

Appendix 1

Coal Mining Report

**Environmental
Geotechnical
Specialists**



REPORT

job number	J3383/16/EDS	site address	Law Head Farm
date	29/01/2016		Law Slack Road
			Hade Edge
written by	C. E. Mason		Holmfirth HD9 2RY
checked by	J. R. Farnsworth	issued by	C. E. Mason

Rogers Geotechnical Services Ltd

Telephone 0843 50 666 87 **Fax** 0843 51 599 30

Email enquiries@rogersgeotech.co.uk

www.rogersgeotech.co.uk

Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.



GEO TECHNICAL
ENVIRONMENTAL

A REPORT ON A COAL MINING RISK ASSESSMENT

AT

LAW HEAD FARM, OFF LAW SLACK ROAD, HADE EDGE

FOR

MR AND MRS DEAKIN

**ARCHITECTS: HEPPENSTALLS-
CHARTERED ARCHITECTS AND SURVEYORS**

Report No J3383/16/EDS

January 2016

CONTENTS

	Page
1. INTRODUCTION	1
2. GEOLOGICAL DESK STUDY	2
2.1 Coal Authority Mines Report	2
2.1.1 Underground Coal Mining	2
2.1.2 Mine Entries	2
2.1.3 Coal Mining Geology	2
2.1.4 Opencast Coal Mining	2
2.1.5 Coal Mining Subsidence	3
2.1.6 Mine Gas	3
2.1.7 Hazards Related to Coal Mining	3
2.2 British Geological Survey Maps and Viewer	3
2.3 Geological Survey Borehole Records	4
3. RISK ASSESSMENT	6
4. CONCLUSIONS	7

APPENDIX 1 – SITE PLAN

APPENDIX 2-- COAL AUTHORITY MINING REPORT

APPENDIX 3-- BOREHOLE SCANS RECORDS

A REPORT ON A COAL MINING RISK ASSESSMENT

AT

LAW HEAD FARM, OFF LAW SLACK ROAD, HADE EDGE

FOR

MR AND MRS DEAKIN

**ARCHITECTS: HEPPENSTALLS-
CHARTERED ARCHITECTS AND SURVEYORS**

Report No J3383/16/EDS

January 2016

1. INTRODUCTION

It is understood that as part of the planning application at the above mentioned site, a Coal Mining Risk Assessment has been commissioned. Consequently, a desktop study was commissioned in order to assess the risk to the development from coal mining. This report presents the findings of the study.

2. GEOLOGICAL DESK STUDY

The geological desk study has been undertaken using the following sources of information.

- British Geological Survey map sheet¹.
- British Geological Survey *Geology of Britain Viewer*².
- Coal Authority Report³.
- British Geological Survey *Borehole Records*⁴.

¹ Sources: British Geological Survey (NERC) Map Sheet 86; Glossop; Solid and Drift Edition

² Sources: British Geological Survey (NERC) Geology of Britain Viewer [online resource from www.bgs.ac.uk]

³ Coal Authority Reference: 51000256240001 Dated 25th January 2016.

⁴ Sources: British Geological Survey (NERC) Borehole Records [online resource from <http://www.bgs.ac.uk/>]

2.1 Coal Authority Mines Report

As part of this study a Non-residential Coal Authority Mining Report has been obtained. The report is presented as Appendix 2 and for the purposes of discussion has been summarised below:

2.1.1 Underground coal mining

Past

The property is not within the zone of likely physical influence on the surface from past underground workings. However the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods. The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods. The property is not in an area that is likely to be affected at the surface from any planned future workings. However, reserves of coal exist in the local area which could be worked at some time in the future.

2.1.2 Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property. Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

2.1.3 Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

2.1.4 Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove

coal by opencast methods. The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

2.1.5 Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property. The 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.

2.1.6 Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

2.1.7 Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

2.2 British Geological Survey Maps and Viewer

The appropriate map sheet for the site and the geology viewer has been examined and the following table presents the indicated geology:

Table 1: Geological Data for the Site

Strata Type	Strata Name	Previous Name ⁵	Description ⁵
Superficial Geology	None Present		
Solid Geology	Eastern side of site		
	Pennine Lower Coal Measures Formation	Lower Coal Measures	Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.
	Western side of site		
	Middle Band Rock	-	The Middle Band Rock is a thin and relatively impersistent thinly bedded rubbly sandstone notable mainly in the north of the district and around Huddersfield.

