

Proposed Temporary Modular School Whittaker Street, Radcliffe

Desk Based Coal Mining Risk Assessment

Job Number: LKC241673

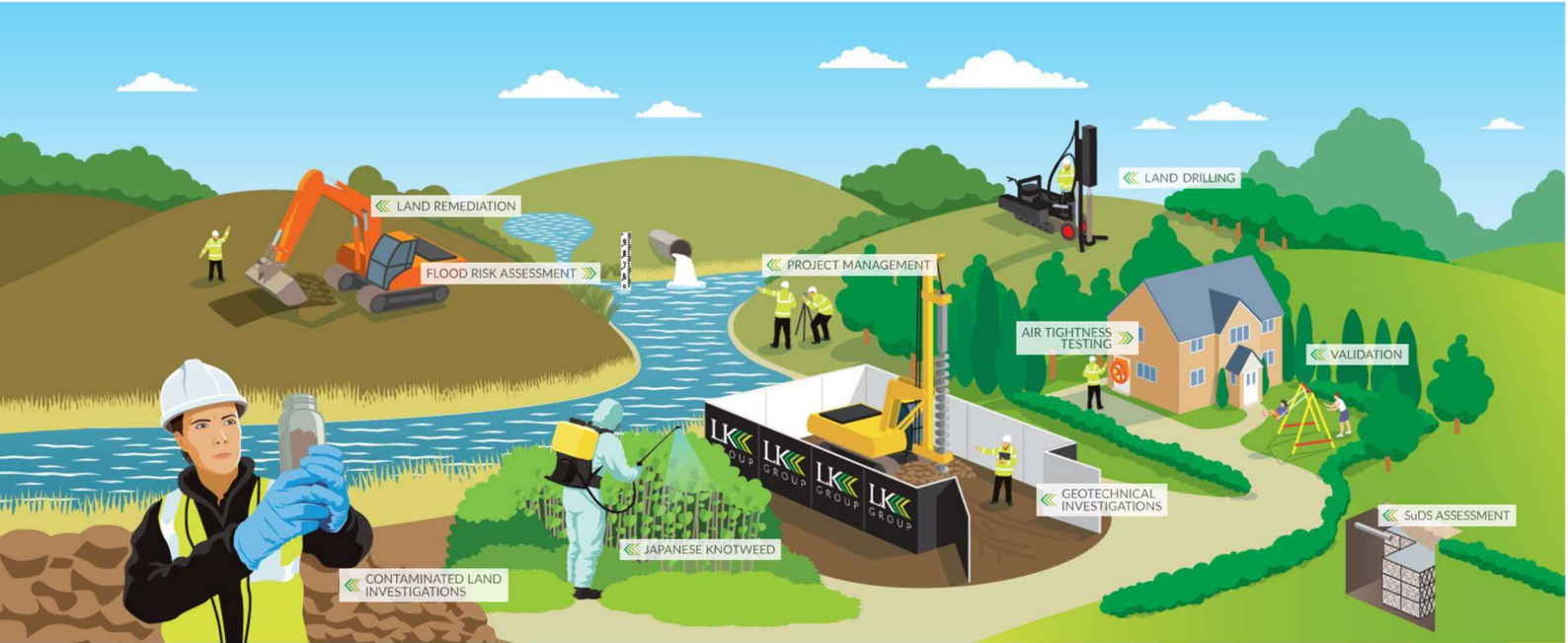
Date: January 2025

Client: Bury Council



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It should be noted this report pertains solely to potential ground stability issues relating to potential shallow mining within the proposed planning boundary only.

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1. Introduction

LK Consult Ltd (LKC) has been commissioned to carry out a Desk Based Coal Mining Risk Assessment (CMRA) for Whittaker Street, Radcliffe.

A Coal Mining Risk Assessment Report is required for a planning application within a designated 'Coal Mining Development High Risk Area'. Depending on the nature of the development or the type of applicant exemptions for a CMRA do apply¹; however, these would be advised by the Local Planning Authority (LPA).

The planning application (ref. 71228) is partially titled "...a temporary (4 year period) modular school to accommodate approx. 50 pupils..." and the exemptions section of the .gov.uk website states:

"Applications relating to modular buildings which are proposed to be regularly or permanently occupied, such as classrooms, offices and hospital buildings, may need to be supported by a CMRA, but this should be proportionate to the nature of the development proposed and at the discretion of the case officer."

