Environmental
Geotechnical
Specialists

PHASE 2
GEO-ENVIRONMENTAL
REPORT

job number	C5759/26/E/8948
date	02.04.26
site address	274 Cumberworth Lane Denby Dale Huddersfield HD8 8QS
written by	R. Palmer
checked by	I. Sakoor
issued by	R. Palmer

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Appendices

Report on a Phase 2 Geo-environmental Investigation

Location:	274 Cumberworth Lane Denby Dale, Huddersfield, West Yorkshire, HD8 8QS
For:	FHH Developments
Consultants:	Hinchcliffe Architecture & Design
Report No:	C5759/26/E/8948 Report date: April 2026

For and on behalf of **Rogers Geotechnical Services Ltd**

Rob Palmer MSc FGS ACIEH
Engineering Director

Imran Sakoor BEng FGS
Geo-environmental Engineer

Report Summary[1]

Item	Comments	Section
Development	Construction of two residential properties.	1.
Strata Conditions	Site cleared, with weathered fraction of the underlying rock at surface	4.
Geology	Pennine Lower Coal Measures Formation	5.
Mining Legacy	Workings recorded. Grouting and suitable foundations required.	9.
Contamination	No significant contamination identified.	10.
Ground Gas	Monitoring ongoing, albeit low levels recorded thus far.	10.

[1] This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.

1. Introduction

It is understood that the land at 274 Cumberworth Lane is to be developed by the construction of two residential properties. Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils, to assess their engineering properties and to assist in the design of safe and economical foundations for the proposed development. This investigation also takes into consideration the risk of any contamination present. This report describes the work undertaken, presents the data obtained and discusses the ground conditions in relation to the proposed works.

2. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

3. Desk Study

A Phase 1 Desk Study has been undertaken by Rogers Geotechnical Services (RGS) and the results were presented as report number C5759/26/E/8948 in March 2026. This report has been used during the current intrusive investigation.

4. Fieldworks

The fieldworks were undertaken on the 13th and 26th February 2026 and included the following:

- Three windowless sample boreholes.
- Installation of three gas monitoring standpipes.
- Three hand-dug trial pits.

The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report. It is of note that the property shown on the site plan was demolished prior to the fieldworks taking place and enabling works had been undertaken to make the site safe for the mobilisation of drilling rigs.

4.1 Windowless Sample Boreholes

These boreholes were sunk using a drive-in windowless sampler. The cores were undertaken in 1m lengths with a diameter of 87mm. The recovered cores were sealed and returned to the laboratory

for logging. The soils were described in general accordance with BS5930: 2015 +A1: 2020 and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

4.2 Gas Monitoring Standpipes

Gas monitoring standpipes were installed 1.0m depth (rockhead) in all of the boreholes and the installation details are shown on the appropriate borehole records. In all cases, the monitoring standpipe consisted of a perforated pipe from the base of the borehole to 0.3m below surface, with a non-perforated pipe to ground level. The response zone was filled with pea gravel, with a bentonite seal above, and the installation was capped with a stop box cover in a concrete surround.

4.3 Hand-dug Trial Pits

These trial pits were undertaken with hand-held equipment in order to obtain suitable environmental samples. The recovered samples were sealed and transported directly to the laboratory for testing. The soils were described in general accordance with BS5930: 2015 +A1: 2020 and full descriptions are given on the records in Appendix 3.

5. Geology

The available 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]	Previous Name[4]	Description[3]
Superficial Geology	N/A	N/A	Not indicated to underlie the site.
Solid Geology	Pennine Lower Coal Measures Formation	-	Unnamed sandstone member.

The Whinmoor Coal outcrops nearby and is recorded to have been worked beneath the site itself.

[2] Sources: British Geological Survey (NERC) Map Sheets 86; Glossop; Solid and Drift Edition, and GeoIndex Onshore Viewer [*online resource from www.bgs.ac.uk*]
[3] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

6. Mining Investigation – Haigh Huddleston

In view of the risks from coal mining, the client had a series of boreholes drilled to assess the presence/absence of mine workings. The drilling was undertaken by D&G under permit 31212, and the results of the drilling investigation were presented by Haigh Huddlestone as report E26/8406/R003 in February 2026. In general, the rockhead was recorded at 1.5m. Thereafter, interbedded layers of mudstone and sandstone were recorded to 5.5m and 8.0m depth, whereupon broken strata or the intact Whinmoor Coal was recorded. The intact coal was recorded to be between 1.0m and 1.5m in thickness. The 'worked' ground varied in thickness between 1.0m and 1.5m, albeit in some places the crown collapse resulted in broken ground up to 3.9m thick. A lower seam was intermittent at deeper depths, but was not worked and was laterally inconsistent.

It is understood that a series of grouting is to be undertaken, the specification of which is presented within the Haigh Huddleston report. It is also understood that a suitable raft foundation will be designed in due course.