It may further be appreciated that the eastern half of site is located on undifferentiated rocks of the Pennine Lower Coal Measures Formation. The western half of the site is located on the Middle Band Rock, a sandstone member of the Pennine Lower Coal Measures Formation. Nearby geological dip

⁵ Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from www.bgs.ac.uk]

indicators suggest that the solid geology in the local area dip at approximately 5° north-north east.

There are three notable coal seams within the vicinity of the site as summarised below:

Table 2: Summary of coal seams within the vicinity of the site.

Seam Name	Seam thickness ^{6*}	Outcrop distance from site ⁶
Halifax Hard Bed Coal	0.10-1.00m	190m E
Middle Band (Clay) Coal (SB)	0.00-0.60m	At or close to the eastern site border
Soft Bad (Coking) Coal	0.10-1.20m	140m W

NB: All distances given are approximate only.

* It should also be noted that coal seams can vary in thickness over relatively short distances.

Given a general dip of 5° of the local strata, the Middle Band Coal may be anticipated at or close to the surface of the site. This seam is shown to outcrop at or in very close proximity to the eastern site boundary, and trends approximately north-north-west south-south-east.

The Soft Bed Coal also outcrops in the local area. The stratigraphical section suggests that the Soft Bed Coal Seam will underlie the Middle Band Coal by approximately 21m, therefore this coal seam can be anticipated at depths of between 19m and 23m below the site surface, getting progressively deeper towards the north-north-east.

However, whilst the Hard Bed Coal is seen to outcrop in the local area, because it is stratigraphically younger than the strata found at the surface of the site, and due to the topography and dip of the local strata, this coal seam is not anticipated to be present below the site.

In addition, it would appear that there is a northwest-southeast trending fault, with a downthrown block to the southwest, approximately 70m west of the site.

2.3 Geological Survey Borehole Records

The British Geological Survey (NERC) keeps borehole records from across Britain which are available for public viewing through their website⁷. As part of this study, the records in the area around the site have been reviewed in order to assist in establishing the geological conditions.

⁶ Sources: British Geological Survey (NERC) Map Sheet 77; Huddersfield; Solid and Drift Edition

⁷ <http://www.bgs.ac.uk/data/boreholescans/>

Based upon records provided by the British Geological Survey (NERC) the following table has been produced as a summary for the most applicable features of note in relation to this study, the logs of the boreholes are presented as Appendix 3:

Table 3: Notable Geological Features

Borehole	Approx. Distance from Site	Cavity/ Coal Seam Depth	Cavity/ Coal Seam Thickness
SE 10 NE 7 Grid Ref: 416634,405092	855m NNE	Cavity- old workings in Halifax Hard Bed Coal: 21.40m	0.60m
SE 10 NE 8 Grid Ref: 416634,405092	855m NNE	Halifax Hard Bed Coal: 24.10m	1.00m
SE 77 SE 77 Grid ref: 416431,404994	835m NNE	Halifax Hard Bed Coal: 31.45m	0.10m
SE 10 SE 78 Grid ref: 416073,404672	356m ENE	Cavity- old workings in Halifax Hard Bed Coal: 28.50m	0.70m
		Halifax Hard Bed Coal: 29.20m	0.20m
SE 10 SE 79 Grid Ref: 416111,404470	336m E	Cavity- Cavity- old workings in Halifax Hard Bed Coal: 13.90m	1.70m
		Coal Band- 23.95m	0.05m

It should be appreciated that there were limited BGS borehole records within the local area and no borehole records within 250m of the site. Furthermore, while there were other boreholes at a greater distance from the site; these were felt to be of lesser value to this study.

In general terms, the borehole records suggest that the weathered rock head of the Pennine Lower Coal Measures Formation is present below the area around the site. The borehole records indicate the strata in the local area consists of mudstones, shales and sandstones.

The Halifax Hard Bed Coal seam was found to be worked within the local strata. However, due to its stratigraphical position within the surrounding solid geology and the topography within the local area, this coal seam and its associated workings are not anticipated to be found below the site. It is of note however that these workings are not known to the Coal Authority, and therefore this coal seam is likely to have been worked via illicit mining methods. These methods of mining

could therefore potentially be found in other workable coal seams within the area.

In addition, a further coal seam was revealed in the borehole located 336m E of the site. Whilst this seam may correspond to the Middle Band Coal, this coal seam has not been positively identified in the published borehole data.