At this stage LKC are not aware if the LPA have considered the above note in relation to the proposed development and its temporary nature; therefore a CMRA has been produced.

'Coal Mining Development High Risk Areas' are areas, based upon Coal Authority records, where the potential land instability and other safety risks associated with former coal mining activities are likely to be greatest. They include, for example, areas of known or suspected shallow coal mining, recorded mine entries and areas of former surface mining.

This assessment is based upon guidance provided by the Coal Authority² and comprises a review of available desk-based information.

The scope of this Coal Mining Risk Assessment (as per Coal Authority guidance) is to:

- Present a desk-based review of all available information on the coal mining issues which are relevant to the application site.
- Use the above 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 regarding development on unstable land.

A summary of the site details is presented in Table 1-1. Site plans are provided in Appendix A.

Location	East of Whittaker Street, Radcliffe. Centred at National Grid Reference 378472E 407494N.
Topography	c. 77m AOD. Site is approximately level.
Current Site Use	Retained car park and recently demolished council offices.
Proposed Development	Temporary (c. 4 years) modular school with playground, parking and boundary treatments.

Table 1-1: Summary of site details.

2. Review of Information

2.1. Information Sources

LKC have obtained and reviewed information from the following sources:

- Review of Published BGS Geological Mapping including:
 - Lancashire Sheet 95, Published 1862, Scale 1:10,560.
 - Lancashire Sheet 95NE, Published 1929, Scale 1:10,560.
 - Hand annotated Sheet SD70NE, undated but OS backcloth dated 1970.
 - Sheet 85 Manchester Solid, Published 1975, Scale 1:50,000.
 - Sheet 85 Manchester Solid, Published 2010, Scale 1:50,000.
- The Geology of Manchester and the South-east Lancashire coalfield, Memoir Sheet 85, Published 1931.
- Geology of the Manchester district, a brief explanation of the geological map Sheet 85 Manchester, Published 2012.
- Coal Authority Consultants Coal Mining Report (Appendix B).
- Coal Authority Interactive Map Viewer³.
- Coal Authority List of Combustible Coal Seams⁴.
- Historical mapping held in LKC archives from previous investigations in the site area.
- Site investigation information from previous investigations in the site area carried out by LKC and from third parties available on Bury Council planning public access⁵.
- On-site testing (Appendix C).
- Other documentary information.

Pertinent information is summarised in the following sections:

2.2. Geological Mapping

2.2.1. Superficial

The superficial geology is mapped as Devensian Till (Diamicton).

2.2.2. Bedrock

The bedrock is mapped as the Pennine Middle Coal Measures Formation. The strata in the general area dips to the south east at 1 in 6 (equivalent to 9.5°).

A coal seam is shown to subcrop (at rockhead) c. 5m north of the planning boundary on the 1929 1:10,560 scale mapping and is identified as the Stonedolph Mine. This seam is not mapped on the 1975 1:50,000 scale mapping. Other coal seams in the area comprise the Top Five Quarters Mine c. 180m northwest and the Ashclough Mine c. 120m south east.

A fault runs through western part of the site, orientated north-west to south-east. The coal seams in the area curtail at the fault.

Considering the proposed development plan (Appendix A) and a dip of 9.5° the Stonedolph Mine may be c. 1.67m below rockhead in northern part of the modular building footprint and c. 6.35m below rockhead in the southern part of the building footprint.

The above seams and faults are illustrated on Plate 2-1.

