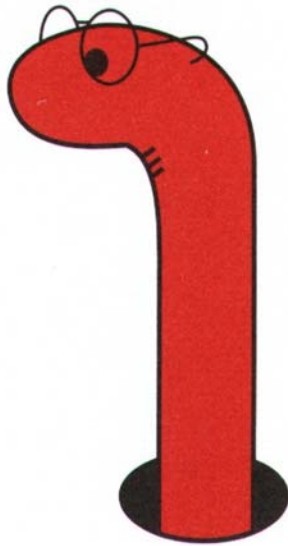


Electronic Report



WORMS EYE

Worms Eye Limited
PO Box 1157
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01282 414649
info@wormseye.co.uk

Our Ref: Hare Hill Road/OL15 9HQ/2024
Date: 28 February 2024

Tim Fairley
64 Blackstone Edge Old Road
Littleborough
OL15 0JN

Copy to : Thomas Holt
Thomas@whiteleyeaves.co.uk

timfairley@live.com

LAND TO THE REAR OF 95 HARE HILL ROAD, LITTLEBOROUGH, OL15 9HQ

COAL MINING RISK ASSESSMENT

INTRODUCTION

A residential development is proposed. Worms Eye have been commissioned to prepare a Desk Top Coal Mining Risk Assessment in order to assess the impact of coal mining on the site.

SITE LOCATION

The site is an irregular shape, about 29 by 23m, located to the southwest of Hare Hill Road in Littleborough and at OS Grid Reference 393420, 416669. The site is a domestic garage colony, to the northwest, northeast and southeast are houses, and to the west is a fire station. The area slopes down to the southeast.

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PROPOSED DEVELOPMENT

It is proposed to build a block of four town houses on the southwest of the site, having gardens to their southwest and an access road and parking to their northeast..

SCOPE OF COAL MINING RISK ASSESMENT

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

- Present a desk study of available information on the coal mining issues relevant to the site.
- Identify and assess risks to the development from coal mining legacy.
- Set out mitigation measures to address coal mining issues affecting the site, including remedial works and/or demonstrate how coal mining issues have influenced the development.
- Demonstrate to the Local Planning Authorities the application site is, or can be made, safe and stable to meet national planning policy with regard to development on unstable land.

SOURCES OF INFORMATION USED TO INFORM THIS REPORT

The following data sources have been reviewed in preparing this risk assessment.

- British Geological Survey map, Solid and Drift edition, 1:50000 scale.
- A Coal Mining Consultants Report dated 17/2/24.
- A site history based on historic Ordnance Survey mapping of the area.
- Memoirs of the Geological Survey.

GEOLOGY OF SITE

The geological map indicates that the underlying solid rocks are Woodhead Hill Rock sandstone in the Pennine Lower Coal Measures, dipping to the southwest at about 5°. 320ne 150 sw

Surface drift is shown as glacial till (boulder clay) beneath the site with Head (poorly sorted rock debris and clay) just to the southwest.

NEARBY BOREHOLES/PREVIOUS INVESTIGATION

The following information, and enclosed borehole logs, contain British Geological Survey materials © NERC (2024). The BGS hold records for a borehole 104m south, this shows:

- | | |
|------------------------------|---------------|
| • Made ground | 0 to 4.5m |
| • Sand | 4.5 to 9.0m |
| • Sandstone with coal traces | 9.0 to 27.0m |
| • Mudstone with coal traces | 27.0 to 59.5m |
| • Coal | 59.5 to 60.1m |
| • Mudstone with coal | 60.1 to >75m |

BRIEF SITE HISTORY

The site was originally used as tenter ground, before being used as allotments. Circa 1970s a domestic garage colony was created on site. Historical maps show no mining related features on or close to the site.

