

Warth Business Park, Radcliffe

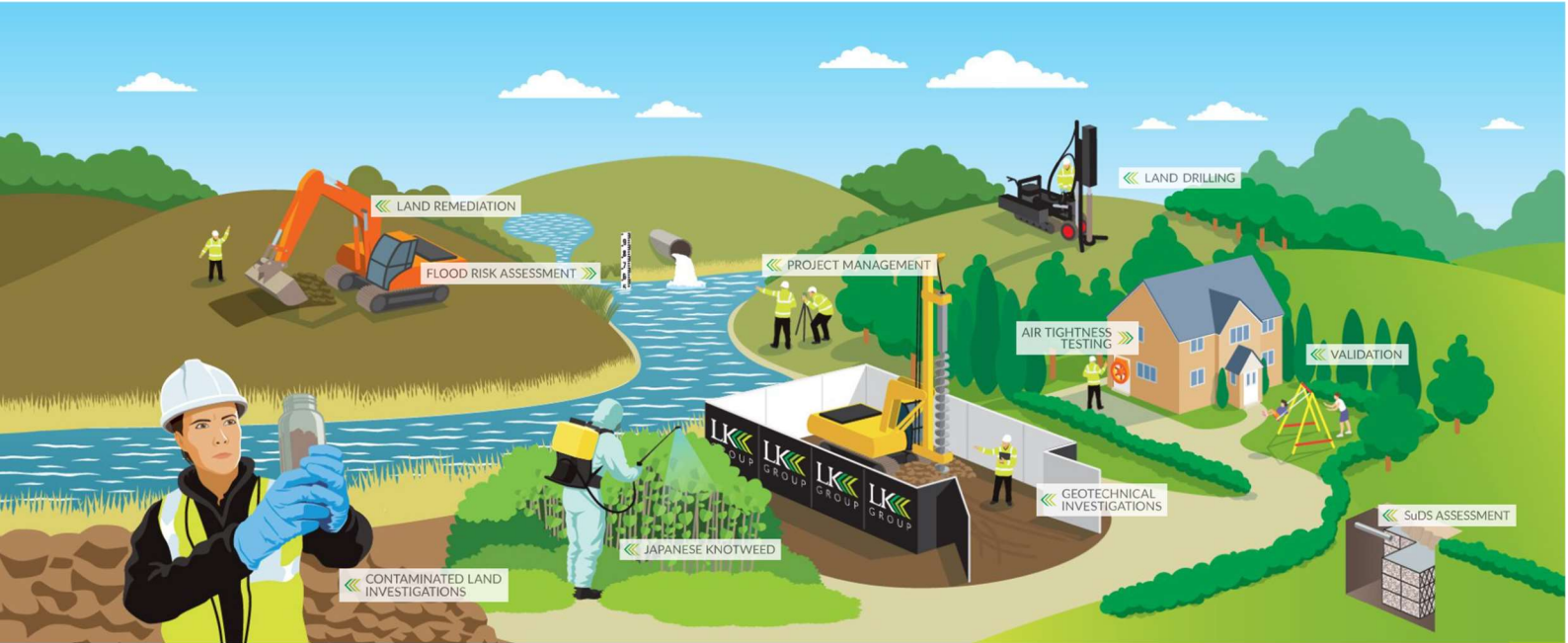
Desk Based Coal Mining Risk Assessment

Job Number: LKC241231
Date: July 2024
Client: GFIC Properties Ltd



INCREASING LAND VALUE

LK
GROUP



We advise and partner with our clients to design and deliver cost-effective consultancy, contracting and project management that enhances our environment and our communities.

Ground Investigation | Land Remediation | Project Management

L
K
»
»
»
»

CONSULT

» Eton Business Park, Eton Hill Rd, Radcliffe, Greater Manchester M26 2ZS
 » 0161 763 7200 » info@thelkgroup.com » www.thelkgroup.com

Company registered in England and Wales No. 06767704

DOCUMENT QUALITY ASSURANCE

Site Address	Warth Business Park, Warth Road, Bury, BL9 9NB
Report Title	Desk Based Coal Mining Risk Assessment
Job Number	LKC241231
Client	GFIC Properties Ltd

Revision	0	Date of Issue	17/07/2023
Document Ref:	LKC241231-A2-CMRA-Warth Business Park, Radcliffe R0		
Status	Final.		
Written By	Alex Evans		
Approved By	Hannah Moss / Catherine Baranek		

DISCLAIMER

This report has been prepared by LK Consult Ltd (LKC) who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant, experienced in preparing reports of a similar scope.

However, to the extent that the report is based or relies upon information contained in records, reports or other materials provided to LKC, which have not been independently produced or verified, LKC gives no warranty, representation, or assurance as to the accuracy or completeness of such information.

This report is prepared solely for the benefit of the client named above. It may not be relied upon by or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance, and regulatory approval until all invoices have been settled in full.

Those using this information in subsequent assessments or evaluations do so at their own risk.

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

TABLE OF CONTENTS

1.	Introduction	1
2.	Review of Information.....	2
2.1.	Information Sources.....	2
2.2.	Geological Mapping	2
2.3.	Coal Authority Consultants Coal Mining Report.....	4
2.4.	Coal Authority Interactive Mapping.....	6
2.5.	Combustible Coal Seams.....	7
2.6.	Historical BGS Logs.....	8
2.7.	Historical Mapping	8
3.	Mine Shaft Assessment.....	9
4.	Coal Mining Risk Assessment.....	10
5.	Conclusions and Recommendations	11
5.1.	Summary	11
5.2.	Site Investigation Recommendations.....	11
5.3.	Watching Brief.....	12
5.4.	Mitigation Measures	12
5.5.	Conclusions and Safe Development.....	12

FIGURES

Figure 1 – Site Location and Boundary Plan

APPENDICES

Appendix A – Geological Mapping

Appendix B – Coal Authority Consultants Report

Appendix C – BGS Borehole Data

Appendix D – Historical Mapping

Appendix E – Policy for Building Over or Within the Influencing Distance of a Mine Entry

Appendix F – References

1. Introduction

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

A Coal Mining Risk Assessment Report is required for a planning application within a designated 'Coal Mining Development High Risk Area'. '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 Authority¹ 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. Figure 1 indicates the site location and boundary plan.

Location	North of River Irwell, south of Warth Road and west of Radcliffe Road. Centred at National Grid Reference 379580E 409170N.
Area	5.71Ha.
Topography	73 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Industrial Park.
Proposed Development	The proposed development is unknown at this stage. It is assumed that the site will remain as industrial / commercial use.