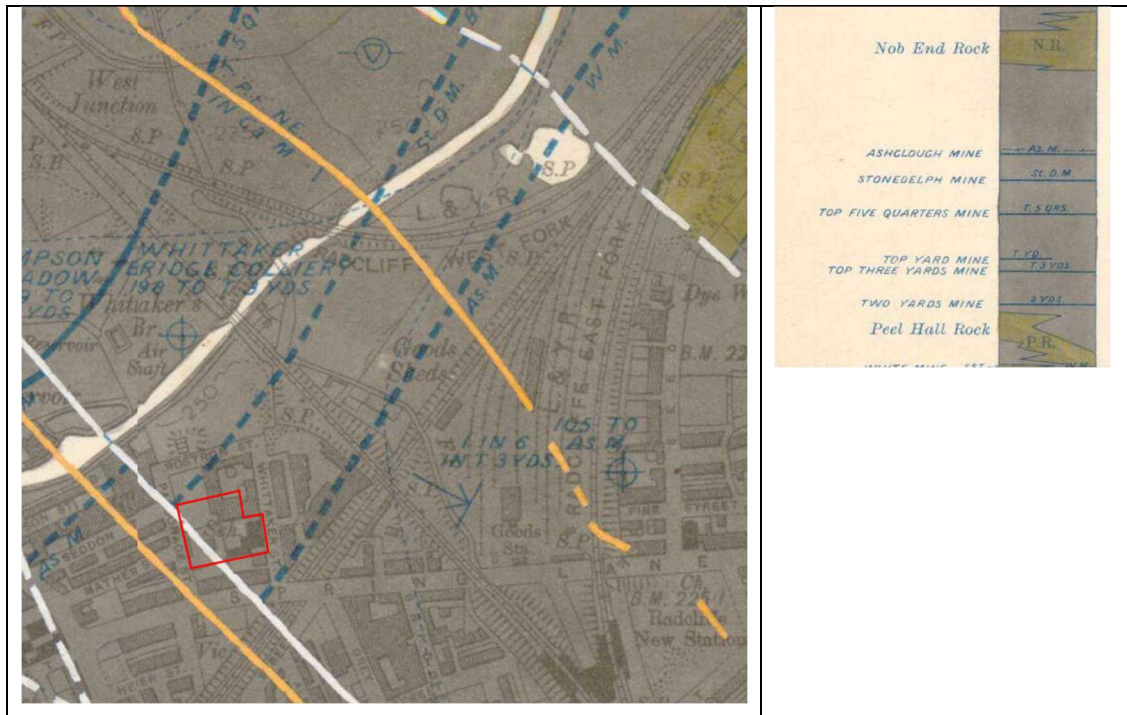


Plate 2-1: Extract from 1929 Lancashire Sheet 95NE (map and generalised vertical section extracts, both not to scale).

It should be noted that coal seams are known by various names and this can be seen on Plate 2-2. The Stonedelf Mine is also known as the Ince New Coal.

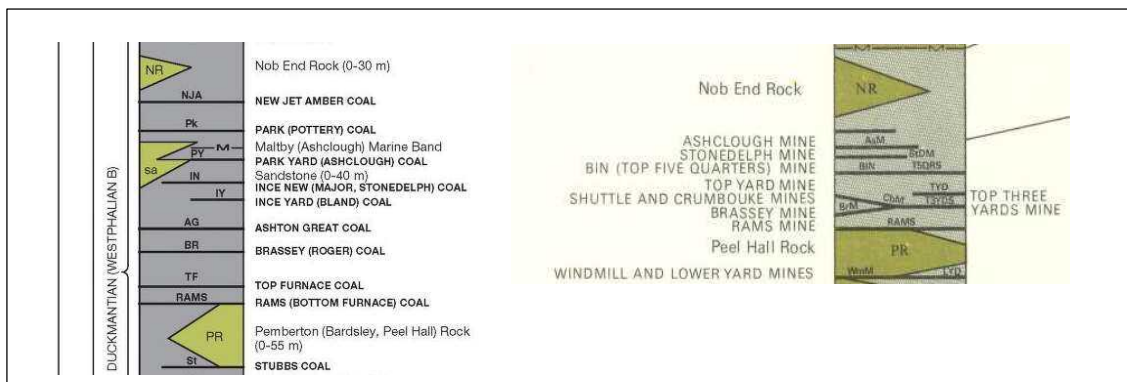


Plate 2-2: Extract of the generalised vertical section from Sheet 85 dated 2010 (left) and dated 1975 (right). Not to scale.

Sheet 85 explanatory notes provide additional information on the coal seams within the Manchester Area (see Plate 2-3). It indicates the Stonedelf Mine / Ince New Coal seam may be 0.8-1.1m thick and deep mined.

Pennine Middle Coal Measures Formation			
Worsley Four Feet	W4	0.2-1.3	Deep mined
Parker	Pr	0.5-0.9	Deep mined
Radley	Ra	0.2	Not worked
Cannel	Can	0.2	Not worked
New Jet Amber	NJA	0.6	Deep mined
Riding	Rd	0.8	Not worked
Park (Pottery)	Pk	0.4-1.4	Deep mined
Park Yard (Ashclough)	PY	0.0-0.3	Not worked
Ince New (Major, Stonedelph)	IN	0.8-1.1	Deep mined
Ince Yard (Bland, Bin, Binn)	IY	0.6-1.3	Deep mined and surface mined (opencast)
Crumbouke (Colonel)	Cb	0.8-1.5	Deep mined and surface mined (opencast)
Ashton Great	AG	0.0-2.2	Deep mined
Brassey (Roger)	BR	0.3-1.2	Deep mined
Top Furnace	TF	0.2-0.7	Deep mined
Rams Coal (Bottom Furnace)	Rams	0.8-2.4	Deep mined and surface mined (opencast)
Stubbs	St	0.0-0.4	Not worked
Fairbottom (Bargan)	F	0.3-0.7	Deep mined and surface mined (opencast)

Coal seams anticipated below the site

Plate 2-3: Extract from the Geology of Manchester district explanatory notes (2012).