3. **RISK ASSESSMENT**

The risk to the stability of the proposed residential development has been evaluated from the data obtained and with reference to the following ratings and definitions:

Low - The possibility of instability is unlikely therefore no further action is necessary.

Moderate - The possibility of instability is likely and further investigation or remedial action may be required.

High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Table 4: Development specific risk assessment

Item	Risk of Instability	Coal Seam(s) Considered	Risk Rating
1	Shallow coal workings	Middle Band (Clay) Coal (SB)	Moderate/ high
2	Shallow Coal workings	Soft Bed (Coking) Coal	Low
3	Coal workings at depth	None indicated	Low

On the basis of all of the information provided above it is concluded that there may be two workable coal seams at depths between 0m and 21m below the site. The coal authority report indicates there may be coal at or close to the surface that may have been worked at some time in the past and this consideration is likely to be associated with these seams. Whilst these seams may be of limited thickness, as illicit mining methods are known to have occurred within the Halifax Hard Bed Coal in the local area, as such the possibility of these seams being worked below the site cannot be ruled out.

It may be noted that guidance available from both the NHBC and the CIRIA publication, SP32 - *construction over abandoned mine workings*, suggests that an overburden thickness above a coal seam should be greater than 10 times the thickness of a seam plus seam thickness in order that the collapse of workings would pose a low risk to surface structures.

Taking the above into consideration, as the maximum thickness of the Middle Band Coal is estimated to be 0.60m, the guidance would recommend a minimum

thickness of competent overburden of around 6.60m. It is considered that there may not be a sufficient thickness of overburden above Middle Band Coal to prevent the instability of surface structures. As a consequence, a moderate to high risk rating is considered appropriate and further investigation or remedial action is required.

Furthermore, as the maximum thickness of the Soft Bed Coal is estimated to be 1.20m, the guidance would recommend a minimum thickness of competent overburden of around 13.2m. It is considered that there may be a sufficient thickness of overburden above the Soft Bed Coal to prevent the instability of surface structures, and therefore a low rating is considered appropriate.

In regard to deeper mining which could affect the site, the Coal Authority holds no records that the property is in the likely zone of influence from at depth, and therefore a low risk rating is applicable. Moreover, if workings were present in deeper seams, there is likely to be more than sufficient cover of competent rock to prevent instability from any workings.

4. CONCLUSIONS

In light of the potential risks of instability at the site from the possible working of shallow coal, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.

General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through pillars associated with pillar and stall workings. Furthermore, it is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the thin seams are un-worked. It may therefore be possible to undertake one borehole to 30m in the first instance with the remaining boreholes proving the depth and continuity of the coal seam. In any event, it is considered that approval should be sought with the Local Authority as to the efficacy of this approach.

For and on behalf of
Rogers Geotechnical Services Ltd,

C. E. Mason BSc
Graduate Engineer

J. R. Farnsworth BEng FGS
Senior Geotechnical Engineer.

APPENDIX 1

SITE PLAN

1:1250 50m 100m

Copyright exist on the designs and information shown on this drawing. No part of this drawing can be reproduced without written confirmation of Heppenstalls. This drawing should only be used for the purpose it was issued for and should not be used for construction unless it is marked for construction. Heppenstalls must be notified should any discrepancies be found.

Revision

Sinks

Issues

Green Gate Farm Cottage

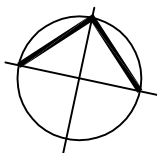
Law Head Farm

LAW SLACK ROAD

404.2m

LAW COMMON ROAD

Planning Application



Location Plan 1:1250

Client Mr and Mrs R.A.Deakin

Project
Law Head Farm, Hade Edge
Proposed single-storey dwelling

Drawing
Site Layout

Number	Checked	Date
4238-02-05	Scale @ A4	01/2016

HEPPENSTALLS

Chartered Architects & Surveyors



Allisons buildings, 135 Armitage Road Milnsbridge, Huddersfield, HD3 4JY projects@heppenstalls.net

Architecture
Surveying
Planning
Project Management



tel 01484 658411 www.heppenstalls.net

APPENDIX 2

COAL AUTHORITY MINING REPORT

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848

**ROGERS GEOTECHNICAL SERVICES
LTD
BARNCLIFFE MILLS
NEAR BANK
HUDDERSFIELD
HD8 8LU**

Our reference: **51001075414001**
Your reference: **J3383/16/EDS**
Date of your enquiry: **25 January 2016**
Date we received your enquiry: **25 January 2016**
Date of issue: **25 January 2016**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