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, which is summarised in Section 2:

- Review of Published BGS Geological Mapping including:
 - Sheet Lancashire Sheet 87 SE, Published 1929, Scale 1:10,560.
 - Sheet 85 Manchester Solid, Published 1975, Scale 1:50,000.
 - Digital Geology, dated 2007, Scale 1:10,000 (Appendix A).
 - Sheet 85 Manchester Bedrock, Published 2010, Scale 1:50,000.
- Geology of the Manchester district, a brief explanation of the geological map Sheet 85 Manchester.
- Coal Authority Consultants Coal Mining Report (Appendix B).
- Coal Authority Interactive Map Viewer².
- Coal Authority List of Combustible Coal Seams³.
- Historical BGS boreholes within the site vicinity⁴ (Appendix C).
- Envirocheck historical mapping (Appendix D).

2.2. Geological Mapping

2.2.1. Artificial

No BGS recorded artificial deposits are recorded on site. 1:10,000 scale digital mapping shows Made Ground (Undivided) immediately adjacent to the western site boundary.

2.2.2. Superficial

The superficial geology is mapped as Alluvium (Clay, Silt, Sand and Gravel).

2.2.3. Bedrock

The bedrock is mapped as the Pennine Lower Coal Measures Formation (Mudstone, Siltstone and Sandstone). The strata in the general area dips to the south-west between 9° and 11°.

A coal seam is shown to subcrop (at rockhead) onsite in the south-west. This coal seam is labelled as the Hell Hole Mine on 1975 edition 1:50,000 scale mapping, and on 1929 1:10,560 mapping. This is an alternative name for the Wigan Four Feet coal seam.

A coal seam is shown to subcrop (at rockhead) approximately 215m to the north-east of site. This seam is anticipated to be the Trencherbone (Oldham Great) seam based on 2010 edition 1:50,000 scale mapping.

Assuming a dip of between 9-11° to the south-west, the seam is expected at a depth of 33-41m below rockhead beneath the north of site and 66-81m below rockhead in the south of site.

Extracts from geological mapping (1975 and 2010 sheet 85) are shown on Plate 2-1.

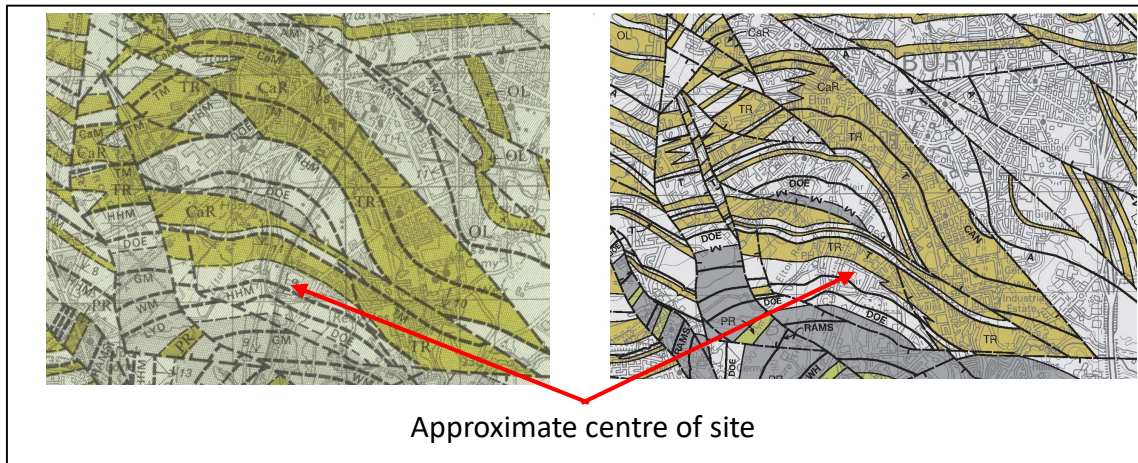


Plate 2-1: Extracts from geological mapping. Left: 1975 1:50,000 sheet mapping, right: 2010 1:50,000 sheet mapping. Not to scale.

Plate 2-2 shows an extract of the generalized vertical sections from Sheet 85 (dated 1975 and 2010) showing the section of strata expected on and below the site.

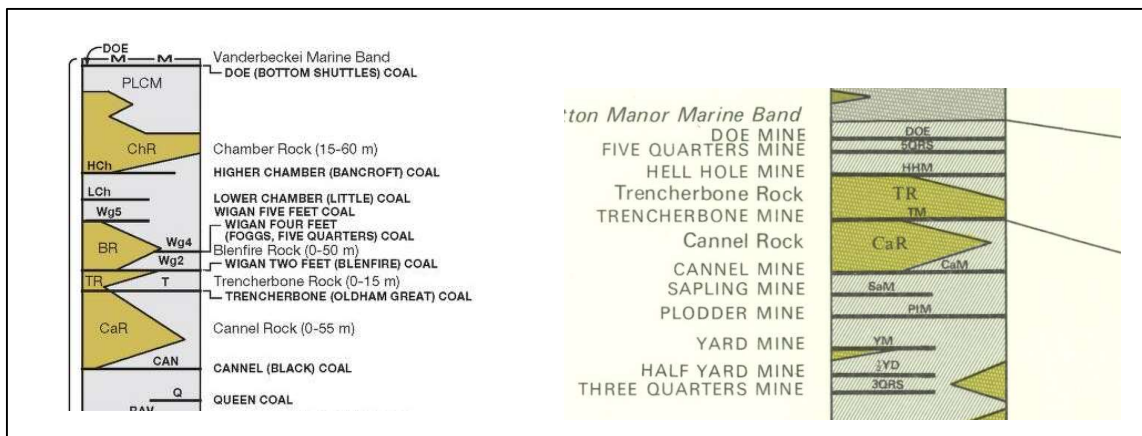


Plate 2-2: Extract of the generalized vertical section from Sheet 85 dated 2010 (left) and dated 1975 (right). Not to scale.

Sheet 85 explanatory notes provide additional information on the coal seams within the Manchester Area.

An extract showing a section from the top of the Lower Coal Measures is provided in Plate 2-3. The shallowest coal seam in the southwest of the site is anticipated to be the Wigan Four Feet (Foggs, Five Quarters) with the coal seams below this in age order. It should be noted that not all coal seams may be present below the site due to geological variation.