The explanation of Sheet 85 (1931) notes:

“The Bin Mine is the Top Five Quarters of the area between Radcliffe and Farnworth. In this area two coals above the Bin have been named – the Stonedelph and the Ashclough – but appear to be of little or no economic value and they cannot be traced any great distance into the western part of the area”.

2.3. Coal Authority Consultants Coal Mining Report

The consultants coal mining report is summarised in Table 2-1.

Mining Activity and Geology	
Past underground mining	Roger Mine at 66m and 107m depth and RAMS mine at 98m depth.
Probable unrecorded shallow workings	Yes.
Spine roadways at shallow depth	No spine roadway recorded at shallow depth.
Mine entries (within 100m)	None recorded within 100m of the enquiry boundary.
Outcrops	Ince New, 6.1m north, workable thickness, outcrop bearing of 39 degrees.
Geological faults, fissures and breaklines	Fault under or close to the property recorded.
Opencast mines	None recorded within 500m of the enquiry boundary.
Coal Authority managed tips	None recorded within 500m of the enquiry boundary.
Investigative or Remedial Activity	
Site investigations	None recorded within 50m of the enquiry boundary.
Remediated sites	None recorded within 50m of the enquiry boundary.
Coal mining subsidence	Not received a damage notice or claim for the subject property, or any property within 50m, since 1994. No current Stop Notice delaying remedial works or repairs to property. Not aware of any request made to carry out preventative works before coal is worked.
Mine gas	None recorded within 500m of the enquiry boundary.
Mine water treatment schemes	None recorded within 500m of the enquiry boundary.
Licensing and Future Mining Activity	
Future underground mining	None recorded.
Coal mining licensing	None recorded within 200m of the enquiry boundary.
Court Orders	None recorded.

Section 46 notices	No notices have been given, stating that the land is at risk of subsidence.
Withdrawal of support notices	Not in an area where a notice to withdraw support has been given or where a notice has been given cancelling the entitlement to withdraw support.
Payments to owners of former copyhold land	Not in an area where a relevant notice has been published.
Further Information	
The following further information is provided: Future Development. Mine Gas. Development Advice.	

Table 2-1: Summary of Coal Authority Consultants Coal Mining Report.

Data definitions are provided for the above items:

Past underground mining is defined by the Coal Authority as *'details of all recorded underground mining relative to the enquiry boundary. Only 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 are defined as *'areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30m deep)'*.

Coal outcrops are defined by the Coal Authority as *'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 50m 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.'*

Plate 2-4 shows an extract of the plan provided with the Coal Authority Consultants Coal Mining Report which illustrates the location of the Ince New Coal seam outcrop and the fault.

