ROGERS GEOTECHNICAL SERVICES LTD

The Ground Investigation Specialists

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ISO 9001 REGISTERED FIRM

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REPORT ON ROTARY PROBING

at

12 A ROWLEY LANE, LEPTON, HUDDERSFIELD, HD8 0DG

for

L & D FAWCETT LTD.

Report No J1563/10/E

September 2014

CONTENTS

REPORT ON ROTARY PROBING

at

12 A ROWLEY LANE, LEPTON, HUDDERSFIELD, HD8 0JG.

for

L & D FAWCETT LTD.

Report No J2776/14/E **September 2014**

1. INTRODUCTION

L & D Fawcett Ltd have constructed a detached dwelling on the land associated with 12a Rowley Lane, Lepton, Huddersfield. As part of the planning process a site investigation has been undertaken to establish the feasibility of a deep soakaway and to determine if coal workings are present beneath the site.

This report presents the data obtained and discusses the ground conditions in relation to the proposed development.

2. DESK STUDY

A letter report entitled Coal Mining Risk assessment was issued by ARP Geotechnical Ltd in December 2013. In that report it was concluded that the shallowest coal seam is the Better Bed coal, which is likely to be situated between 25m and 30m below ground level. In view of this risk it was suggested that a 'rock drilling investigation' is carried out to check the presence of any workings.

Prior to this investigation a preliminary desk study was undertaken which included the following:

- Review of the Mines Report
- Geological appraisal of the site
- Acquisition of licences.

2.1 Review of Mines Report

A mining report from the Coal Authority has been obtained, which is presented as Appendix 1 of this report. This report is summarised below.

Past
According to the records the site is in the likely zone of influence from workings in 1 seam at 240m depth and last worked in 1925. Any ground movement from these coal workings should have stopped by now. However, the property is in an area where the Coal Authority believes that there is coal at or close to the surface and that this coal may have been worked at some time in the past.

Present
The report indicates that the site is not in the likely zone of influence of any present underground coal workings.

Future
It is understood that the site is not in an area for which the Coal Authority has granted or is determining whether to grant a licence to remove coal using underground methods. Moreover, it is not in an area that is likely to be affected at the surface from any planned future workings. However, it was noted that 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
The report indicates that there are no known coal mine entries within, or within 20 meters of, the boundary of the property.

Coal Mining Geology
The Coal Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness due to coal mining that have made the property unstable.

Opencast Coal Mining
The property is not within the boundary or within 200m of an opencast site from which coal is being removed or has been removed in the past via opencast methods.

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

There is no current Stop Notice delaying the start of any remedial or repair works to the property

The Authority is not aware of any request having been made to carry out preventative 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.

2.2 Geological Appraisal

An examination of the 1: 50 000 scale British Geological Survey map of the area[1] along with published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: *Geological Data for the Site*

Strata Type	Strata Name[2]	Description[3]
Superficial Geology	None	
Solid Geology	Pennine Lower Coal Measures Formation	Inter-bedded 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.

A review of the geological maps and information provided in the ARP report has been undertaken, which confirmed that the Black Bed Coal seam outcrops upslope of the site above the junction of Rowley Lane and Hermitage Park. The next coal seam on the generalised vertical section is the Better Bed Coal, which is approximately 35m below the Black Bed Coal seam. Thus, the Better Bed Coal seam is expected at around 25m to 30m below the site.

2.3 Acquisition of Licence

In order to undertake this investigation it was necessary to obtain permission to enter or disturb Coal Authority interests. This was permission was granted on the 6th August 2014 as permit reference number 9532, which is presented in Appendix 2 to this report.

[1] Sources: British Geological Survey (NERC) Map Sheets 77; Huddersfield; Drift Edition and Solid Edition and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[2] Sources: BGS Geology of Britain Viewer
[3] Sources: BGS Lexicon of Named Rock Units

3. FIELDWORKS

3.1 Rotary Boreholes

The fieldworks were undertaken during the period 24th and 29th August 2014 in accordance with the instruction to proceed issued by L and D Fawcett Ltd. These works were required to prove that workings were not present to a depth of 30m beneath this site. In accordance with the licence this work was undertaken using a Dando Terrier and the RGS-001 rotary drilling rig using water flush drilling techniques. The locations of the boreholes are presented in Appendix 3. The results of this work are provided on the borehole records that are presented in Appendix 4.

3.2 Borehole Soakaway Test

One soakaway test was undertaken at a depth of 4.3m within borehole R1. At this location a borehole was drilled and a 100mm diameter temporary casing installed. The soakaway test was then undertaken utilising the base of the borehole as the soakage stratum. The results of this test are presented in Appendix 5.