Pennine Lower Coal Measures Formation				
Doe (Hathershaw, Bottom Shuttles)	Ha	0.0–0.2	Not worked	
Higher Chamber (Bancroft)	HCh	0.0–0.3		
Lower Chamber (Little)	LCh	0.0–0.4	Not worked	
Wigan Five Feet	Wg5	0.1–0.6	Deep mined	
Wigan Four Feet (Foggs, Five Quarters)	Wg4	0.1–1.3	Deep mined and surface mined (opencast)	
Wigan Two Feet (Blenfire, Lower Victoria)	Wg2	0.1–0.6	Deep mined	
Trencherbone (Wigan Six Feet, Oldham Great)	T	2.0–4.8	Deep mined; surface mined (opencast)	Coal seams anticipated below the site
Peacock (Saltpetre, Cellar)	Pe	0.5–1.8	Not worked	
Smithy	Sy	0.0–0.2	Not worked	
Little Black (Little, Little King)	LB	0.1–0.6	Surface mined (opencast)	
Cannel (Black)	CAN	0.3–0.9	Deep mined and surface mined (opencast)	
King	K	0.0–1.3	Deep mined and surface mined (opencast)	
Queen (Foot, Sapling)	Q	0.6–1.5	Deep mined	
Ravine (Stone, Plodder)	RAV	0.9–2.5	Deep mined	

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

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	Yes: See Plate 2-4.
Probable unrecorded shallow workings	Yes.
Spine roadways at shallow depth	No spine roadway recorded at shallow depth.
Mine entries (within 100m)	Yes: See Plate 2-5. 1 shaft within 20m of site (offsite).
Abandoned mine plan catalogue numbers	NW1161, PO0, 16820, 0, 3001
Outcrops	Yes: see Plate 2-6.
Geological faults, fissures and breaklines	No faults, fissures or breaklines 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.

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

Licensing and Future Mining Activity	
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 2-2(continued): Summary of Coal Authority Consultants Coal Mining Report.

Plate 2-4 shows the past underground mining. This 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'*.

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	CANNEL	Coal	3Y5P	112	Beneath Property	9.5	South	130	1894
unnamed	CANNEL	Coal	3XN8	115	Beneath Property	9.5	South	130	1894

Plate 2-4: Extract from Coal Authority Report showing past underground mining.

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)'*.

Plate 2-5 shows the mine entries within 100m of the site boundary.

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	379409-003	379459 409257	This shaft has been filled. The fill material has been drilled and injected with grout and the shaft capped to National Coal Board specifications by British Rail in 1975.	Coal	

Plate 2-5: Extract from Coal Authority Report showing mine entries within 100m.

Shaft reference 379409-003 is located within 10m of the site boundary (offsite).

Plate 2-6 shows the coal outcrops. This is 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.'*

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
WIGAN FOUR FEET	Coal	Yes	Within	N/A	308

Plate 2-6: Extract from Coal Authority Report showing outcrops.

Plate 2-7 shows an extract of the plan provided with the Coal Authority Consultants Coal Mining Report.

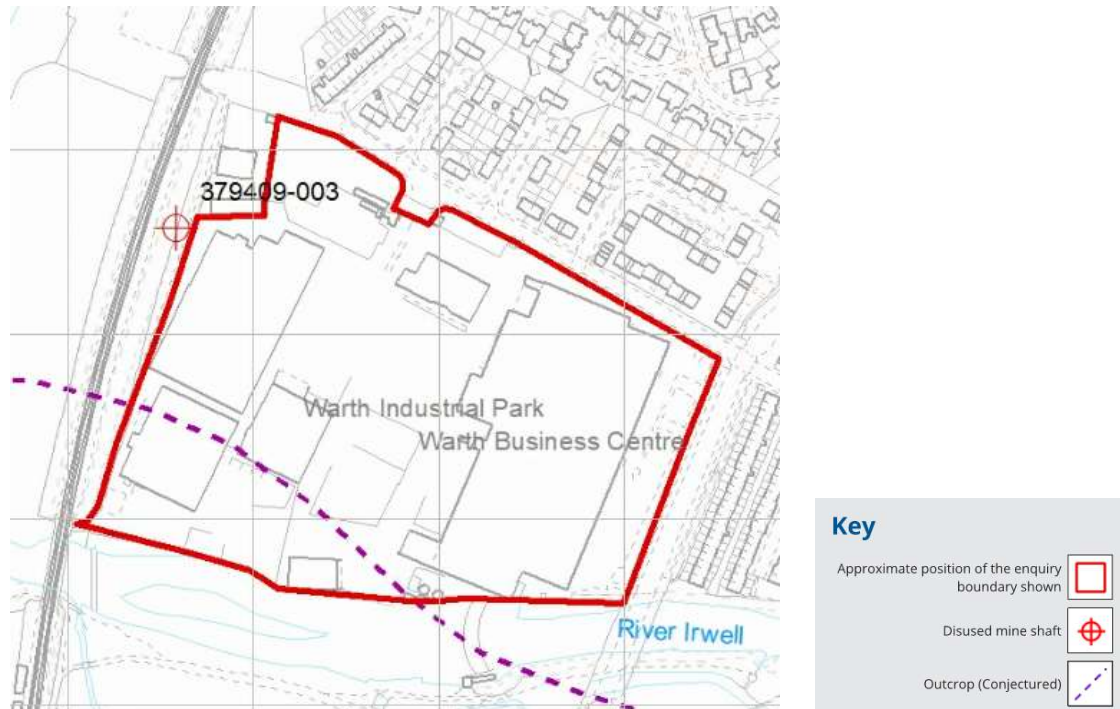


Plate 2-7: Extract from Coal Authority Consultants Coal Mining Report – Summary of Findings.

2.4. Coal Authority Interactive Mapping

Plate 2-8 shows the development high risk areas.



Plate 2-8: Development High Risk Area

Part of the north-western site boundary and the southern western areas of the site are within a Development High Risk Area, with the following features identified:

- 1no. Mine Entry with Mine Entry Potential Zones of Influence – north-western site boundary.
- Coal Outcrops – south of site.
- Probable Shallow Coal Mine Workings – south of site.

The following additional information is available on the mine shaft within influencing distance of the site (assumes distances are in metres):

Ref: 379409-003

Treated: True

Assumed shaft diameter: 2.4

Shaft Depth: 119

Date of treatment: Null

Departure: 8

Name: Bank Top Colliery Openshaw Fold Pit

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.

The list includes the Trencherbone seam (also known as the Wigan Six Feet or Oldham Great), which is anticipated at depth below the site. In addition, if roof coal is left, this could also pose a risk.

The mine entry within 10m of the site boundary could provide a preferential pathway for gas risk associated with the Trencherbone coal seam.

2.6. Historical BGS Logs

An extract from the nearest borehole log that shows depth to bedrock in the area is provided in Plate 2-9. Note that the log is in feet and inches.

Ref: SD70NE19 440m west of site:

(and any additional remarks).	Feet.	Inches.
Sand or gravel	63	-
White Earth	24	-
Warrant	5	-
Rocky Flue	27	-
Warrant	6	-
Metal or White Earth	9	-
COAL		5
Binn		2
COAL		5
Binn		4
COAL		10
Warrant	8	7
COAL	1	3
Binn		4
COAL		7

Plate 2-9: Snip of SD70NE19 (Note units in feet and inches)

Bedrock is assumed to be at approximately 20mbgl. Coal is identified at 40.84 – 40.97mbgl, 41.02 – 41.15mbgl, 41.25 – 41.50mbgl, 44.12 – 44.50mbgl, and 44.60 – 44.78mbgl.