MINING REPORT

A Coal Authority mining report has been obtained and is enclosed, the salient points are:

- The Bassey seam outcrops northwest to southeast 42m northeast, and dips to the southwest.
- No spine roadway recorded at shallow depth.
- The site is underlain by probable unrecorded shallow workings.
- No record of past, present or future planned underground mining.
- No known mine entries within 100 metres.
- No opencast mining within 500m.
- No record of mine gas emissions within 500m.
- No subsidence claims, since 1994, or remediated sites within 50m.
- The site is within an area of previous interest, close to where the CA have received information relating to past site investigations and requires further investigation.
- Two site investigations are recorded, 2m and 25m west*

* - One investigations has been viewed on the planning portal. This shows clay to about 9m overlying sandstone. A 0.9m thick, intact, coal seam was seen at about 17m deep, underlain by siltstone, and a 0.5m thick, intact, coal seam at 31.5m deep.

SHALLOW COAL SEAMS

The CA report the Bassey seam outcrops about 42m to the northeast of the site, passing beneath the site at about 3m below rockhead and below the proposed houses at about 4m below rockhead. The next seam in the sequence is the Margery seam, about 38 metres below the Bassey.

IDENTIFICATION AND ASSESSMENT OF SITE SPECIFIC COAL MINING RISKS

The table below initially summarises the potential risks associated with coal mining for the site.

Coal Mining Issue	Yes	No	Risk Assessment
Recorded underground coal mining		X	
Underground coal mining (recorded at shallow depths)		X	
Underground coal mining (possible at shallow depths)	X		Shallow seam, <5m deep, possible risk
Future underground coal mining		X	
Mine entries (shafts and adits)		X	
Coal mining geology (fissures)		X	
Record of past mine gas emissions		X	
Unrecorded mine gas emissions	X		Potential risk from shallow, possibly worked, seam
Recorded coal mining surface hazards		X	
Surface mining (opencast workings)		X	
Nearby subsidence claims		X	
Mine Workings Found in Previous Investigations		X	

For those issues identified as “yes” a more detailed discussion of the risks is made below.

Shallow Underground Mining – unrecorded/probable/possible

The finding from the CA report suggest the Bassy coal seam is the shallowest seam. At less than 10m below rock head this needs to be considered further and the Geological Memoir for this area has been reviewed. To achieve a minimal thickness of rock cover over a worked coal seam, 10 times the seam thickness is widely accepted.

The next seam in the sequence is the Margery seam, about 38 metres below the Bassey. At over 40m below rockhead this is neither shallow nor a risk to the development.

Bassy Coal Seam

The coal seam is reported as being about 0.5 to 0.9m thick, but only exploited to a small extent. This would allow about 3 to 4m of rock cover over the seam, less than 10 times the seam thickness. This is insufficient rock cover, to minimise risks to the development, if the seam is worked and workings were to collapse.

Mine Gas

The findings suggest there is a shallow, possibly worked, coal seam below about 4m of rock cover and up to about 9m of drift deposits (clay). Although the overlying clay and rock might be expected to impede the passage of gases, if workings are present and were to collapse this would reduce the amount of cover and increase the potential for gases to migrate towards the surface and pose a risk to the development.

DISCUSSION

Shallow Mining

The findings of this desk study indicate that the Bassy is the only shallow coal seam. The depth of the seam suggests there may be insufficient thickness of rock cover to minimise damage to the structure in event of a collapse of mine workings. This is probably the shallowest seam seen in the boreholes to the west, which was found not to be worked.

The presence of two geological faults to the northeast and southwest, with no mine entries shown between, suggest workings may not be present in this area. Although the findings on the adjacent site also suggest workings may not have extended this far from the nearest mine entry, the presence of shallow workings cannot be ruled out at this point.

The potential inaccuracies on the geology map pose difficulties with making accurate measurements. It is considered that the Coal Authority Report and memoirs suggest there is a shallow coal seam, and there may be insufficient rock cover if the seam was worked. The findings are also inconclusive on whether the site was worked in this area and, therefore, the presence of shallow workings cannot be ruled out at this point.

Mine Gas

There is a shallow coal seam. If workings are present it is considered that, should workings collapse, there may be insufficient overlying cover to prevent gases migrating towards the surface. Therefore, the shallow coal seam is considered a potential gas risk to the development and a period of gas monitoring is required.