LAW HEAD FARM, LAW SLACK ROAD, HADE EDGE, HOLMFIRTH, HD9 2RY

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on Coal Authority Information section of the report.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

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

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

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore 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 good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Issued by:	The Coal Authority, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG
Tax Point Date:	25 January 2016
Issued to:	ROGERS GEOTECHNICAL SERVICES LTD BARNCLIFFE MILLS NEAR BANK HUDDERSFIELD HD8 8LU
Property Search for:	LAW HEAD FARM, LAW SLACK ROAD, HADE EDGE, HOLMFIRTH, HD9 2RY
Reference Number:	51001075414001
Date of Issue:	25 January 2016
Cost:	£59.00
VAT @ 20%:	£11.80
Total Received:	£70.80
VAT Registration	598 5850 68

Location map



Approximate position of property



Enquiry boundary

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved. Ordnance Survey Licence number: 100020315

Key

Approximate position of enquiry boundary shown



APPENDIX 3

BGS BOREHOLE RECORDS

SE 10 NE - 7 16343 05118

Borehole No 1. Surface Level 354.49m A.O.D

Depth m

0-21.4 Open hole drilling in black shale.
 21.4-22.0 Cavity - old workings in Halifax Hard Bed coal.
 22.0-24.0 Seatearth with rootlets - becoming lighter towards base.
 24.0-24.6 Light grey mudstone.
 24.6-24.9 Coarse dark grey mudstone.
 24.9-25.4 Dark grey mudstone.
 25.4-26.4 Mid grey shale.
 26.4-27.7 Dark grey shale.
 27.7-30.0 Black shale.
 Base of hole.

British Geological Survey

British Geological Survey

British Geological Survey

SE 10 NE - 8 16634 05092

Borehole No 2. Surface Level 323.40m A.O.D

Depth m

0-24.1 Open hole drilling in black shale.
 24.1-25.1 Halifax hard bed coal.
 25.1-25.5 Soft seatearth.
 25.5-26.0 Compact grey shale.
 26.0-26.9 Coarse grained grey shale.
 26.9-27.2 Coarse grey shale with carbonaceous partings.
 27.2-27.5 Soft grey shale.
 27.5-27.8 Fine grained grey shale.
 27.8-28.4 Grey shale becoming darker towards base.
 28.4-28.7 Dark grey shale becoming coarser grained towards base.
 28.7-29.3 Dark grey coarse grained shale.
 29.3-30.5 Fine grained mid grey shale.
 30.5-32.4 Black shale.
 Base of hole.

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

SE 10 NE - 7 16343 05118

Borehole No 1. Surface Level 354.49m A.O.D

Depth m

0-21.4 Open hole drilling in black shale.
 21.4-22.0 Cavity - old workings in Halifax Hard Bed coal.
 22.0-24.0 Seatearth with rootlets - becoming lighter towards base.
 24.0-24.6 Light grey mudstone.
 24.6-24.9 Coarse dark grey mudstone.
 24.9-25.4 Dark grey mudstone.
 25.4-26.4 Mid grey shale.
 26.4-27.7 Dark grey shale.
 27.7-30.0 Black shale.
 Base of hole.

SE 10 NE - 8 16634 05092

Borehole No 2. Surface Level 323.40m A.O.D

Depth m

0-24.1 Open hole drilling in black shale.
 24.1-25.1 Halifax hard bed coal.
 25.1-25.5 Soft seatearth.
 25.5-26.0 Compact grey shale.
 26.0-26.9 Coarse grained grey shale.
 26.9-27.2 Coarse grey shale with carbonaceous partings.
 27.2-27.5 Soft grey shale.
 27.5-27.8 Fine grained grey shale.
 27.8-28.4 Grey shale becoming darker towards base.
 28.4-28.7 Dark grey shale becoming coarser grained towards base.
 28.7-29.3 Dark grey coarse grained shale.
 29.3-30.5 Fine grained mid grey shale.
 30.5-32.4 Black shale.
 Base of hole.

SE 10 SE - 77 16431 04994.

Borehole No 4. Surface Level 369.70m A.O.D

Depth m

0-3.30 Open hole drilling in sandstone.
3.30-31.45 Open hole drilling in black shale.
31.45-31.55 Halifax Hard Bed coal.
31.55-31.60 Sandstone/ganister.
31.60-32.95 Soft grey mudstone.
32.95-33.45 Light grey mudstone.
33.45-34.95 Compact mudstone/shale.
34.95-36.45 Compact grey shale.
36.45-37.95 Dark grey shale.
37.95-40.40 Black shale.
40.40-42.15 Sandstone.
Base of hole.