2.7. Historical Mapping

A review of available historical mapping identified a coal pit adjacent to the north-west of site on 1850 mapping. Coal pits were also noted in the surrounding area with the closest being 140m to the west.

3. Mine Shaft Assessment

1no. mine entry is located close to the site boundary.

According to the Coal Authority information the mine entry has been treated to Coal Board specifications in 1975 (injected with grout and capped) and is in proximity to the former railway line, now Metrolink line.

The risk of collapse is considered to be low; however, development works be proposed within influencing distance of this mine entry then due consideration to potential shaft collapse should be given.

Potential collapse is influenced by the ground and can be dependent on the strength and thickness of superficial deposits, bedrock properties, connected mine entries and hydrogeology.

4. Coal Mining Risk Assessment

Table 4-1 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 112m depth (Cannel seam), 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)	✓	Probable underground shallow workings recorded by the Coal Authority within the Wigan Four Feet seam. LKC note shallow workings may be associated with the Trencherbone seam. Further coal seams may also be present. If shallow coal seams have been worked, they could pose a risk of ground instability at the site surface. Investigation work recommended and a watching brief during groundworks.
Mine entry (shaft)	?	A potential risk has been identified associated with shaft Ref: 379409-003. However, the shaft is off site and has been treated so the risk is expected to be relatively low. However further assessment is required once details of any proposed development in this area is known. Further assessment could include reviewing of stabilisation work (if available from the Coal Authority or Network Rail / Metrolink) and assessing the potential zone of influence based on depth to bedrock.
Coal mining geology (geological faults, fissures and breaklines)	X	Not recorded on Coal Authority data.
Record of past mine gas emissions	?	Not recorded on Coal Authority data. However, shallow potentially worked coal seams may be present below the site, which have the potential to be a source of ground gas. In addition, the Trencherbone seam (expected at depth below the site) has the potential to spontaneously combust when being entered, worked or disturbed. Mine gas could migrate to the site surface and accumulate in confined spaces posing a risk to site users and buildings. The adjacent mine shaft is likely to act as a pathway for gas relating to underground seams. Investigation work recommended (gas monitoring and gas risk assessment).
Recorded coal mining surface hazard	X	No recorded coal mining surface hazard.
Surface mining (opencast workings)	X	No recorded surface mining (opencast workings).

Table 4-1: Potential Coal Mining Risks.

Notes:

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

5. Conclusions and Recommendations

5.1. Summary

Based upon the available information, LKC have identified potential shallow coal mining risks which are summarised in Table 5-1.

Coal Mining Issue	Potential Risk
Underground coal mining (recorded at shallow depths)	X
Underground coal mining (probable at shallow depths)	✓
Mine entries (shafts / adits)	?
Coal mining geology (fissures)	X
Record of past mine gas emissions	?
Recorded coal mining surface hazard	X
Surface mining (opencast workings)	X

Table 5-1: Summary of coal mining potential risks.

5.2. Site Investigation Recommendations

Considering the available information and guidance given in CIRIA C758⁷, LKC consider that intrusive investigation work should be carried out to confirm the risk associated with coal mining. The intrusive investigation works should be designed by a suitably qualified mining engineer; these works are likely to include the options detailed in Table 5-2.

Coal Mining Issue	Investigation Work
Underground coal mining (recorded at shallow depths)	N/A
Underground coal mining (probable at shallow depths)	Rotary drilling to confirm the depth to coal seams, the thickness of seams, signs of workings and evidence of treatment work. Watching brief during groundworks to check for any signs of mining related ground instability (see below).
Mine entries (shafts / adits)	Depth of bedrock and ground conditions to be confirmed to allow zone of influence to be calculated. Possible additional investigation work / remedial measures may be required subject to review of zone of influence and proposed development plans.
Coal mining geology (fissures)	N/A
Record of past mine gas emissions	Gas monitoring and detailed gas risk assessment in line with CIRIA 655 ⁸ and CL:AIRE Coal Mine Gas Emissions guidance ⁹ .
Recorded coal mining surface hazard	N/A
Surface mining (opencast workings)	N/A

Table 5-2: Summary of investigation requirements.

Prior to carrying out investigation work, it would be advisable to consult available abandoned mine plans to aid in the design of any future works. This should include review of mine shaft stabilisation work undertaken (where available).

Investigation work should be carried out in line with CIRIA C758¹⁰ and Coal Authority guidance.

A Coal Authority Permit¹¹ is required for intrusive activities which will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits).

5.3. Watching Brief

A watching brief is recommended in all coal mining areas. This could be undertaken by experienced site staff on low-risk sites or by a suitably qualified coal mining engineer or consultant on high-risk sites. This site is considered to be high risk, given the recorded the presence of a mine entry close to the site.

The watching brief should cover the period in which any earthworks, reduce level dig or foundation excavation works 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.

If any of the above features are identified during the course of the development works, then work should be stopped to allow the mining engineer / consultant to assess them and if necessary, design further or additional investigation and / or remediation works.

5.4. Mitigation Measures

Depending on the findings of the mining investigation, mitigation measures may be required. Table 5-3 provides possible mitigation options.

Coal Mining Issue	Mitigation Measures
Underground coal mining (recorded at shallow depths)	N/A
Underground coal mining (probable at shallow depths)	Move structures to 'safe' areas of the site. Stabilisation of the ground (i.e., grouting) and suitable foundations to be implemented.
Mine entries (shafts / adits)	Move structures to 'safe' areas of the site. Treat mine entry (backfill, cap). Follow The Coal Authority's 'Policy for Building Over or Within The Influencing Distance of A Mine Entry' ¹² (See Appendix E).
Coal mining geology (fissures)	N/A
Record of past mine gas emissions	Gas protection measures.
Recorded coal mining surface hazard	N/A
Surface mining (opencast workings)	N/A

Table 5-3: Summary of potential mitigation measures.

5.5. Conclusions and Safe Development

At this stage the possibility for shallow workings can only be ascertained from site investigation; however, LKC consider that the site could be safely developed with

regards to shallow mining subject to an appropriate site investigation and, if required, appropriate mitigation measures which may include some of those measures as detailed above.