MITIGATION STRATEGY PROPOSED

Shallow Mining

There is a risk of future mining subsidence if unrecorded workings in the Bassy coal seam are present. There is a need to confirm:

- If the coal seam is present (geological maps do not locate seams precisely).
- If present, its depth and thickness
- If it has been worked beneath the site.

To do this it will be necessary to drill boreholes (Coal Authority permission required). It is suggested 3 boreholes extend to 20m below rock head.

Mine Gas

There are potential risks of mine gas from shallow workings migrating up to the development. If the shallow seam is worked the following investigation is suggested:

- Install 4 gas monitoring points.
- Test for methane, carbon dioxide, oxygen on 6 occasions over a 3 month period.

If the seam is found not to be worked then it is considered there will be no mine gas risk.

CONCLUSION

Watching Brief

In common with many mining areas, it is recommended that site staff here keep a watching brief during the project, particularly while excavations are taking place. Any unusual features such as voids, cracks, ground movement or strange soil conditions should be flagged up and safely checked out.

Shallow Mining

The findings suggest the Bassy coal seam is present at shallow depth beneath the site, below rock head, and beneath the proposed houses. The anticipated depth of the coal seam suggests there is insufficient rock cover above the seam, and a potential risk to the proposed development, if workings are present and these were to collapse.

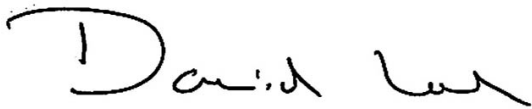
Once rotary drilling has been carried out the mitigation strategy can be finalised, and the project constructed safely, to meet the requirements of development on unstable land.

Boreholes should provide all round coverage.

Mine Gas

If the shallow coal seam is worked it is considered to be a potential risk to the development and it is recommended that a period of gas monitoring is carried out. Monitoring points will need to target the proposed buildings.

Yours faithfully
on behalf of Worms Eye Ltd

A handwritten signature in black ink, appearing to read 'David Lord', with a stylized, cursive script.

David Lord
BSc (Hons)
FGS MEnvSc AIEMA

LAND TO THE REAR OF 95 HARE HILL ROAD, LITTLEBOROUGH, OL15 9HQ

List of Appendices – COAL MINING RISK ASSESSMENT

Existing Site Plan

Proposed Site Plans

Coal Mining Report

Coal Authority Summary Map

Extract From Geology Map

BGS Borehole Logs

ABBREVIATIONS

<u>Chemical</u>	BAP	Benzo(a)pyrene
	BTEX	Benzene, toluene, ethylbenzene, xylene
	DAHA	Dibenzo(ah)anthracene
	MTBE	Methyl tertiaryt-butyl ether (additive to petrol)
	EPH	Extractable Petroleum Hydrocarbons (formerly Diesel Range Organics – DRO)
	NFD	No fibres detected (asbestos test)
	PAH	Polycyclic aromatic hydrocarbons
	PCB	Polychlorinated biphenyls
	PID	Photo ionisation detector
	PRO/GRO	Petrol range organics/gasoline range organics
	SVOC	Semi-volatile organic compounds
	TCE	Trichloroethylene
	TPH	Total petroleum hydrocarbons
	VOC	Volatile organic compounds
<u>Other</u>	AGS	Association of Geotechnical Specialists
	BGS	British Geological Survey
	BRE	Building Research Establishment
	CBR	California Bearing Ratio
	CIEH	Chartered Institute of Environmental Health
	CIRIA	Construction Industry Research and Information Association
	CLEA	Contaminated Land Exposure Assessment (Environment Agency)
	CLR 8	Contaminated Land Research Report 8 (Environment Agency)
	DWQ	Drinking water quality
	EA	Environment Agency
	EQS	Environmental quality standards
	ICRCL	Inter-departmental Commission for the Reclamation of Contaminated Land
	LQM	Land Quality Management Ltd (Land and Environmental Consultancy)
	NHBC	National House Builders Council
	SGV	Soil Guideline Values
	SPT	Standard penetration test
	TPHWG	TPH Working Group