7. Insitu Testing

7.1 Gas and Water Level Monitoring

The standpipes were monitored between the 20th February and the 13th March 2026. The results of the gas monitoring undertaken to date are tabulated below and full results are presented in Appendix 5:

Table 3: Gas Monitoring

Location	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (l/h)	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
WS01	20.02.2026	0.0	0.0	20.4	0.0	987↔	-	1.10
	27.02.2026	0.0	0.0	20.7	0.0	986↑	-	
	06.03.2026	0.1	0.2	21.7	0.0	1001↑	-	
	13.03.2026	0.1	0.6	21.7	0.0	970↓	-	
WS02	20.02.2026	0.0	0.4	20.1	0.0	987↔	-	1.10
	27.02.2026	0.0	0.5	20.5	0.0	986↑	-	
	06.03.2026	0.1	0.5	21.6	0.0	1001↑	-	
	13.03.2026	0.0	0.1	21.5	0.0	970↓	-	
WS03	20.02.2026	0.0	0.0	20.1	3.3	987↔	-	1.10
	27.02.2026	0.0	0.8	19.7	0.0	986↑	-	
	06.03.2026	0.0	1.3	21.0	0.0	1001↑	-	
	13.03.2026	0.1	1.5	20.2	0.0	970↓	-	

↑ - rising pressure ↓ - falling pressure ↔ -steady pressure

8. Laboratory Testing - Environmental

A suite of testing was conducted on samples from across the site and the following regime was undertaken.

- Metals – Cd, Cr^{VI}, Cu, Hg, Ni, Pb, V and Zn.
- Semi and Non-Metals - As, Se, Free CN^- and Phenols.
- Polycyclic aromatic hydrocarbons (PAHs).
- Petroleum hydrocarbons (TPHs).
- Others – pH, organic content and total/soluble SO_4^{2-}.
- Asbestos.

This testing was undertaken by i2 Analytical Ltd and the results of all of the chemical testing are presented in Appendix 6 of this report.

9. Discussion of Ground Conditions – Environmental

9.1 Discussion of Test Results

It is understood that the site is to be developed by the construction of two residential properties. Consequently, the site may be classified as residential with plant uptake.

9.1.1 Soil Samples

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. With respect to the results it should be appreciated that the soil organic matter (SOM) content for the samples tested was found to range between 0.7% and 0.9%. On this basis, it is considered that the screening values associated with 1% SOM should be adopted. These values have been derived in such a way as to adhere to the principles within the revised CLEA model and include the most current release of the SGVs. A list of subscribers is provided within the website[4] and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 6. These results indicate the following:

Table 4: Summary of Contaminated Areas

Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with plant uptake)
TPA	0.20	None.
TPB	0.30	None.
TPC	0.50	None.

Concentrations of cadmium, $chromium^{VI}$, mercury, selenium, free cyanide, phenols (total) and total petroleum hydrocarbons (aliphatic C5 to C12; aromatic C5 to C12) were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the

[4] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

associated Atrisk Soil Screening Values. In addition, no asbestos was detected within the soil samples tested.

On the basis of the above information, the results of the investigation have concluded that the site is uncontaminated in regards to the intended end use.

9.1.2 Gas Concentrations

With respect to ground gas, the results of the monitoring visits indicated a maximum concentration of 0.1% methane, with concentrations of carbon dioxide ranging between 0.0% and 1.5%, in association with oxygen levels of between 19.7% and 21.6%. It should be appreciated that on non-contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a negligible flow rate was recorded, as such, an assumed value of 0.1% will be employed in the following calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low or falling barometric pressure, preferably below 1000mb. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 970mb and 1001mb.

In order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 0.1% (0.001) methane was recorded along with 1.5% (0.015) carbon dioxide, in association with a maximum flow rate of 0.1 l/hr. This results in a GSV of 0.0001 l/hr for methane and a GSV of 0.0015 l/hr for carbon dioxide.

In accordance with Table 2 of BS8485: 2015*, Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings,* the site may be characterised as *Characteristic Situation Level 1*. It is therefore considered that there is a very low risk of harm to end users and site operatives and no special precautionary measures are required in accordance to Table 8.6, *Typical scope of gas protection measures,* of CIRIA report C665.

With regard to the number of monitoring visits required reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007)[5]. Accepting that the proposed development is of high sensitivity and that the generation potential is very low, these tables suggest that 6 readings could be undertaken over a period of 3 months. However, C665 notes that *not all sites will require gas monitoring for the period and frequency indicated in Tables 5.5a and 5.5b.*

In this case, a total of 4 monitoring visits were undertaken over a four-week time period. It is recommended that another 2 visits are completed within the next 8 weeks.

[5] Adapted from tables 5.5a and 5.5b of CIRIA C665, 2007, *Assessing risks posed by hazardous ground gas to buildings, p60.*

9.2 Site Specific Risk Assessment

9.2.1 Approach

The presence of contamination hazards and the risks associated with them should be assessed in accordance with industry practice and the 'suitable for use' approach. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency[6] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[7] This method dictates that there must be a risk of contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed, DEFRA and The Environment Agency state that 'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'[8]

9.2.2 Conceptual Ground Model and Risk Assessment

In view of the results of the chemical testing undertaken the conceptual site model is presented accordingly as Table 5.

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

N/A - A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.

Low - A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.

Moderate - The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary

High - The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

The results of the risk assessment are presented in Table 5.