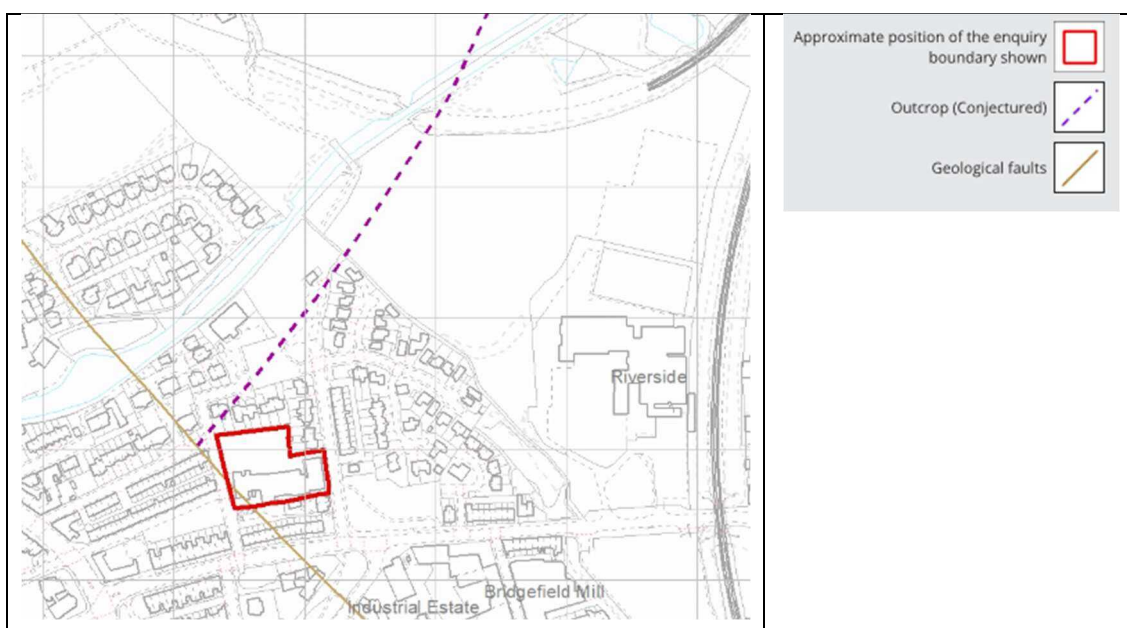


Plate 2-4: Extract from Coal Authority Consultants Coal Mining Report.

2.4. Coal Authority Interactive Mapping

Plate 2-5 shows the development high risk areas, coal outcrops, areas of probable workings and coal seams as published on 1:50,000 scale mapping.

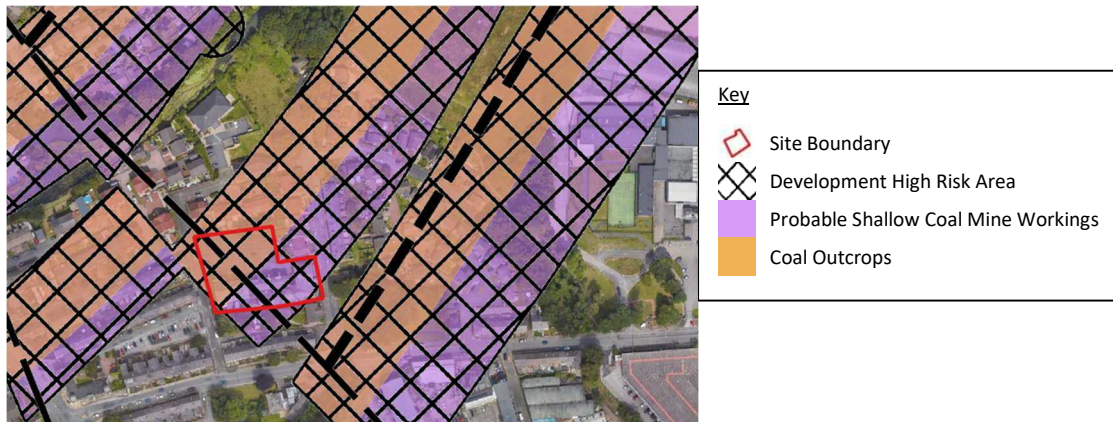


Plate 2-5: Development High Risk Area.

The coal seams are shown as thick dashed lines. LKC note that the Ashclough seam to the south is shown, whereas the Ince New Coal which sub crops adjacent north of the site is not shown. The fault is illustrated through the western part of the site.

All of the development site is within a Development High Risk Area.

2.5. Combustible Coal Seams

Some coal seams have been known to suffer from occurrences of spontaneous combustion and are consequently regarded as at 'high risk' of succumbing to spontaneous combustion when being entered, worked, or disturbed. The Coal Authority have produced a list of seams for different areas of the UK.

None of the coal seams listed are expected at shallow depth below the site. However, if roof coal has been left, this could also pose a risk.

2.6. Historical Mapping

The southern part of the site has recently been cleared of the former council office buildings. Previously these buildings were used as a school and a technical college.

The north eastern quadrant of the site has variously been used as a council yard, fire station, a public baths and an unreferenced building. The north west quadrant has been used as a cleansing depot with boundary small buildings. This area was cleared between 1972 and 1984 mapping and since used as a car park for the council offices.

There are no coal mining features on historical mapping pertaining to site itself or adjacent north where the Stonedolph Mine is indicates to subcrop.

2.7. Site Investigation

Intrusive works in the general area and to the east towards Bury Road and Radcliffe Road show firm to stiff glacial clay deposits to c. 14-18mbgl. Further south into Radcliffe centre and further west towards Black Lane, LKC have encountered rockhead around 8-12mbgl.