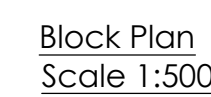
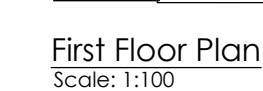
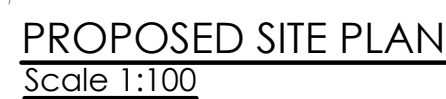
1. This report should be considered in relation to the objectives agreed between Worms Eye and the Client, outlined in the introduction.
2. For the work, reliance has been placed on publicly available data, obtained from the sources identified in the report. The information is not exhaustive and further information may be available from other sources. When using the information it has been assumed it is correct, and no attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and guidelines, for land and groundwater contamination, enforced by the Local Authority and the Environment Agency.
4. During the site walkover, reasonable effort was made to obtain an overview of the site. However, no attempt was made to enter areas that are unsafe, a risk to health and safety, locked, barricaded, overgrown, or areas not made accessible.
5. Access, the presence of services and activities on the site, limited locations where sampling could be carried out and the techniques that could be used.
6. Assessments are based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. The conclusions and recommendations provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
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9. New information, revised practices, or changes in legislation, may necessitate the re-interpretation of the report, in whole or in part.



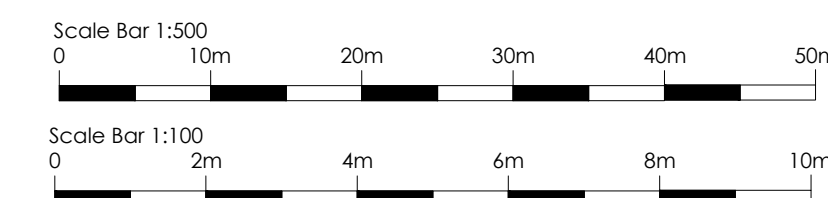
Key

Site Boundary





KEY		
	GLASS/ CANS/ BOTTLES	MIXED PULPABLES
		
	Paving	
	Soft landscaping/ Grass	
	Permeable Paving to Parking Spaces	
	Site Boundary	
	Separation distances	
	Feather edge board fence 1.8m high	



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CLIENT TIM FAIRLEY		
JOB NUMBER 713 DATE 23.10.23		
DRAWING NAME PROPOSED PLANS		
SCALE DRAWN: 1:100/ 1:500/ PAGE SIZE A1		
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ADDRESS LAND TO REAR OF 95 HARE HILL ROAD, LITTLEBOROUGH, OL15 9HQ		
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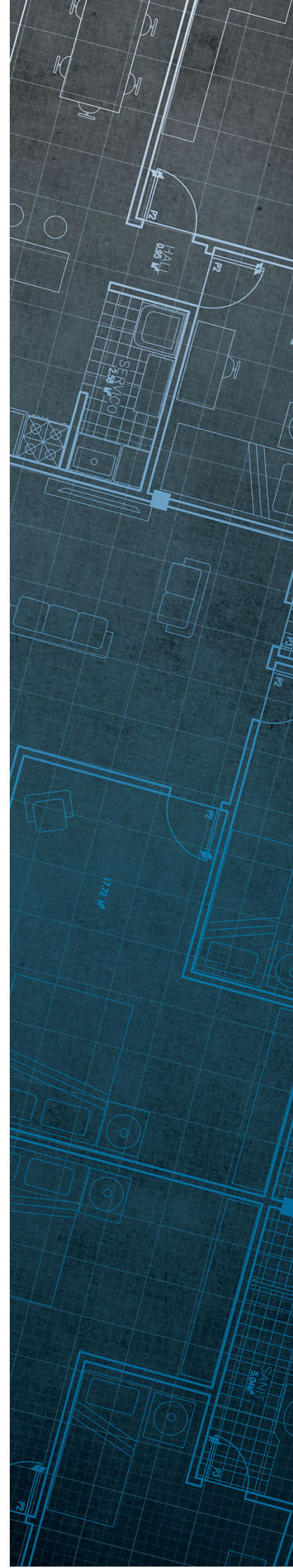
The Coal
Authority