[6] R&D Publication CLR 8, 'Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research'.
[7] The pollution linkage approach was developed by 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990' which provides meanings for the terms contained in The Environmental Protection Act 1990 Part IIA, the primary legislation for addressing the issues of contaminated land.
[8] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

Table 5: Conceptual Site Model and Site-Specific Risk Assessment				
Conceptual Site Model			**Site Specific Risk Assessment**	
Pathways	**Receptor**	**Linkage Present?**	**Risk Rating**	**Actions Required**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – contact with soil likely during works, however. no contamination encountered during works.	Low	No further action required.
	End User	Yes – site to be developed into residential dwellings with landscaped areas. Contact with soil may be likely after works, however. no contamination encountered during works.	Low	
	Neighbours	Yes – immediate neighbours present, however. no contamination encountered during works.	Low	
Inhalation of Dust/Vapours	Operative	Yes – dust may be produced during works, however. no contamination encountered during works.	Low	No further action required.
	End User	Yes – dust may be derived after works, however. no contamination encountered during works.	Low	
	Neighbours	Yes – immediate neighbours present, however. no contamination encountered during works.	Low	
Ingestion of fruit/vegetables and/or waters	Operative	No – no edible plants or contained water sources in the area of the proposed new works.	N/A	No further action required.
	End User	Yes – site to be developed into residential dwellings and landscaped areas are presumed to be present, however. no contamination encountered during works.	Low	
	Neighbours	Yes – immediate neighbours present, however. no contamination encountered during works.	Low	
Migration of hazardous gases via permeable strata or shallow mining activity	Operative	Yes – low concentrations of methane and carbon dioxide have been found to be present at the site (assuming *Characteristic Situation Level 1*).	Low to Moderate	Low concentrations of harmful gases (methane and carbon dioxide) were detected at the site. Gas monitoring schedule to be completed in due course.
	End User		Low to Moderate	

	Neighbours			
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – known controlled waters within 250m, however. no contamination encountered during works.	Low	No further action required.
Migration via permeable unsaturated strata	Controlled Waters	Yes – a secondary A aquifer is present beneath the site, however. no contamination encountered during works.	Low	
Run off via drainage/sewers etc	Controlled Waters	Yes – old services may be present on site, however. no contamination encountered during works.	Low	
Direct contact with contaminated soils	Plants	Yes – no contamination present at the site.	Low	No further action required.
Uptake via root system			Low	
Direct contact with contaminated soils	Building Materials	No – contamination within tolerable limits.	Low (plastic services)	
Direct contact with contaminated groundwater			Low (buried concrete)	
Exposure to Radon	Operative	No – Not in a radon affected area.	N/A	Less than 1% of properties are above the action level. No radon protection measures required.
	End User			
UXO Risk	Operative	No – it is considered that the activities of the end users are unlikely to affect any UXO devices that may be present below the site.	Low	No further action required.
	End User			

9.3 Indicative Remediation Strategy

In view of the site specific risk assessment it is considered that remediation will unlikely be required at this site. This will need to be reviewed once the gas monitoring programme is completed.

10. Recommendations for Further Work

- This report should be forwarded to the relevant authorities as soon as practicable to ensure they have sufficient time to review and discuss any issues.
- Completion and reporting of recommended additional gas monitoring.
- Produce a Remediation Strategy if elevated ground gas is detected.
- Detailed design of the sub-structure.

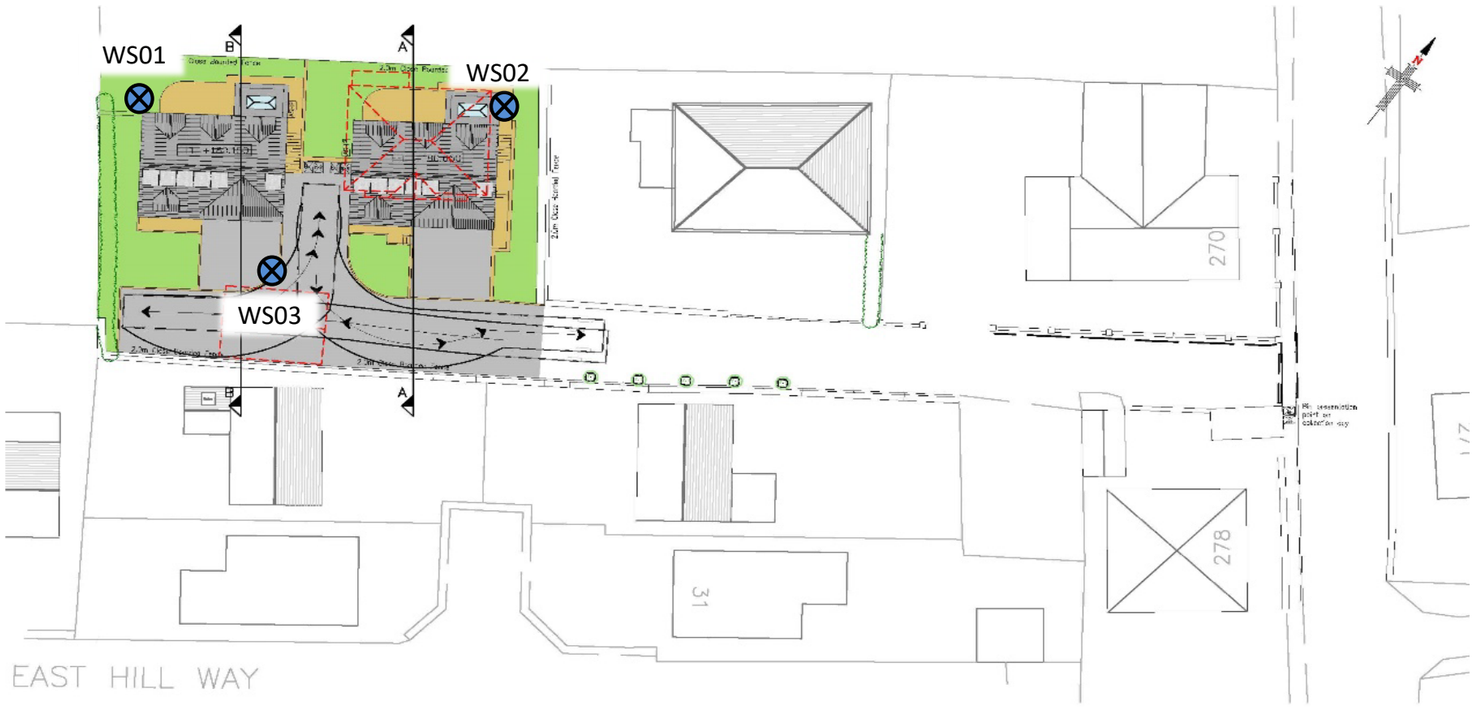
Clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