Therefore, LKC consider the study site should be capable of being made safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

Figures



Client: GFIC Properties Ltd				Title: Site Location & Boundary Plan			
Site: Warth Business Park, Radcliffe				Scale (see scale bar): 1:25,000 & 1:2,500 @ A4			
Job No.: LKC241231	Drawn By: EH	Checked By: CC	Drawn: July 2024	Figure: 1	Revision:		

Appendix A – Geological Mapping

Geology 1:10,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Holocene - Holocene
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene
	WMGR	Infilled Ground	Artificial Deposit	Holocene - Holocene
	DDGR	Disturbed Ground (Undivided)	Unknown/Unclassified Entry	Holocene - Holocene
	LSGR	Landscaped Ground (Undivided)	Artificial Deposit	Holocene - Holocene

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Pleistocene
	GFSDD	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	Sand and Gravel	Devensian - Ipswichian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Devensian - Ipswichian
	GLLDD	Glaciolacustrine Deposits, Devensian	Clay and Silt	Devensian - Ipswichian
	TILLD	Till, Devensian	Diamicton	Devensian - Ipswichian
	HMGDD	Hummocky (Moundy) Glacial Deposits, Devensian	Diamicton	Devensian - Ipswichian
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Quaternary - Ryazanian
	RTD2	River Terrace Deposits, 2	Sand and Gravel	Quaternary - Ryazanian
	HEAD	Head	Clay, Silt, Sand and Gravel	Quaternary - Ryazanian

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	PMCM	Pennine Middle Coal Measures Formation	Mudstone, Siltstone and Sandstone	Bolsovian - Duckmantian
	PMCM	Pennine Middle Coal Measures Formation	Sandstone	Bolsovian - Duckmantian
	PR	Peel Hall Rock	Sandstone	Duckmantian - Duckmantian
	PLCM	Pennine Lower Coal Measures Formation	Sandstone	Langsettian - Langsettian
	PLCM	Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Langsettian - Langsettian
	TRBR	Trencherbone Rock	Sandstone	Langsettian - Langsettian
	CAR	Cannel Rock (South Lancashire)	Sandstone	Langsettian - Langsettian
	Rock			
	Fault			



Geology 1:10,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:10,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around a site. This mapping may be more up to date than previously published paper maps.

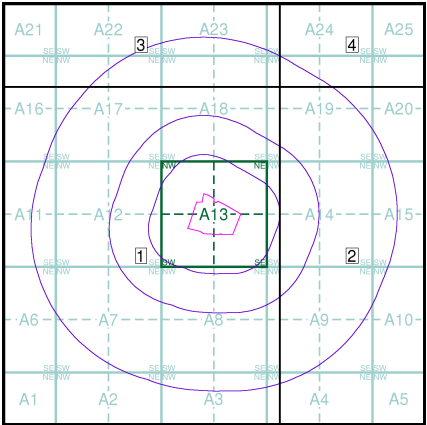
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page.

Please Note: Not all of the layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:10,000 Maps Coverage

Map ID:	3	Map ID:	4
Map Name:	SD71SE	Map Name:	SD81SW
Map Date:	2007	Map Date:	2007
Bedrock Geology:	Available	Bedrock Geology:	Available
Superficial Geology:	Available	Superficial Geology:	Available
Artificial Geology:	Available	Artificial Geology:	Available
Faults:	Available	Faults:	Available
Landslip:	Available	Landslip:	Available
Rock Segments:	Available	Rock Segments:	Available
Map ID:	1	Map ID:	2
Map Name:	SD70NE	Map Name:	SD80NW
Map Date:	2008	Map Date:	2008
Bedrock Geology:	Available	Bedrock Geology:	Available
Superficial Geology:	Available	Superficial Geology:	Available
Artificial Geology:	Available	Artificial Geology:	Available
Faults:	Available	Faults:	Available
Landslip:	Available	Landslip:	Available
Rock Segments:	Available	Rock Segments:	Available

Geology 1:10,000 Maps - Slice A



Order Details

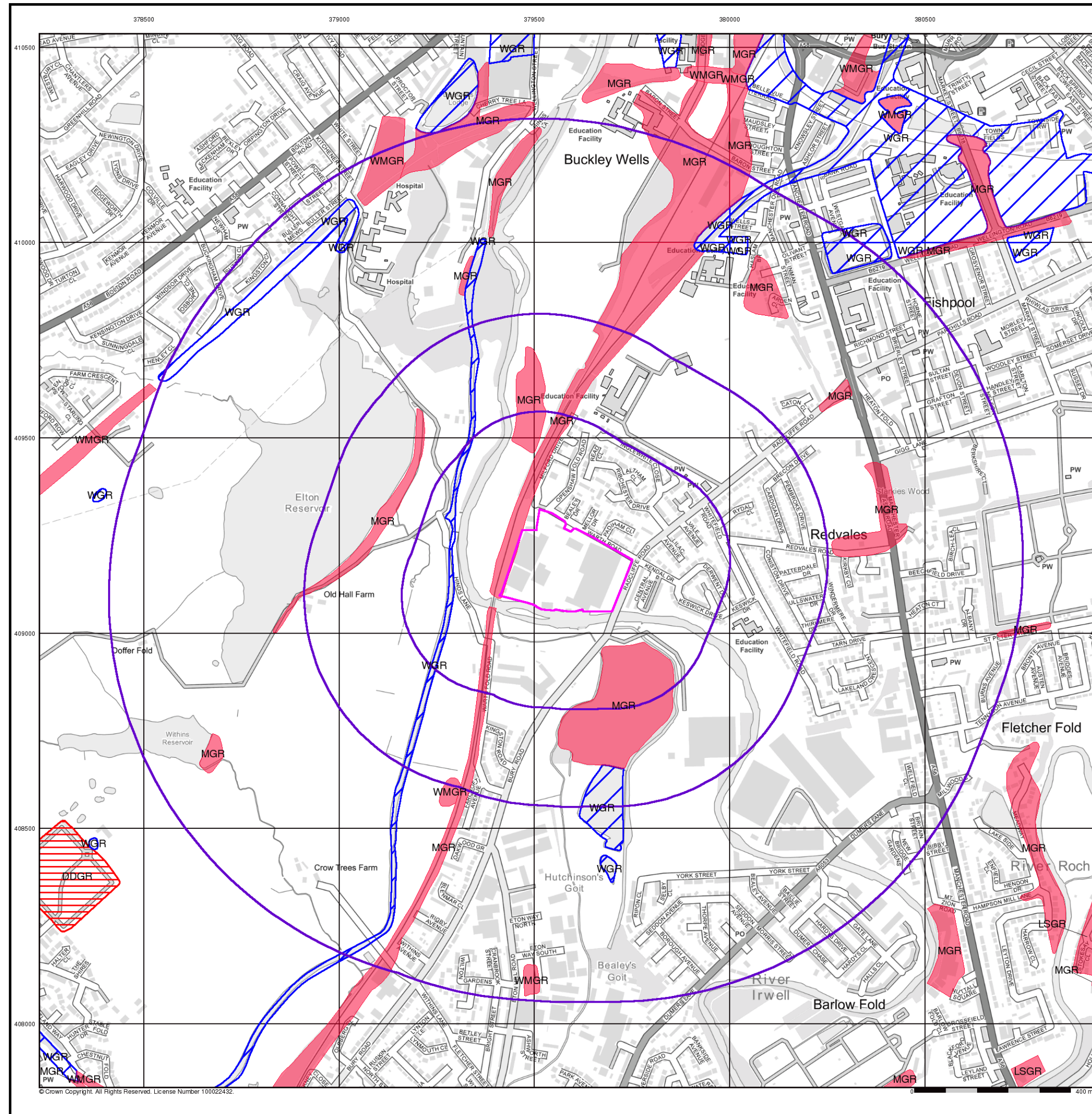
Order Number:	352066079_1_1
Customer Ref:	LKC 24 1231
National Grid Reference:	379580, 409170
Slice:	A
Site Area (Ha):	5.71
Search Buffer (m):	1000