Consultants Coal Mining Report

1 Lyndale Drive
Littleborough
Rochdale
OL15 9HQ

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

Our reference:	51003405856001
Your reference:	Hare Hill Road



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

David Lord

Enquiry address

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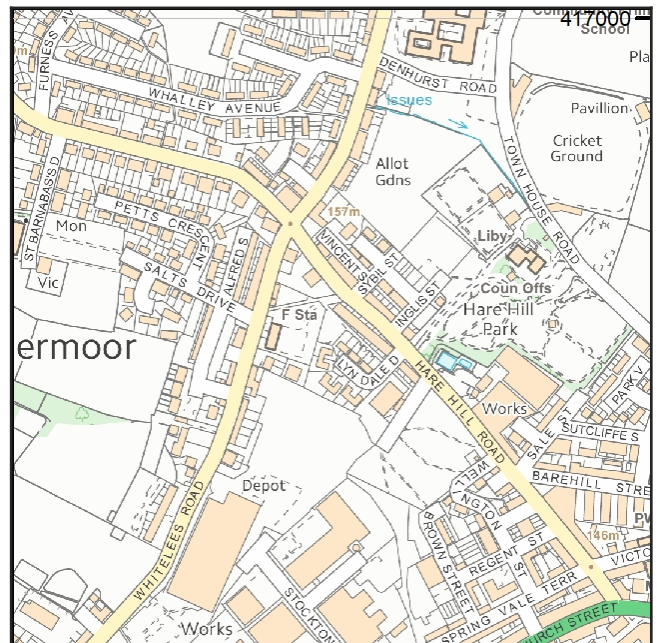
www.groundstability.com

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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

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

16820		
-------	--	--

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
BASSEY	Coal	Yes	42.4	North-East	146

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

Distance to site investigation (m)	Direction
24.9	West
2.1	West

See Section 4 for further information.

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.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

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.

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

Key

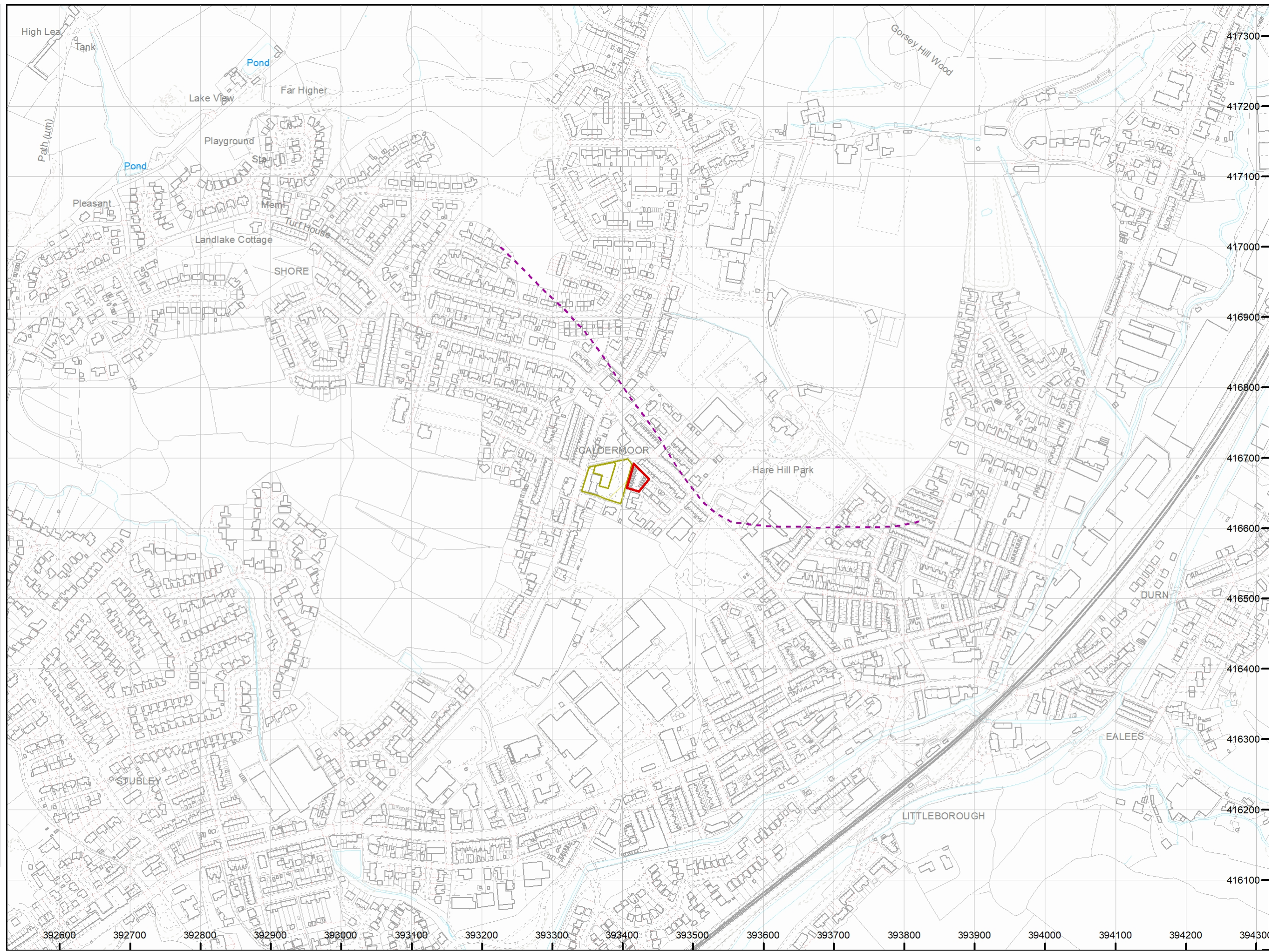
Approximate position of the enquiry boundary shown 