4. STRATA CONDITIONS

The rotary probe boreholes initially encountered made ground to between 0.6m and 1.0m depth. On penetrating this zone, brown and yellow silty clay (drillers description) was proved to depths of between 2.3m in R1and 5.0m R2 with a 0.1m thick sandstone layer at 3.8m depth. This material is considered to represent the weathered fraction of the Pennine Lower Coal Measures.

Underlying the silty clays in R1, greyish brown sandstone was revealed to borehole termination at 9.0m, with a 1.0m thick layer of weak grey siltstone revealed at 5.0m depth. The borehole was stopped at this depth due to the loss of drilling flush, although no voids were detected. It is concluded that the loss of flush may be attributed to jointing or faulting within this material. This view was confirmed when R2 was sunk. At this location weak (becoming medium strong at 8.1m) grey siltstone was revealed to 30m depth with a 1.3m thick layer of mudstone observed at 26.4m depth. No coal seams or voids were detected during this work, indicating that the Black Bed Coal is at a depth greater than 30m below ground level, with competent rock above.

5. INSITU TESTING

The result obtained from the soakaway test is summarised below:

Table 3: *Soakaway Test Results*

BH	Depth (m)	Response Zone (m)	Soil Description (Base of BH)	Infiltration Rate (m/sec)	Drainage Characteristics
R1	4.3	100mm dia. x 300mm	Sandstone	4.8×10^{-5}	Good

6. DISCUSSION OF GROUND CONDITIONS

On the basis of all of the information provided above it is concluded that there are no shallow coal workings beneath this site. The Black Bed Coal seam is likely to be present at depths in excess of 30m below ground level. Moreover, the Coal Authority have indicated that there are workings in 1 seams at 240m, which were last worked in 1925. However, they have stated that any ground movement from these coal workings should have stopped by now. Therefore, it is considered that there is a null to negligible risk of ground movement as a consequence of coal workings beneath the site.

6.1 Soakaways

The soakage rate obtained during the investigation was found to be good. However, it should be appreciated that the test was undertaken within the sandstone, which was present in borehole R1. Borehole R2 revealed siltstones and mudstones at depth, which are of generally of lower permeability. Therefore, it is considered that the use of borehole soakaways is feasible provided that they are constructed in the area of R1 where the sandstone was revealed.

For and on behalf of
Rogers Geotechnical Services Ltd,

I.Sakoor BEng
Geotechnical Engineer

S.P. Rogers CEng, CGeol, MICE, MCIHT, FGS
Technical Director

APPENDIX 1

MINING REPORT

THE COAL AUTHORITY
200 LICHFIELD LANE
MANSFIELD
NOTTINGHAMSHIRE
NG18 4RG

Our reference:	**71000600646001**
Your reference:	**9532**
Date of your enquiry:	**21 July 2014**
Date we received your enquiry:	**21 July 2014**
Date of issue:	**22 July 2014**

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

Non-Residential Coal Authority Mining Report

SITE AT, 12A ROWLEY LANE, LEPTON, KIRKLESS,

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

The property is in the likely zone of influence from workings in 1 seam of coal at 240m depth, and last worked in 1925.

Any ground movement from these coal workings should have stopped by now.

In addition 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.