Site Details

Site at 379580, 409190



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Artificial Ground and Landslip

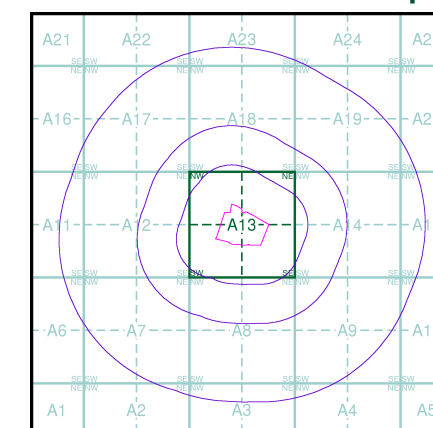
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes founded strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details

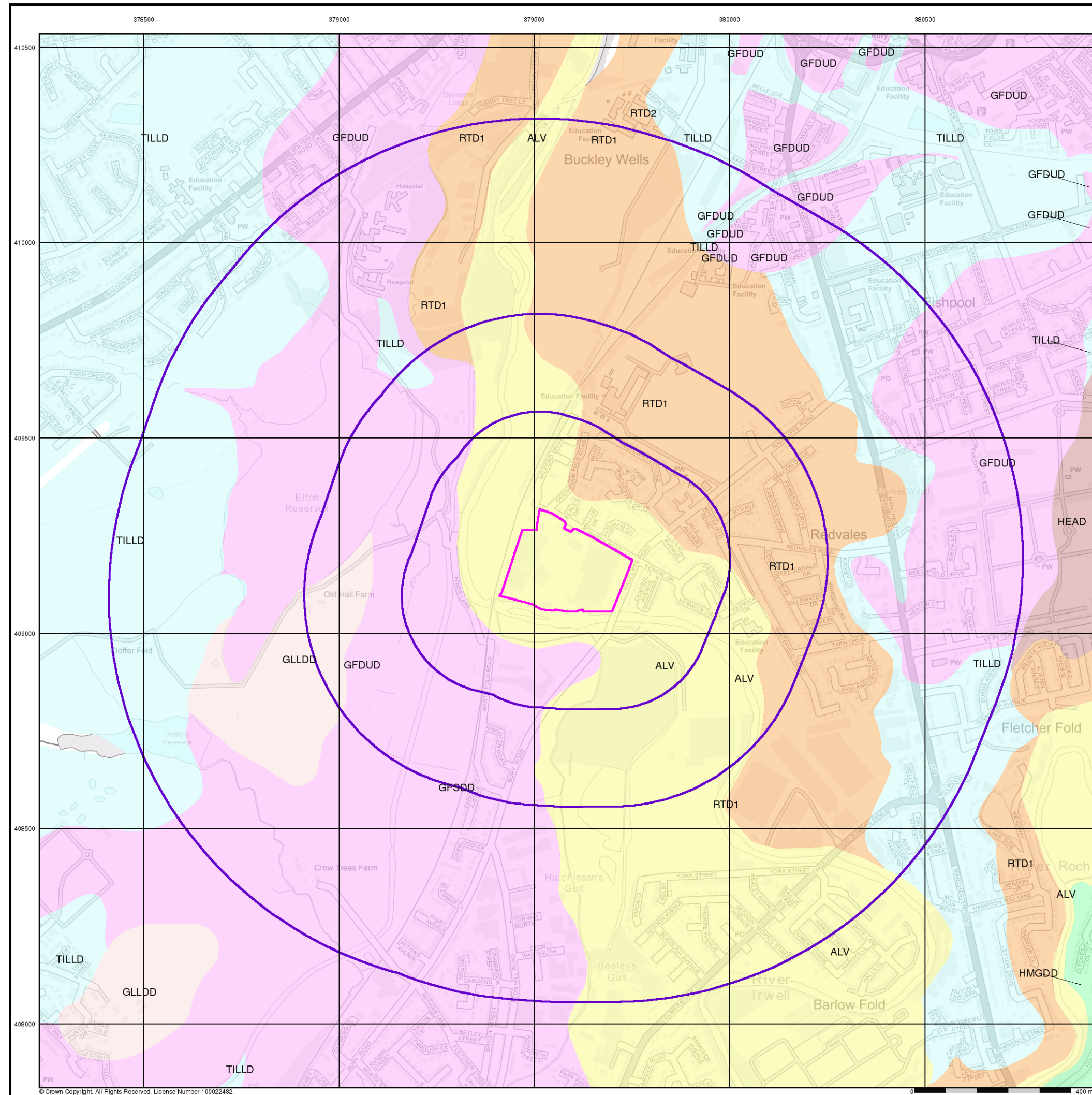
Order Number: 352066079_1_1
Customer Ref: LKC 24 1231
National Grid Reference: 379580, 409170
Slice: A
Site Area (Ha): 5.71
Search Buffer (m): 1000