11. References

- British Geological Survey (NERC) (2026), BGS, Keyworth.
  - Geology of Britain Viewer: (*http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html)*
  - Lexicon of Named Rock Units:
  - (*http://www.bgs.ac.uk/lexicon/)*
- British Standards Institution (1990) BS1377: *British standard methods of test for soils for civil engineering purposes,* B.S.I., London.
- British Standard Institution (2005 +A1: 2011) BS EN ISO 22476-3: *Geotechnical investigation and testing – Field testing, Part 3: Standard penetration test,* B.S.I., London.
- British Standards Institution (2015 +A1: 2020) BS 5930: *Code of practice for ground investigations,* B.S.I., London.
- British Standards Institution (2011), BS 10175: *Investigation of potentially contaminated sites – Code of Practice,* British Standards Institute.
- British Standards Institution (2015 +A1:2019) BS8485: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings,* B.S.I., London.
- British Standards Institution (2013), BS 8576 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds.
- British Standards Institution (2017) BS EN ISO 14688: *Geotechnical investigation and testing – Identification and classification of soil*, B.S.I., London.
- Building Research Establishment (BRE) Special Digest 1 (2005), Third Edition: Concrete in aggressive ground, BRE Press, Garston.
  - Part C: *Assessing the aggressive chemical environment.*
  - Part D: *Specifying concrete for general cast-in-situ use.*
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – Final SC050021/SR2, *Human Health toxicological assessment of contaminants in soil*. Environment Agency, Bristol.
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – SC050021/SR3, *Updated technical background to the CLEA model*. Environment Agency, Bristol.
- Department for Environment, Food and Rural Affairs (2014) SP1010: *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document*.
- Wilson S, Oliver S, Mallet H, Hutchings H, Card G, *Assessing risks posed by ground gasses to buildings,* CIRIA Report C665.

Appendix 1

Site Plan



Proposed Site Layout

Notes:

Investigation positions approximated from site operative's notes.

RGS Environmental Geotechnical Specialists

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Client:

FFH Developments

Job Number:

C5759/26/E/8950

Project Details:

274 Cumberworth Lane
Denby Dale

Scale:	Not to scale - reference only

ENVIRONMENTAL GEOTECHNICAL GEOLOGICAL

Appendix 2

Borehole Records

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **WS01**

Sheet 1 of 1

Project Name:	274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords:
Location:	Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Level:
Client:	FHH Developments		Dates: 13/02/2026

Hole Type: WLS

Scale: 1:25

Logged By: RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		1.00	SPT	87	95	N=35 (6,7/8,9,9,9,9)	1.45			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
										End of Borehole at 1.45m

Remarks

AGS

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: 274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords:	Hole Type WLS
Location: Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Level:	Scale 1:25
Client: FHH Developments		Dates: 13/02/2026	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		1.00	SPT	87	95	N=40 (7,8/9,8,10,13)	1.45			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
										End of Borehole at 1.45m

Remarks

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **WS03**

Sheet 1 of 1

Project Name: 274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords:	Hole Type WLS
Location: Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Level:	Scale 1:25
Client: FHH Developments		Dates: 13/02/2026	Logged By RP

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		1.00	SPT	90	100	N=49 (9,10/11,11,13,14)	1.45			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
										End of Borehole at 1.45m

1 2 3 4 5

Remarks

AGS

Appendix 3

Trial Pit Records

Trial Pit Log

Trialpit No
TPA
Sheet 1 of 1

Project Name: 274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords: - Level:	Date 26/02/2026
Location: Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Dimensions (m): Depth 0.60	Scale 1:25
Client: FHH Developments			Logged RP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.60			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION End of pit at 0.60 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TPB
Sheet 1 of 1

Project Name: 274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords: - Level:	Date 26/02/2026
Location: Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Dimensions (m): Depth 0.60	Scale 1:25
Client: FHH Developments			Logged RP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.30	ES		0.60			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION End of pit at 0.60 m

Remarks:

Stability:

Trial Pit Log

Trialpit No
TPC
Sheet 1 of 1

Project Name: 274 Cumberworth Lane	Project No. C5759/26/E/8950	Co-ords: - Level:	Date 26/02/2026
Location: Denby Dale, Huddersfield, West Yorkshire, HD8 8QS		Dimensions (m): Depth 0.60	Scale 1:25
Client: FHH Developments			Logged RP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.60			Firm to stiff grey mottled orangish brown slightly gravelly silty CLAY. WEATHERED PENNINE LOWER COAL MEASURES FORMATION End of pit at 0.60 m

Remarks:

Stability:

Appendix 4

Haigh Huddleston Report

Haigh Huddleston & Associates
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DRILLING AND GROUTING SPECIFICATION

FOR

GROUND STABILISATION WORKS

AT

274 CUMBERWORTH LANE, DENBY DALE

FOR

FHH DEVELOPMENTS LTD

FEBRUARY 2026

E26/8406/R003

Haigh Huddleston Associates is the trading name of Haigh Huddleston Associates Limited
Registered Office: Unit 4, Midgley Business Park, Bar Lane, Midgley, Wakefield, WF4 4JJ
Registered in England Number 6458196

INDEX

1.0 INTRODUCTION

Haigh Huddleston & Associates have been instructed by Demolition and Geotechnical to prepare a specification for the treatment of the proposed shallow mine workings identified at 274 Cumberworth Lane on behalf of FHH Developments.