A ground investigation has been carried out c. 200m north east of the site, which is along strike, within the same succession of the identified coal seams (planning approval ref. 70071) and within the same fault block. LiDAR notes ground levels are c. 2m lower than the study site. The co-ordinates from the rotary borehole logs have been plotted in GIS and are illustrated on Plate 2-6 alongside the study site boundary and the inferred position of the Ashclough mine seam.

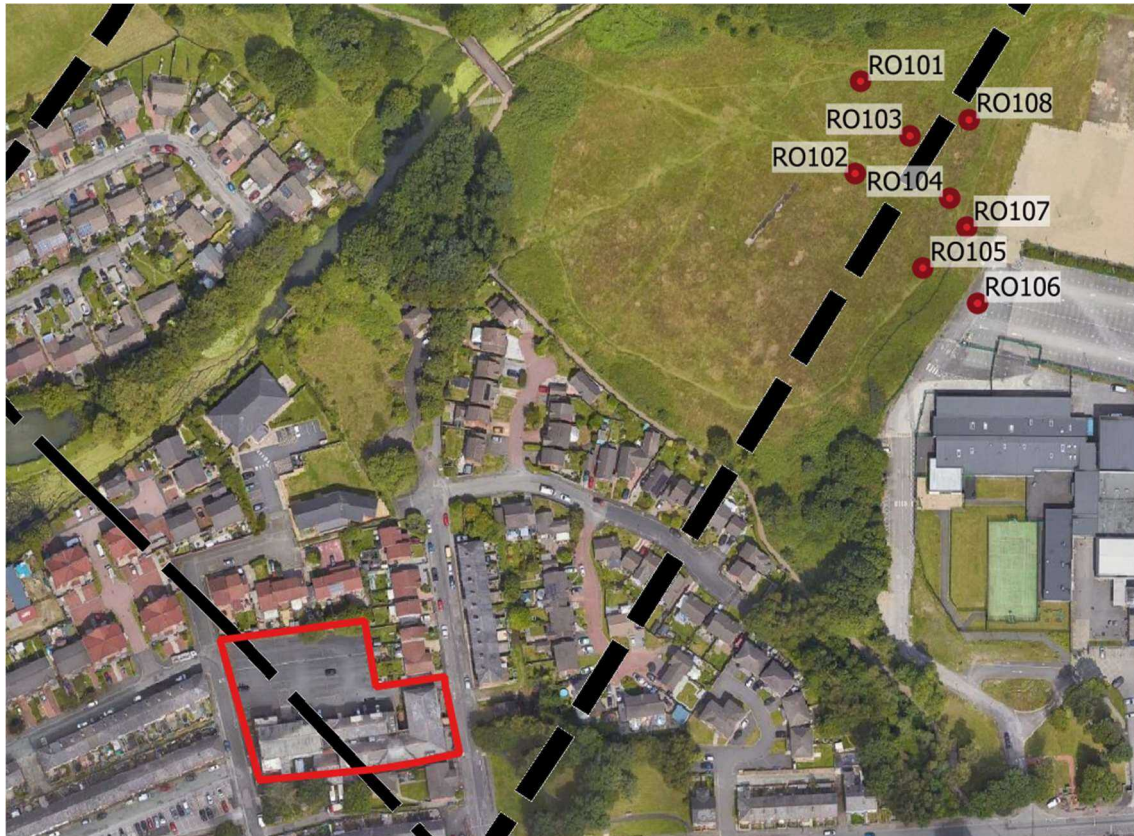


Plate 2-6: Nearby Rotary Boreholes and Coal Seams.

The location of the boreholes indicates that R0101-R0103 are to the west of the inferred subcrop of the Ashclough seam and considering the 1:10,000 scale mapping these should encounter the Ince New coal (present adjacent on the northern study site boundary) only at c. 13.9-17.5m below rockhead (based upon on the location of subcrops on the published mapping and a dip of 9.5°). Boreholes R0104-R0108 are down dip of the inferred Ashclough seam subcrop position so may encounter both coal seams (depending on final drilling depth).

A summary of the ground conditions and coal seams encountered in the ground investigation report is provided in Table 2-2.