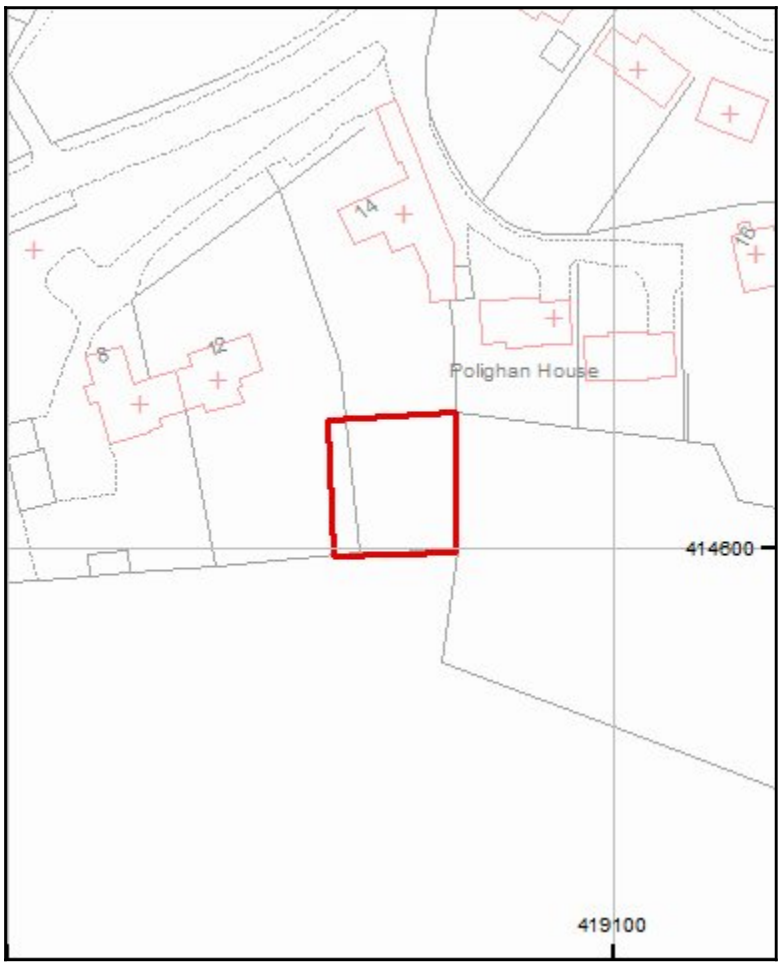
Additional Remarks

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 2006.

Location map

Approximate position of property

Enquiry boundary



Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey

APPENDIX 2

PERMIT TO ENTER OR DISTURB
COAL AUTHORITY MINING INTERESTS

The Coal Authority

Permit Reference Number 9532

Permission to Enter or Disturb Coal Authority Mining Interests

Name and Address of Permit Holder:

L & D Fawcett
Hollin House
Venery Close
Clayton West
HUDDERSFIELD
HD8 9XH

Site Location:

12a Rowley Lane
Lepton
Kirklees
HD8 0JG

This certificate hereby grants the above named Permit Holder permission to carry out :-

Investigation of Shallow Mine Workings by 3 Boreholes to approx 30m depth

within the Authority's mining interests at the identified site location for the period of 12 months from the effective date shown below. The granting of this Permission does not constitute advice given by the Authority in relation to the proposed operations. It is the Applicant's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.

Signed:  Effective Date: 6 August 2014

For and on behalf of The Director of Operations at the Coal Authority

Nominated Representative: Paul Hobson, Licensing and Permissions Manager;
The Coal Authority, Licensing & Permits Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel:372 ; E-Mail: paulhobson@coal.gov.uk

APPENDIX 3

SITE PLAN

Title: **Site Location Plan**

Rogers Geotechnical Services Ltd	Site Name: **12a Rowley Lane, Lepton** **L and D Fawcett Ltd**	Job No: **J2776/14/E**

APPENDIX 4

ROTARY BOREHOLE RECORDS

Borehole Log

Borehole No. **R1**

Sheet 1 of 1

Project Name: 14a Rowley Lane, Lepton	Project No. J2776/14/E	Co-ords: -	Hole Type RO
Location: Huddersfield		Level:	Scale 1:50
Client: L and D Fawcett Ltd.		Dates: 26/08/2014 -	Logged By IMY

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND. (Driller's description).
					0.80			
					0.90			MADE GROUND (Timber fragments). (Driller's description).
					1.00			Firm brown CLAY. (Driller's description).
								Yellow orange CLAY. (Driller's description).
					2.00			Yellow orange CLAY with gravel of sandstone. (Driller's description).
					2.30			Sandstone. (Driller's description).
					5.00			Weak grey SILTSTONE. (Driller's description).
								Poor return and poor flush.
					6.00			Greyish brown SANDSTONE with coal flecks. (Driller's description).
					7.90			Orangish brown SANDSTONE. (Driller's description).
					8.40			Greyish brown SANDSTONE with coal flecks. (Driller's description).
								Lost flush.
					9.00			End of borehole at 9.00 m

Remarks

Borehole Log

Borehole No. **R2**

Sheet 1 of 3

Project Name: 14a Rowley Lane, Lepton	Project No. J2776/14/E	Co-ords: -	Hole Type RO
Location: Huddersfield		Level:	Scale 1:50
Client: L and D Fawcett Ltd.		Dates: 26/08/2014 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND. (Driller's description).
					0.60			Orangish brown silty CLAY. (Driller's description).
					2.30			Brown silty CLAY with gravel. (Driller's description).
					3.80			SANDSTONE. (Driller's description).
					3.90			Orange silty CLAY with gravel. (Driller's description).
					5.00			Weak greyish brown SILTSTONE. (Driller's description).
					5.90			Weak grey SILSTONE. (Driller's description).
					8.10			Medium strong grey SILTSTONE. (Driller's description).
					8.70			Medium strong greyish brown SILTSTONE. (Driller's description).
					9.00			SILTSTONE. (Driller's description).
								Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