The specification is based upon the findings of the previous site investigation works undertaken on site by Demolition and Geotechnical in February 2026.

It is proposed to undertake ground stabilization works of the shallow workings identified at the site through the use of drilling and grouting methods.

The specification is divided into two parts. The first summarizing the findings of the investigation works to date, with the second providing a general specification for the stabilization works to be undertaken.

2.0 SITE DETAILS AND PREVIOUS INVESTIGATIONS

2.1 THE SITE

It is located to the north of Denby Dale village center. The proposed development site is located approximately 230m to the northwest of the junction of Cumberworth Lane and the A631 Wakefield Road.

At present the site serves a single detached residential dwelling and garage. Both of which are proposed to be demolished. The site is bound by fields to the northwest, residential dwellings to the west and south with associated private driveways.

The site levels are relatively flat with a 1-1.5m fall from the northern to the southern boundary. The proposals involve the demolition of the existing dwelling and garage and the construction of two new detached residential dwellings in their place including access and parking. The development proposed can be found in Appendix A.

2.2 PREVIOUS INVESTIGATION WORKS

A total of eleven deep rotary boreholes were drilled on site as part of the aforementioned investigation works. The holes were taken down to depths of 9.0-30.0m below existing ground levels.

BH No.	SOIL/CLAY	MUDSTONE/ SANDSTONE	SOFT/ BROKEN STRATA	COAL WHINMOOR COAL(THK)	ROCK COVER (M)	MUDSTONE	COAL WHINMOOR COAL (THIN)	ROCK COVER
BH1	0.00-1.50	1.50 - 7.50	7.50 – 8.50		6.00			
BH2	0.00 – 1.50	1.50 – 7.50	7.50 – 8.50		6.00			
BH3	0.00 – 1.50	1.50 -7.50	7.50 – 8.50		6.00			
BH4	0.00 – 1.50			7.50 – 8.50	6.00			
BH5	0.00 – 1.50	1.50 – 7.50	7.50 – 9.00		6.00			
BH6	0.00 – 1.50	1.50 – 7.50	1.50 – 7.50	7.50 – 8.70	6.00	8.70 – 18.50	18.50 – 19.50	9.80
BH7	0.00 – 1.50	1.50 – 7.50	7.50 – 9.40		6.00	9.40 – 12.0		
BH8	0.00 – 1.50	1.50 – 6.70	6.70 – 9.40		5.20	9.40-12.0		
BH9	0.00 – 1.50	1.50 – 5.50	5.50 – 9.40		4.00	9.40-12.0		
BH10	0.00 – 1.50	1.50 – 8.0		8.00 – 9.50	6.50	9.50-15.0		
BH11	0.00-1.50	1.50 – 7.50		7.50 -9.00	6.00	9.0-18.5	18.5 -19.5	10.00

Solid coal was encountered in two of the boreholes 06 and 11 this enabled the borehole to be extended without the loss of flush. The upper coal seam encountered was confirmed as 1.2-1.5m thick this is consistent with the Whinmoor Coal Seam (Cumberworth Thick). A lower coal seam was also proved intact within both of these boreholes at 18.5-19.5m (1.0m thick), this is likely to be associated with the Whinmoor (Cumberworth Thin). Solid mudstone strata was proved in BH11 to a depth of 30m.

Soft / broken strata was encountered in the remaining 9 of the 11 boreholes undertaken within the upper Whinmoor Coal seam. The majority of the boreholes recorded 1.0-1.5m of broken strata, however BH's 08 and 09 found up to 3.9m of broken strata. This indicates that the workings have migrated towards the surface within these boreholes.

No evidence of workings have been encountered within the lower seam. Based on the thickness of the lower seam encountered there is approximately a ratio of x10 rock cover to this seam of mudstone between the two coal seams encountered.

3.0 PROPOSED WORKS

The grouting layout upon which this specification is based is drawing ref E26/8406/033 included in Appendix A.

Generally, the treatment proposals can be summarized as follows:

- Beneath the footprint of the buildings, the boreholes have been based on a 3x3 grid.
- Beneath the proposed driveway, the boreholes have been based on an offset 3x3 grid.
- Where solid coal is encountered within the upper seam the borehole should be extend to prove the lower seam is intact. At present we do not envisage treatment of the lower seam will be necessary, however further investigation should be undertaken during the drilling and grouting works.
- Two no. shafts (422408-075 & 422408-076) are indicated slightly beyond the southwestern corner of the site boundary. We would propose a site strip is undertaken within the corner adjacent to the shafts to confirm the shafts are not located within the site. We would recommend an area of 10 x 10m is cleared to prove natural strata in this area of the site.

Note if the shafts are found within the boundary of the site further assessment would need to be undertaken as to their treatment and relationship to any new construction work proposed.

The boreholes may require casing where undertaken within the former footprint of the house to avoid loss of flush in the upper fill material.