Site Details

Site at 379580, 409190



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

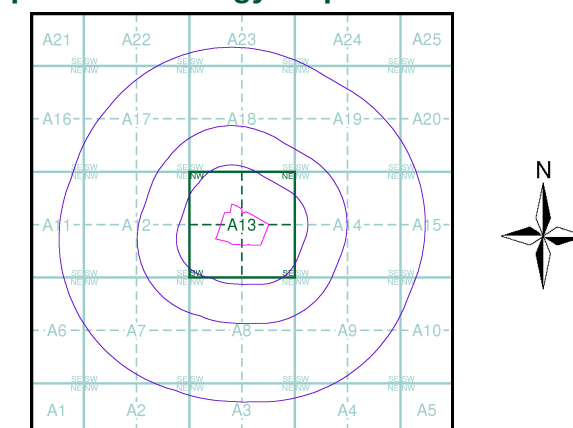


BGS 1:10,000 Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details

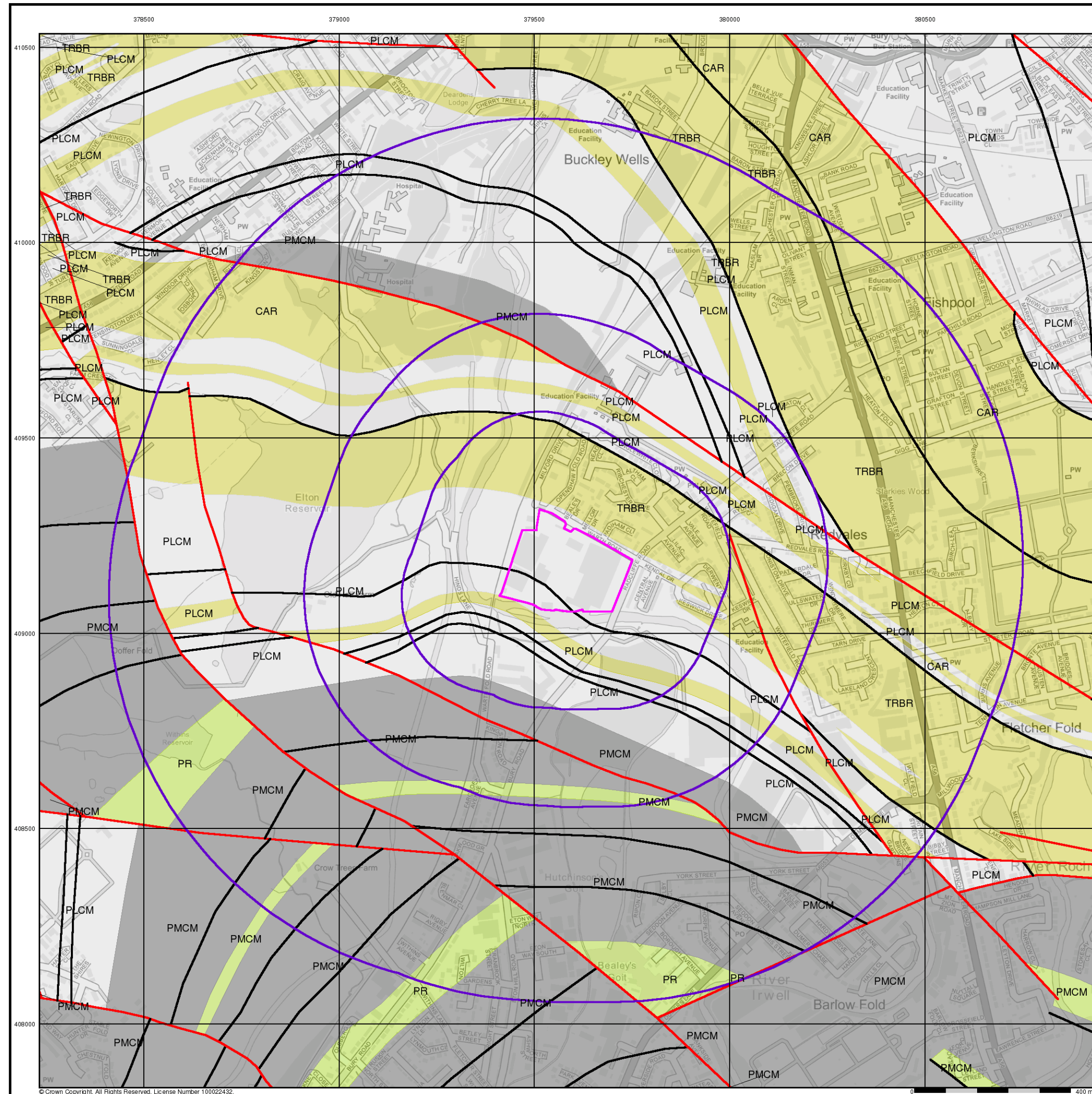
Order Number: 352066079_1_1
Customer Ref: LKC 24 1231
National Grid Reference: 379580, 409170
Slice: A
Site Area (Ha): 5.71
Search Buffer (m): 1000

Site Details

Site at 379580, 409190

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number 100022432.



Bedrock and Faults

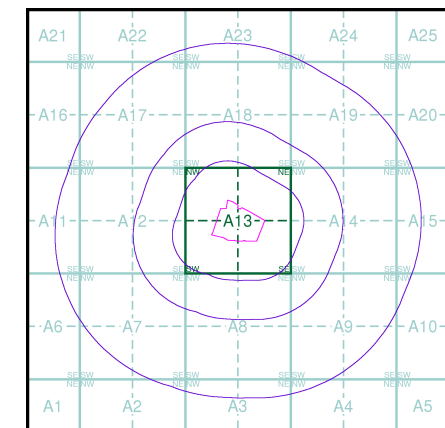
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults and thin beds mapped as lines such as coal seams and mineral veins. These are not restricted by age and could relate to features of any of the 1:10,000 geology datasets.

Bedrock and Faults Map - Slice A



Order Details

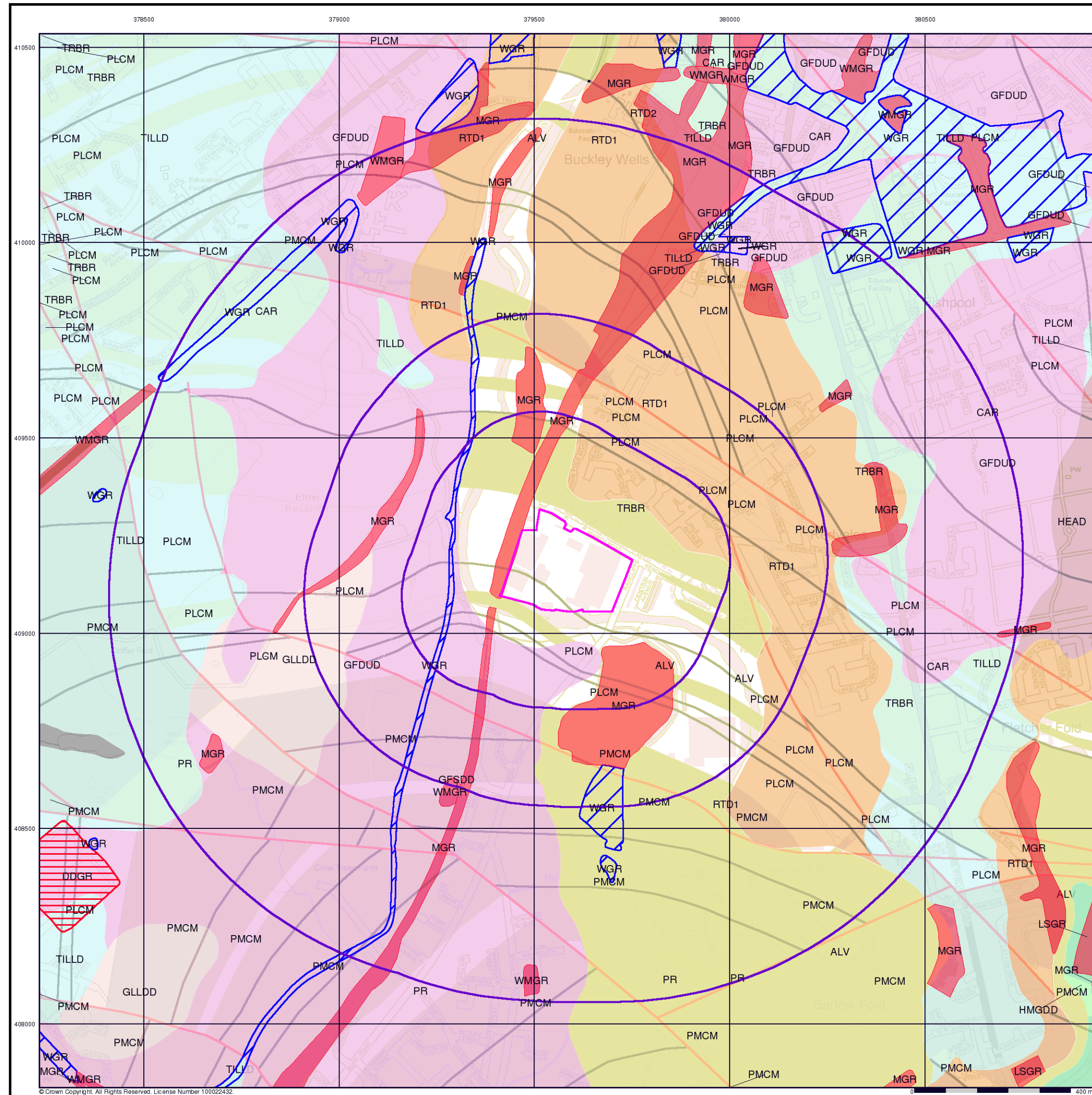
Order Number: 352066079_1_1
Customer Ref: LKC 24 1231
National Grid Reference: 379580, 409170
Slice: A
Site Area (Ha): 5.71
Search Buffer (m): 1000

