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Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.