BH	Depth to Rockhead	Possible Ince New Coal	Possible Ashclough Coal
RO101	20.50 (54.52)	40.50-40.70 (34.52-34.32)	
RO102	14.00 (60.66)	17.80-18.00 (56.86-56.66)**	
RO103	17.20 (57.12)	35.90-36.20 (38.42-38.12)	
RO104	16.70 (57.21)	37.50-37.80 (36.41-36.11)	
RO105	11.80 (61.72)	35.80-36.10 (37.72-37.42)	21.80-22.10 (51.72-51.42)
RO106	11.20 (59.86)	39.50-39.80 (31.56-31.26)	25.50-25.80 (45.56-45.26)
RO107	16.30 (57.42)	40.50-40.80 (33.22-32.92)	22.60-22.80 (51.12-50.92) 25.70-25.90 (48.02-47.82)
RO108	19.20 (54.96)		25.50-25.70 (48.66-48.46) 27.50-27.70 (46.66-46.46)

Table 2-1: Depth to Rockhead and Coal Seams.

Depths in metres below ground level and metres above Ordnance Datum (given in brackets).

** The depth may not be reflective of the Ince New Coal and may have been incorrectly logged or represent a discrete lens of coal.

Notwithstanding that open hole rotary boreholes are logged by the drilling foreman based upon flush returns and factors such as rate of drilling, rather than geological examination of undisturbed soil and rock arisings, LKC note that the Ince New and Ashclough seams appear to be relatively thin – i.e. 20-30cm. Only the Ashclough seam was encountered as two leaves c.f. Section 2.9.

Rockhead is present at 54-61mAOD.

2.8. On-site Testing

The development proposal comprises modular buildings with the intention to place the jacks on plates or small slabs directly onto the existing surface. Plate Load Testing has been carried out in 12no. locations and the report is provided in Appendix C. Many of the tests are 10% or above equivalent CBR; with the exception of location 5 (1.1%) on the western boundary and locations 8 (7.2%), 10 (5%), 11 (7.5%) and 12 (6.1%) which are located on the southern building run. LKC recommend that the engineer considers this in the foundation assessment.

2.9. Other Documentary Information

Hayes (2004) discusses the seams mentioned in this report:

“In the Radcliffe area, the Ince New coal seam occurs in two parts – an upper coal (0.46m thick) separated from the lower coal (0.46m thick) by a 0.76m thick fireclay horizon. The lower coal also has a dirt parting (0.025- 0.23m thick). The Ashclough coal seam also occurs as two leaves of coal – a top coal (0.84m thick) and a bottom coal (0.71m thick) separated by a dirt parting (0.46-0.91m thick).”

2.10. Summary Conclusions

Based upon the above LKC conclude the following:

- The site may be underlain by greater than 10m of superficial deposits. Therefore bell pits are considered to be unlikely.
- The Stonedelf Mine / Ince New coal seam may be less than 30cm thick. Therefore this may not be of workable thickness.
- The memoir / explanation notes that *“the Stonedelf and the Ashclough – appear to be of little or no economic value and they cannot be traced any great distance into the western part of the area”*. Therefore the seams may not be worked in the site vicinity.

3. Coal Mining Risk Assessment

Table 3-1 below summarises the potential risks associated with coal mining legacy for the proposed development site.

Coal Mining Issue	Potential Risk	Risk Assessment
Underground coal mining (recorded at shallow depths)	X	No recorded shallow underground workings below the site. The shallowest workings recorded are at 66m depth and these are not considered to pose a risk of ground instability at the site surface. No further assessment required.
Underground coal mining (probable at shallow depths)	X	Probable underground shallow workings are noted by the Coal Authority. However, LKC consider this does not pose an unacceptable risk to the proposed development due to the following: • Probable thin seam, or little or no economic value in the Radcliffe area. • Fault on site would curtail / terminate the seam. • Greater than 10m of superficial deposits – bell pits and open cast unlikely. • There are no inground foundations proposed and no groundworks proposed. The development is also temporary (4 years duration).
Mine entries (shafts / adits)	?	No recorded mine entries within influencing distance of the site. However, there is also a risk of unrecorded mine entries as the site is within a coal mining area. No specific investigation work is advised. However, a watching brief should be undertaken during any intrusive investigation work and groundworks to check for any signs of unrecorded mine entries.
Coal mining geology (geological faults, fissures and breaklines)	X	Fault present below the site, which could ordinarily contribute to surface subsidence damage because of underground coal mining. However, the nature of the proposed development this is not considered significant.
Record of past mine gas emissions	X	Although a shallow seam may be present which has the potential to be a source of ground gas, LKC note the development has no inground footings and there is a clear passively ventilated area between the site surface and the base of the modular buildings. Therefore there is no viable migration pathway for gas to accumulate in confined spaces posing a risk to site users and buildings.
Recorded coal mining surface hazard	X	No recorded coal mining surface hazard.
Surface mining (opencast workings)	X	No recorded surface mining (opencast workings).