Site Details

Site at 379580, 409190



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GROUP

Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

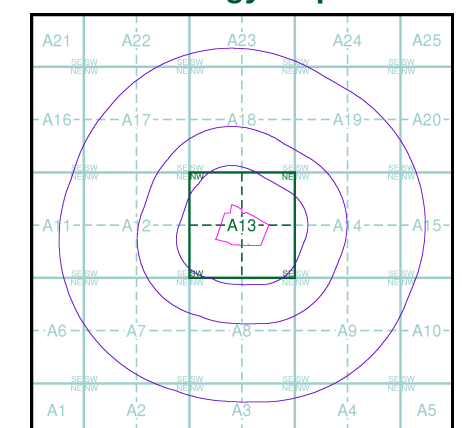
Additional Information

More information on 1:10,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details

Order Number: 352066079_1_1
Customer Ref: LKC 24 1231
National Grid Reference: 379580, 409170
Slice: A
Site Area (Ha): 5.71
Search Buffer (m): 1000

Site Details

Site at 379580, 409190

Landmark®
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix B – Coal Authority Consultants Report



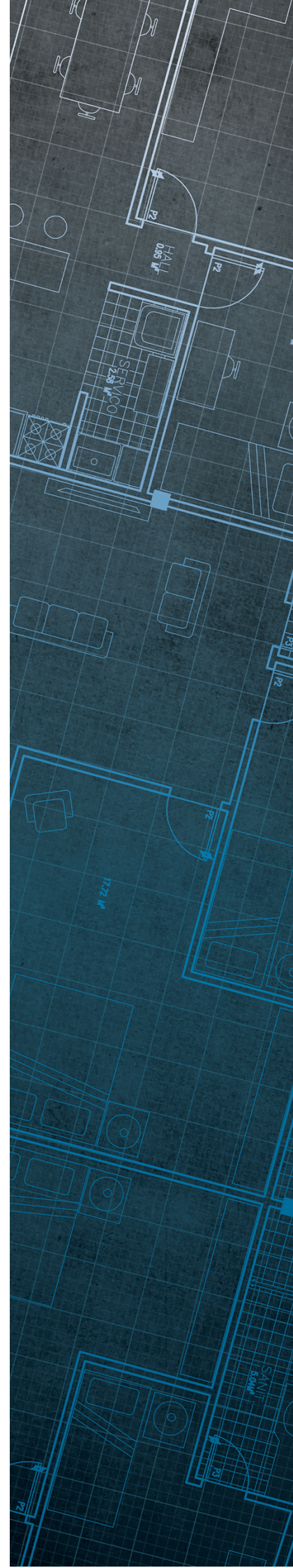
The Coal
Authority

Consultants Coal Mining Report

Site At 379580, 409190
Greater Manchester

Date of enquiry: 17 June 2024
Date enquiry received: 17 June 2024
Issue date: 17 June 2024

Our reference: 51003431480001
Your reference: 350266599_2



Consultants

Coal Mining Report

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

Client name

NLIS Hub

Enquiry address

Site At 379580, 409190
Greater Manchester

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

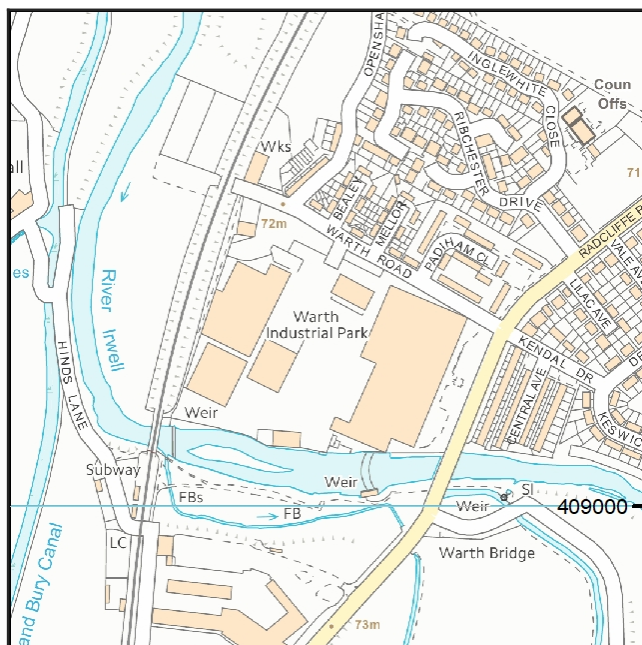
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2018. All rights
reserved.

Ordnance Survey Licence number: 100020315

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	CANNEL	Coal	3Y5P	112	Beneath Property	9.5	South	130	1894
unnamed	CANNEL	Coal	3XN8	115	Beneath Property	9.5	South	130	1894

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
Shaft	379409-003	379459 409257	This shaft has been filled. The fill material has been drilled and injected with grout and the shaft capped to National Coal Board specifications by British Rail in 1975.	Coal	

Abandoned mine plan catalogue numbers

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

NW1161	PO0	16820
0	3001	

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
WIGAN FOUR FEET	Coal	Yes	Within	N/A	308

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

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

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

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

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

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

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

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

Withdrawal of support notices

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

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

Payments to owners of former copyhold land

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

Section 4 – Further information

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

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Development advice

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

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

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.

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. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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.