Outcrop (Conjectured) 

Site investigations 

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Not Supplied - Holocene
	WGR	Worked Ground (Undivided)	Void	Not Supplied - Holocene
	WMGR	Infilled Ground	Artificial Deposit	Not Supplied - Holocene
	SLIP	Landslide Deposit	Unknown/Unclassified Entry	Not Supplied - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	TILLD	Till, Devensian	Diamicton	Not Supplied - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	HEAD	Head	Diamicton	Not Supplied - Quaternary
	ALF	Alluvial Fan Deposits	Sand and Gravel	Not Supplied - Quaternary
	PEAT	Peat	Peat	Not Supplied - Quaternary
	LDE	Lacustrine Deposits	Clay	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WH	Woodhead Hill Rock	Sandstone	Not Supplied - Westphalian
	PLCM	Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	DF	Darwen Flags	Sandstone	Not Supplied - Westphalian
	MLRS	Milnrow Sandstone	Sandstone	Not Supplied - Westphalian
	GAS	Great Arc Sandstone	Sandstone	Not Supplied - Westphalian
	GNR	Ganister Rock	Sandstone	Not Supplied - Westphalian
	HER	Helpet Edge Rock	Sandstone	Not Supplied - Westphalian

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	OL	Old Lawrence Rock	Sandstone	Not Supplied - Westphalian
	LOFO	LOWER FOOT ROCK	Sandstone	Not Supplied - Westphalian
	RR	Rough Rock	Sandstone	Not Supplied - Namurian
	RF	Rough Rock Flags	Sandstone	Not Supplied - Namurian
	ROSSE	Rossendale Formation	Mudstone and Siltstone	Not Supplied - Namurian
	LH	Lower Haslingden Flags	Sandstone	Not Supplied - Namurian
	RR	Rough Rock	Sandstone	Not Supplied - Namurian
	HDW	Huddersfield White Rock	Sandstone	Not Supplied - Namurian
	MARSD	Marsden Formation	Mudstone and Siltstone	Not Supplied - Namurian
	HLBG	Holcombe Brook Grit	Sandstone	Not Supplied - Namurian
	GSYG	Guisley Grit	Sandstone	Not Supplied - Namurian
		Rock Segments		
		Faults		