4.0 GENERAL SPECIFICATIONS

4.1 CONSTITUENT MATERIALS FOR GROUTING

Water shall be from a mains supply or other source and will be provided by the client.

Cement shall be Ordinary Portland Cement, complying with BS12.

PFA complying with BS EN 12715:2000 shall be conditioned hopper ash, or dry powder ash, or a type suitable as a constituent for grout and obtained from an approved supplier.

Sand shall generally comply with BS882 and be of a grading suitable for use in the drilling contractor's plant. Pea gravel shall also comply with current guidance, if this is required to be used in the works.

Thixotropic admixtures shall be bentonite, or other such admixture as presented by the drilling contractor. Details of these materials shall be supplied as required.

4.2 STORAGE AND USE OF MATERIALS

Storage of materials shall be such as to prevent contamination and deterioration. Cement shall be kept in a dry location, and the sequence of deliveries recorded so that cement can be used in rotation.

PFA shall be stored within a predefined area and will be kept dampened to mitigate against fugitive dust.

4.3 GROUTING PLANT

The contractor shall submit for approval the details of the proposed method of mixing, and pumping of grout to the injection points, together with the means of monitoring grouting pressures and the quantities injected. The materials shall be introduced into the mixer via approved methods (volume batching).

The grout mixer shall be capable of producing a homogenous mix, all particles being thoroughly wetted without segregation.

4.4 GROUT MIXES

In due consideration to the proposed residential development of the site, the filling material (grout) shall generally consist of a PFA: cement grout, which should be mixed in the proportions of up to 10:1 where water is present.

Cubes will be formed from grout mixes with crushing strengths of not less than 1 MN/m2 at 28 days.

Where excessive lateral flow of grout is anticipated or when voids greater than 500mm are encountered, the RE may order or agree to the addition of sand or pea gravel to the mix in accordance with CIRIA C758D. The specified grout mix shall have the minimum water content consistent with effective pumping.

4.5 GROUT PROPERTIES AND TESTING

With water / (cement and PFA) ratios generally in the range of 0.4 to 0.45, (including the moisture in the aggregates), the mixes proposed should produce pumpable grout with flowability readings of between 300 to 600mm, when measured in a meter of the “Colcrete” type. The sample for the flowability test shall be obtained by the grouting contractor at the point of injection i.e. from the end of the tremie pipe. A minimum of two flowability tests per week shall be performed by the contractor.

Bleed capacity should be limited to 5% maximum unless agreed otherwise. A minimum of two bleed capacity tests shall be performed by the contractor per shift, or as directed the resident engineer (RE). The sample of grout for the test shall be taken from the point of injection, i.e. the end of the tremie pipe.

Bleed capacity shall be measured in a clear plastic or glass graduated cylinder which has an internal diameter not less than 75 mm and with a volume of approximately 1000 ml. After placing the grout, a cover shall be placed over the cylinder to avoid evaporation. Bleed capacity shall be read at hourly intervals for neat cement grout, and readings should continue for not less than 3 hours. For PFA: cement grouts, readings should continue for not less than 6 hours.

The contractor shall prepare two sets of test cubes of grout per week, or as directed by the RE, with all testing to be commenced within 48 hours of samples/cubes being obtained. Each cube shall be of

100 mm side, or as agreed with the RE, and shall be taken from the grout at the point of injection, i.e. the end of the tremie pipe.

At the instruction of the RE, the contractor shall arrange for them to be tested by crushing at 7 and 28 days in accordance with BS 1881. The testing shall be carried out by an independent UKAS-Accredited laboratory or as agreed with the RE. As stated previously, mixes shall produce cubes with crushing strengths of not less than 1 MN/m2 at 28 days. If the RE considers that the results of the test indicate that a change of mix proportions is required, then the contractor shall make such modifications as the RE may direct.

4.6 DRILLING PROCEDURE

All boreholes to be used for the injection of grout, including those which strike coal pillars, shall be drilled by rotary or rotary percussive techniques down to a minimum of 1.0m beyond the base of the old workings in the seam or the floor of the seam itself whichever is greater. The drilling system and flushing medium to be used shall be as instructed on the Coal Authority licence, and approved by the RE. The Contractor shall allow for the provision of appropriate dust suppression for those holes that are to be drilled near sensitive receptors (e.g. nearby houses, highways, active commercial properties, car parks and public footpaths).

The minimum diameter of the holes shall be 75mm unless otherwise specified by the RE. When it is impracticable to drill at the minimum diameter for the full depth, the diameter of the boreholes shall be increased in the upper lengths.

Boreholes shall be temporarily cased through superficial deposits down to the rockhead and if directed by the RE, down through the rock strata. The boreholes shall be kept open until grout injection into the workings and rock is complete. Where a borehole proves abortive because it becomes obstructed, it shall be re-drilled in a suitable location as directed by the RE, at a large diameter and re-cased.

Boreholes shall be formed in general accordance with the locations shown on the plan in Appendix A. Any deviation from this proposed layout including the drilling of additional secondary and tertiary holes shall be recorded by the Contractor and a revised borehole location plan provided to the RE.

4.7 GROUT PROCEDURE

The aim of the stabilisation work is to substantially fill any old workings within the coal seam as well as any voids or broken ground found within the overlying strata in order to prevent the development of crown holes at the surface/foundation level.

Immediately prior to grouting each borehole, the Contractor shall check that it is unobstructed to the required depth to receive the tubing or tremie pipes for grout injection. Obstructions shall be dealt with as described in 'drilling procedures' above.