SE10/28

Test Pumping Datum (if different from borehole datum)	<u>GROUND LEVEL</u>	above m below borehole datum (mbd)
Pump Suction Depth	<u>33.5 m</u>	mbd
Water Level (Start of Test)		mbd
Water Level (End of Test)		mbd
Pumping rate		m ³ /d : l/s
for		days/hours
Recovery to (from end of pumping)	<u>mbd</u> in	mins : hrs : days
Date(s) of measurements		
Please Supply Chemical Analysis If Available		

D. STRATA LOG

Geological Classification	Description of Strata	Thickness	Depth
(BGS only)		m	m
	TOP SOIL	0-40	0-40
	CLAY	0-60	1-00
	SANDSTONE	5-80	6-80
	GREY MUDDSTONE, SANDSTONE BANDS	3-30	10-10
	SANDSTONE, MUDDSTONE BANDS	3-70	13-80
	GREY MUDDSTONE, SANDSTONE BANDS	19-20	33-00
	SANDSTONE	0-50	33-50
	{continue on separate page if necessary}		
	Other Comments (eg gas encountered, saline water intercepted, etc)		

FOR OFFICIAL USE ONLY

FILE CONSENT NO BGS REF NO
 LICENCE NO USE OF BH NGR.....

C. TEST PUMPING SUMMARY (Please supply fully details on Form WR - 39)

SE10/29

Test Pumping Datum (if different from borehole datum)	<u>Ground Level</u>	above m below borehole datum
Pump Suction Depth	<u>30.0</u>	(mbd)
Water Level (Start of Test)	<u>18.0</u>	mbd
Water Level (End of Test)	<u>21.2</u>	mbd
Pumping rate	<u>2 m³/Hr</u>	m ³ /d : l/s
for	<u>4</u>	days/hours
Recovery to (from end of pumping)	<u>18.0 mbd</u>	in <u>44</u> mins : hrs : days
Date(s) of measurements		
Please Supply Chemical Analysis If Available	<u>(ATTACHED)</u>	

D. STRATA LOG

Geological Classification	Description of Strata	Thickness	Depth
(BGS only)		m	m
	TOP SOIL	0-40	0-40
	CLAY, SANDSTONE BANDS	1-40	1-80
	SANDSTONE	6-20	8-00
	GREY MUONSTONE, SANDSTONE BANDS	1-20	9-20
	SANDSTONE	7-60	16-80
	GREY MUONSTONE, SANDSTONE BANDS.	28-70	45-50
	{continue on separate page if necessary}		
	Other Comments (eg gas encountered, saline water intercepted, etc)		

FOR OFFICIAL USE ONLY

FILE	CONSENT NO	BGS REF NO
LICENCE NO	USE OF BH	NGR.....

SE 10 SE - 78 16073 04672

Borehole No 5. Surface Level 397.76m A.O.D

Depth m

British Geological Survey

British Geological Survey

- 0-28.50 Open hole drilling in black shale.
28.50-29.20 Cavity - old mine workings in Halifax Hard Bed coal.
29.20-29.40 Halifax Hard Bed coal Horizon.
29.40-30.50 Seatearth with rootlets.
30.50-31.00 Light grey mudstone.
31.00-32.20 Dark grey mudstone with plant remains.
32.20-32.80 Compact dark grey shale.
32.80-35.20 Dark grey shale.
35.70-37.90 Black shale.
37.90-38.20 Sandstone with rootlets.

Base of hole.

British Geological Survey

British Geological Survey

SE 10 SE - 79 16111 04470

Borehole No 6. Surface Level 397.15m A.O.D

Depth m

British Geological Survey

British Geological Survey

- 0-13.90 Open hole drilling in black shale.
13.90-15.60 Cavity - old mine workings in Halifax Hard Bed coal.
15.60-16.10 Seatearth.
16.10-17.10 Coarse grained seatearth.
17.10-18.60 Mid grey coarse grained mudstone.
18.60-20.10 Mid grey fine grained mudstone.
20.10-21.60 Dark grey mudstone.
21.60-23.80 Black shale.
23.80-23.95 Ganister.
23.95-24.00 Coal band.
24.00-24.50 Coarse grained sandstone.
24.50-25.25 Sandstone.
Base of hole.