Table 3-1: Potential Coal Mining Risks.

Notes:

✓ = Risk identified, X = No risk identified, ? = Possible risk identified.

4. Conclusions and Recommendations

4.1. Summary

Based upon the available information and considering the specifics of the proposed development (modular buildings and temporary development), LKC has not identified any viable shallow coal mining risks which would warrant further intrusive investigation or specific remediation.

4.2. Watching Brief

A watching brief is recommended for this site to cover the period in which any earthworks, reduce level dig or excavation works for services are being undertaken. Particular care should be taken to identify any potential features which may indicate the presence of shallow coal mining hazards.

Such hazards may include, but not limited to, features such as unexplained depressions or voids, outcropping coal seams, localised areas of deep made ground (which could represent backfilled areas of coal mining related ground subsidence, crown holes or mine entries), or unexpected man-made items at depth (e.g., brickwork, concrete, timber, or steelwork).

Mine entries may manifest during excavation works as circular, square, or rectangular areas of deep Made Ground (typically several metres in size) set against the natural strata (e.g., Glacial Till or weathered rock). Mine shafts may also be covered with a large, thick concrete cap.

4.3. Mitigation Measures

The structural engineer should make recourse to the available information in this report and the plate load tests and specify suitable spreader plates / pads for the modular building jacks.

During the temporary use of the buildings the site manager should carry out regular inspections for potential differential settlement or excess / unacceptable movement during the use of the buildings. This may be part of the routine inspection and maintenance of the site and LKC would expect any such occurrence to be readily visible at joints and sections in the modular buildings. If such movement occurs then it may require intrusive investigation to identify if it is related to mining or the nature of / compaction of the sub base below the site surface.

4.4. Conclusions and Safe Development

LKC consider that the site does not warrant further investigation or remedial works and may be safely developed subject to the structural engineer specifying appropriate spreader plates / foundations (based upon the plate load test results).

LKC also consider that given the type of the development and its temporary lifespan (4 years) then the development may meet the requirements to be exempt from a coal mining risk assessment.

As a conservative measure regular inspections for any unacceptable levels of settlement should be carried out. Any such settlement may require further investigation to ascertain if it is mining related.

However, LKC consider the proposed development, by means of its inherent construction and foundation design would be safe and stable and would meet the requirements of national planning policy with regard to development on unstable land.

Appendix A – Site Plans



Client: Bury Council				Title: Site Location & Boundary Plan			
Site: Wittaker Street, Radcliffe				Scale (see scale bar): 1:25,000 & 1:1250 @ A4			
Job No.: LKC241673	Drawn By: CC	Checked By: CB	Drawn: Jan 2025	Figure: 1	Revision:		



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Scale Bar (m)
 0 1 2 4 8
 N
 Total area: 754m²
 Total Cabins: 26 (29m² per cabin)

- Area of Work
- Staff (4 cabins)
- Gym & Sports (3 cabins)
- General Classroom (5 cabins)
- Hospitality (3 cabins)
- Hair, Beauty and Barbering (3 cabins)
- Construction (3 cabins)
- Dining Space & Prep Kitchen (5 cabins)
- Substation
- Circulation
- Football Pitch
- Bin Store
- M&E
- Enhanced Landscaping (Laurel)
- Outdoor Recreational Space
- Covered Area
- Car Park
- Staff and Pupil Entrance
- Pedestrian and Vehicle Entrance
- External Signage (Refer to 3002 - Modular Build Scoping Drawing -1)

P3	Layout Amendment	HKL	DRO	03/09/24
P2	Amendment for planning application	HKL	DRO	17/06/24
P1	First Issue	HKL	DRO	10/06/24
Rev	Description	Drawn	Checked	Date
Substability Work in Progress				
Project Bury Council Whitefield Centre Whittaker Street Offices, Radcliffe, M26 2DT				
Drawing Proposed Site Plan - Option 17				

Drawing Number	Originator	Zone	Level	Type	Role	Number
Project ID	RYD	00	ZZ	DR	A	0409
Project Number	11348-02	As	SO	SO	Revision	P3
Indicated						