Grout shall be injected into each hole via an approved flexible tube, or series of steel tubes, placed to the base of the hole or to such other depth to receive the tubing or pipes for grout.

Grouting shall proceed upwards from the base of each borehole to the base of the surface deposits. It is not intended that, as a general rule, significant quantities of grout shall be injected into the surface deposits unless specified otherwise. This requirement will be subject to RE review.

The grout shall be injected at the approved rates until grout appears near the point of injection, when the borehole shall be deemed complete. If the is criteria is reached quickly, the grout tubes shall be lifted to check that a local obstruction is not preventing flow of the grout into the strata.

Pressure shall be applied to the grout in every borehole. If grout has not appeared at the point of injection after 5 tonnes of grouting materials have been introduced then sand and/or pea gravel (gravel which passes through a 6.33mm sieve and is retained on a 2.36mm sieve) may be added to the mix or placed down the borehole.

4.8 SERVICES

Prior to commencing drilling and grouting works on site, the client is to locate and mark the locations of all underground services and drains/sewers passing through the site, to enable the contractor to make allowances for working around and protecting all live services and drains/sewers.

When introducing grout into any borehole, the contractor shall ensure by regular inspections throughout the day that the grout is not escaping into adjacent underground service ducts and drains/sewers. In the event that any such leakage is detected, the drilling contractor shall

immediately suspend the grouting operations and commence to remove any accumulated grout at their own expense.

4.9 VALIDATION

When directed by the RE, the contractor shall test the consolidated ground for permeability and strength.

Permeability by grout acceptance testing shall be checked by drilling a minimum of four test holes in positions to be selected by the RE and injecting grout at pressures appropriate to the depth, all in accordance with the requirements for infilling grouting. If the RE considers that the quantities of grout accepted are excessive, then further holes shall be drilled and grouted at the rates and prices agreed.

After testing, boreholes shall be completed in accordance with the requirements for grouting infill holes.

4.10 RECORDS

The Contractor shall prepare and keep available for inspection on site, plans showing the positions of all boreholes, daily drilling records (containing the information detailed below), together with the total amounts of grout injected. The plans shall be updated daily in conformity with the daily drilling records noted below.

On completion of the works, the Contractor shall give fair copies of the plans and sections to the RE within one week of completion of the grouting works.

As works proceed, the Contractor shall maintain separate daily records for drilling, for grouting and for materials and plant received in a form to be approved by the RE. The daily records signed by the contractor's agent shall be submitted each day to the RE for his agreement. The contractor shall provide one copy of the agreed record for the RE's retention and keep a further copy available for inspection on site.

Daily drilling records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Method of boring or drilling
7. Type, diameter and depth of casing used
8. Diameter and depth of hole at the beginning and end of each working day or shift
9. Loss of any flushing medium during drilling
10. Standing time, with reason, or time lost overcoming obstructions
11. Details of underground services located
12. Details of any settlement or ground heave
13. Daily and cumulative length drilled
14. Depth to each major change of stratum
15. Description , with identification, of the stratum and whether it is intact or broken
16. Each depth at which groundwater is encountered (if apparent), the depth to which it rose and any steps taken to stop the flow
17. Depths at which any samples are taken
18. Details and results of any permeability tests instructed by the RE
19. Details of any voids or suspected workings
20. Details of any emissions of gas, water, etc.
21. Depth of completed borehole

Daily grouting records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Details of type of injection grout-line dimensions and length of standpipes inserted
7. Type of grout mix and volumetric quantity injected including total quantity by weight by each type of grouting material introduced
8. Grout pressures recorded, with the corresponding depths
9. The results of all flow and bleed tests
10. Details of casing abandoned
11. Details of grouting materials delivered to the site and a running total of each of the materials delivered
12. The nature, frequency and results of all inspections of services to check for grout penetration
13. Details of all stoppages or delays and any other relevant information

The daily records of materials and plant received shall show in particular that day's quantities by weight of each type of material and cumulative quantities. With the daily records, the contractor shall submit to the RE copies of receipts or invoices for all materials delivered and he shall keep them on site until the Works are complete. Notwithstanding the information listed above, the contractor shall provide any other information required by the RE.

On completion of the drilling and grouting works, the RE shall prepare a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification.

APPENDIX A

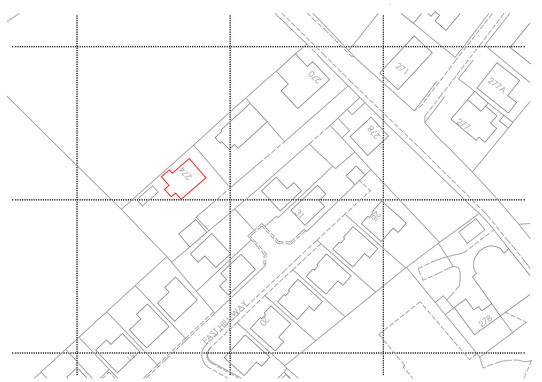
SITE LOCATION PLAN

SITE INVESTIGATION PLAN

DRILLING AND GROUTING GRID

Location Plan

Scale 1:1000



Survey Control Co-ordinates

Reference	East	North	Elevation	Description
GPS01	422697.467	408651.480	181.12	Survey Station
H02	422741.765	408685.533	182.31	Survey Station
H03	422687.014	408664.879	182.47	Survey Station
H04	422679.284	408640.628	180.74	Survey Station

Site Survey Control & Datum Information

Grid Orientation:

Survey relsted to Ordnance Survey "OSGB15" at control point GPS01 and the survey data was processed on a plane grid. (No Scale Factor)

Level Datum:

OS Orthometric Hts

Control & Datum Information

Co-ordinates and levels are based upon OSGB 1936 National Grid (OSG836) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSTN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

Contours are shown at 0.5m intervals.