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Geology 1:50,000 Maps

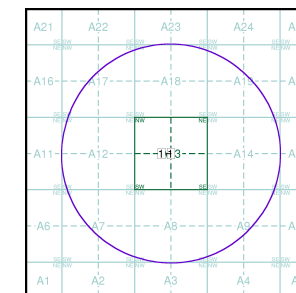
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published 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. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	1
Map Sheet No:	076
Map Name:	Rochdale
Map Date:	2008
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Not Supplied
Landslip:	Available
Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A



Order Details:

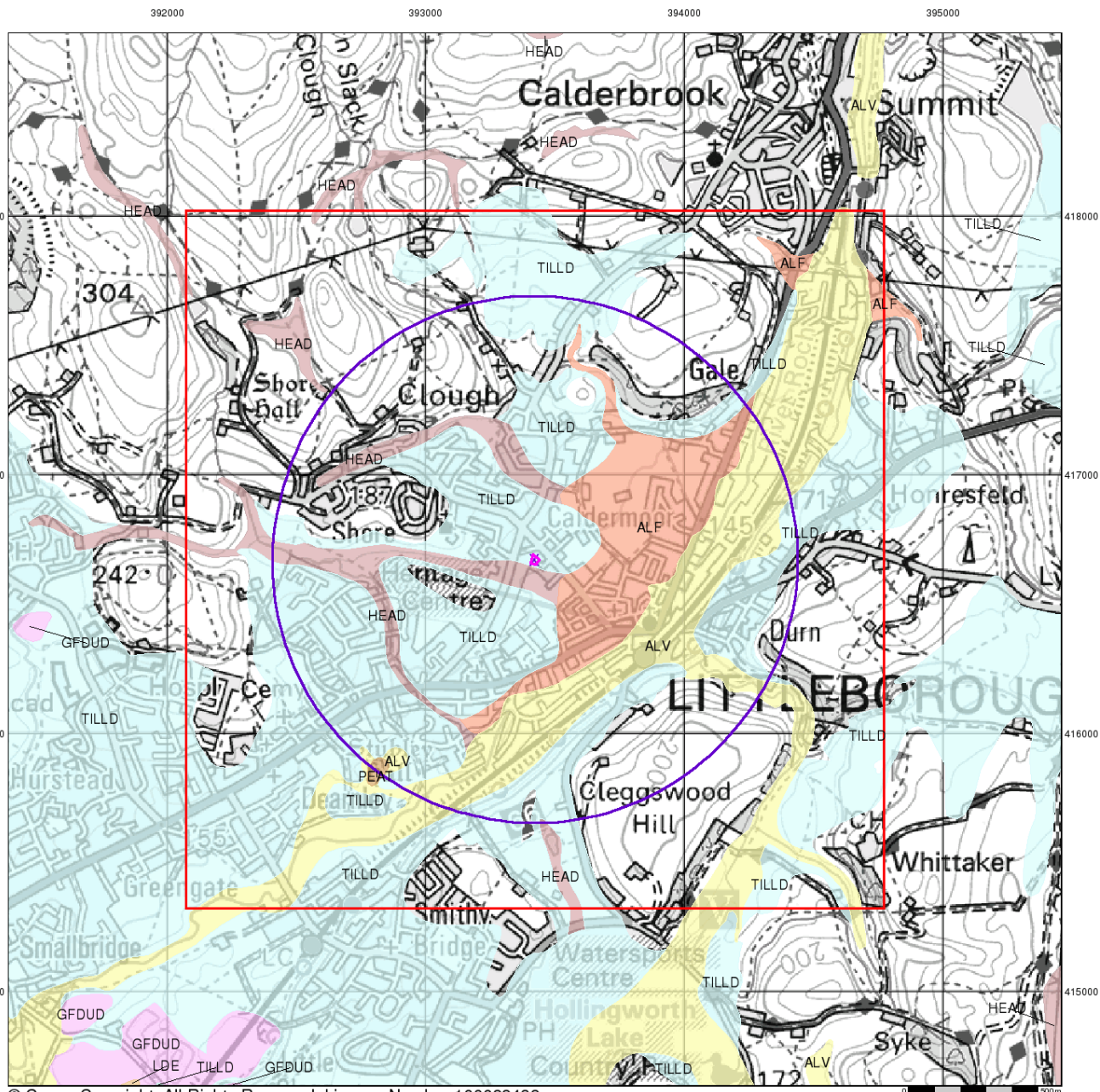
Order Number:	335733037_1_1
Customer Reference:	Hare Hill Road
National Grid Reference:	393420, 416670
Slice:	A
Site Area (Ha):	0.07
Search Buffer (m):	1000