AGS

Borehole Log

Borehole No. **R2**

Sheet 2 of 3

Project Name: 14a Rowley Lane, Lepton	Project No. J2776/14/E	Co-ords: -	Hole Type RO
Location: Huddersfield		Level:	Scale 1:50
Client: L and D Fawcett Ltd.		Dates: 26/08/2014 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				

11
12
13
14
15
16
17
18
19
20

Continued on next sheet

Remarks

Borehole Log

Borehole No. **R2**

Sheet 3 of 3

Project Name: 14a Rowley Lane, Lepton	Project No. J2776/14/E	Co-ords: -	Hole Type RO
Location: Huddersfield		Level:	Scale 1:50
Client: L and D Fawcett Ltd.		Dates: 26/08/2014 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					26.40			MUDSTONE. (Driller's description).
					27.90			SILTSTONE. (Driller's description).
					30.00			End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

AGS

APPENDIX 5

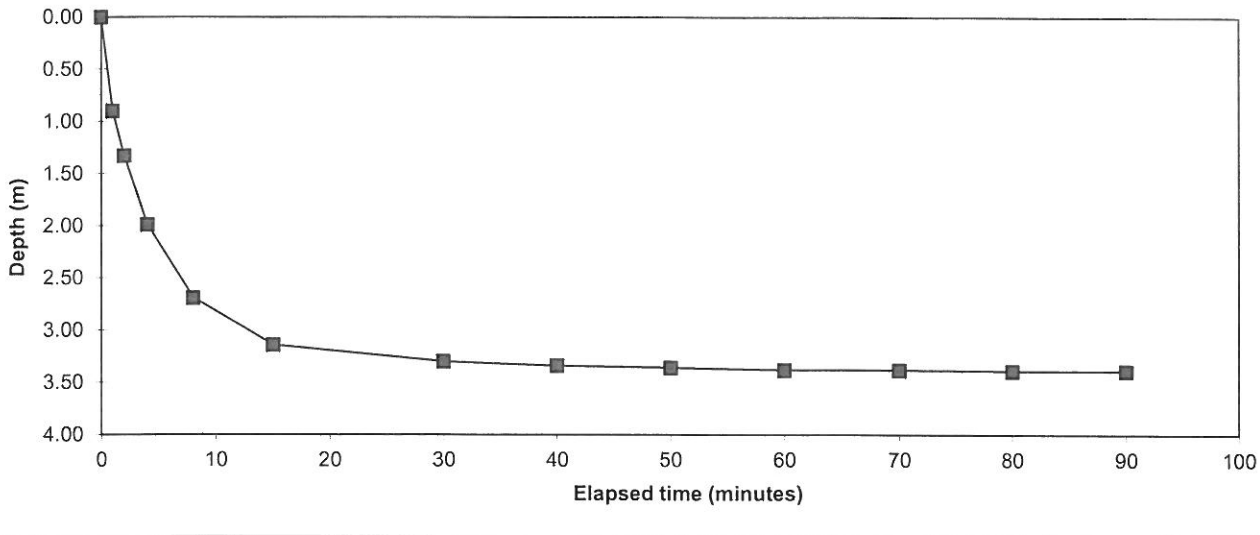
SOAKAWAY TEST RESULT

Rogers Geotechnical Services Ltd

Soakaway Test

Borehole No:	R1	Test No:	1	Date:	26/08/2014
Diameter (m):	0.100		Datum Height:		0.00 m agl
Casing Depth (m):	4.00				
Depth (m):	4.30				

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.000		
1	0.900		
2	1.330		
4	1.990		
8	2.690		
15	3.140		
30	3.300		
40	3.340		
50	3.360		
60	3.380		
70	3.380		
80	3.390		
90	3.390		



Start water depth for analysis (mbgl):	0.00	at 0 mins
End water depth for analysis (mbgl):	3.39	at 90 mins
Volume outflow between start and end water depths (m^3):		0.027
Mean surface area of outflow (m^2): (full exposed side area + base area		0.10
Time of outflow between start and end water depths (mins):		90.0

Soil infiltration rate (m/s):	**4.8E-5**

Remarks Soil infiltration rate calculated by in-house method

Client:	L and D Fawcett Ltd.	**R1**
Site:	12a Rowley Lane, Lepton.	