Site Details:

, 12, Lyndale Drive, Littleborough, OL15 9HQ

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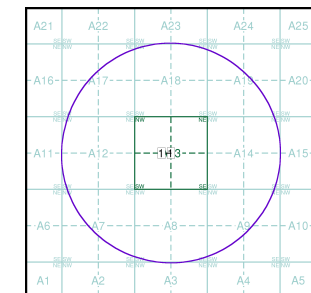
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, 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: 335733037_1_1
 Customer Reference: Hare Hill Road
 National Grid Reference: 393420, 416670
 Slice: A
 Site Area (Ha): 0.07
 Search Buffer (m): 1000

Site Details:

, 12, Lyndale Drive, Littleborough, OL15 9HQ

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ENVIRONMENT AGENCY

Form WR – 38	Ref. sd934165 mccormick foods, manchester (access utilities) log 2817	Agency No.
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BOREHOLE RECORD

A. SITE DETAILS

A. SITE DETAILS				
Borehole drilled for:	ACCESS UTILITIES			
Location:	McCORMICK FOODS MANCHESTER			
N.G.R.:	SD 93420 16541			
Ground Level (if known):	SURFACE			
Drilling Company:	W.B. & A.D. MORGAN LTD., PRESTEIGNE, POWYS. LD8 2UF			
Date of Drilling:	Commenced:	02/09/20	Completed:	18/09/20

B. CONSTRUCTION DETAILS

Borehole datum (if not ground level) <u>GROUNDLEVEL</u>	
(Point from which all measurements of depth are taken e.g. flange, edge of chamber, etc.)	
Borehole drilled diameter.....	24 INCH from <u>Surface</u> to <u>39</u> m/depth
	12 INCH from <u>39</u> to <u>75</u> m/depth
	mm from _____ to _____ m/depth
Casing material: u.P.V.C. diameter	mm from _____ to _____ m/depth
and type (e.g. plain steel, plastic slotted)	
PERMANENT STEEL Plain diameter	<u>13 INCH</u> from <u>Surface</u> to <u>39</u> m/depth
Slotted diameter	mm from _____ to _____ m/depth
Plain diameter	mm from _____ to _____ m/depth
Slotted diameter	mm from _____ to _____ m/depth
Plain diameter	mm from _____ to _____ m/depth
Grouting details:	39.0m to surface 2.0
Water struck at:	75.0 m (depth below datum – mbd)
Rest water level on completion:	ARTESIAN m (depth below datum – mbd)
Estimated blowout yield:	20,000 LITRES per hour

C. STRATA LOG

Description of Strata	Thickness (m)	Depth (m)
CLAY BRICK AND CONCRETE FILL	4.5	4.5
BROWN SAND	4.5	9.0
SLIGHTLY RED SANDSTONE WITH TRACES OF COAL	18	27.0
HARD MUDSTONE WITH TRACES OF COAL	32.5	59.5
COAL	0.6	60.1
MUDSTONE WITH SOME COAL	11.6	71.7
MUDSTONE WITH QUARTZ	3.3	75.0
Other Comments (e.g. gas encountered, saline water intercepted, etc.)		
Gravel Pack Quantity:	NONE	PERMANENT STEEL 39M x 13 INCH
Cement:	39M – 2.0M	
Rig & Crew:	CMV 3000, [REDACTED]	