0 5m 10m 15m 20m

SCALE 1:200

Rev	Description	By	Date

Surv.	Drawn	Date	Chkd	Date
NH	NH	23.12.24		

Hinchliffe Architecture & Design Ltd
24 Carr View Road, Hepworth, Holmfirth, HD9 1HX

Holden Surveys Ltd
Topographical Building & Site Surveys - CAD Services

T: 0773 4936469 E: holdensurveys@msn.com

Title. Site Plan

Site. 274 Cumberworth Lane
Denby Dale
Huddersfield

COMPUTER GENERATED DRAWING - DO NOT ALTER

Dwg No. HADL_34_Cumberworth Lane

Sheet No. 2

SCALE	1/200	REV.	

BORE HOLE LOCATION

BH01
BH02
BH03
BH04
BH05
BH06
BH07
BH08
BH09
BH10
BH11

Haigh Huddleston & Associates

Civil Structural Engineering Consultants

Unit 4, Midgley Business Park, Bar Lane, Midgley, WF4 4JJ t 01924 574074

e martin@haighhuddleston.co.uk

Client
DEMOLITION AND GEOTECHNICAL

Project
274 CUMBERWORTH LANE, DENBY DALE

Detail
SITE INVESTIGATION PLAN

Dwn	Chkd	Date	Scale	Dwg No.
OF	MD	FEB'26	1/200 @A1	E26/8406/003

D & G UK

DRILLING LOG SHEET

SITE: Cumberworth Lane

CREW INITIALS: DS TP | RIG: SM1S

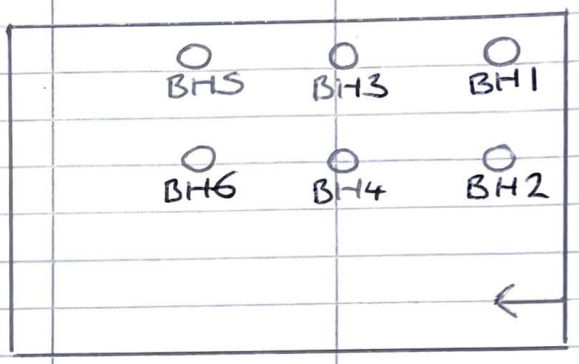
DATE: 11/2/26 | SHEET: 1 OF 1

EQUIPMENT USED: 102mm bit

LEAD DRILLER INITIALS	LEAD DRILLER SIGNED
TP	

BH	DEPTH	STRATA DESCRIPTION
BH1	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone / sandstone
	7.50 - 8.50	broken
	8.50 - 9.00	hard strata
BH2	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone
	7.50 - 8.50	broken
	8.50 - 9.00	hard strata
BH3	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone
	7.50 - 8.50	soft ground
	8.50 - 9.00	hard strata
BH4	0.00 - 1.50	clay/soil
	1.50 - 7.50	lost flush infill due to backfilled area
		hard strata
	7.50 - 8.50	soft possible coal
	8.50 - 9.00	hard strata

BH	DEPTH	STRATA DESCRIPTION
	plan	



BH	DEPTH	STRATA DESCRIPTION
BH5	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone / sandstone
	7.50 - 9.00	broken with small voids
	9.00 - 12.00	hard strata
BH6	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone / sandstone
	7.50 - 8.70	coal
	8.70 - 18.50	mudstone
	18.50 - 19.50	coal
	19.50 - 21.00	mudstone poor flush

BH	CASING DIA	CASING DEPTH

GAS READING	

TOTALS	BH's	DRILL	CASE	CORE
TODAY	6	69	—	
PREVIOUS	—	—	—	
TO DATE	6	69	—	

D&G UK

DRILLING LOG SHEET

SITE: Cumberworth Lane

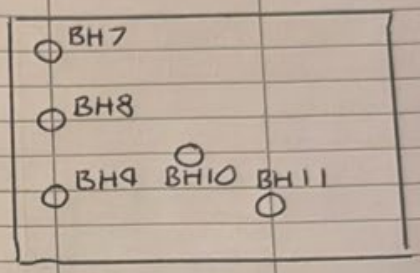
CREW INITIALS: DS TP | RIG: Sm1S

DATE: 12/2/26 | SHEET: 1 OF 1

EQUIPMENT USED: 102mm bit

LEAD DRILLER INITIALS	LEAD DRILLER SIGNED
TP	

BH	DEPTH	STRATA DESCRIPTION
BH7	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone /sandstone
	7.50 - 9.40	broken
	9.40 - 12.00	hard strata
BH8	0.00 - 1.50	clay/soil
	1.50 - 6.70	mudstone /sandstone
	6.70 - 9.40	broken
	9.40 - 12.00	hard strata
BH9	0.00 - 1.50	clay/soil
	1.50 - 5.50	mudstone /sandstone
	5.50 - 9.40	broken
	9.40 - 12.00	hard strata
BH10	0.00 - 1.50	clay/soil
	1.50 - 8.00	mudstone /sandstone
	8.00 - 9.50	coal
	9.50 - 15.00	mudstone (loosing flush in coal seam)

BH	DEPTH	STRATA DESCRIPTION
	plan	
		
BH11	0.00 - 1.50	clay/soil
	1.50 - 7.50	mudstone /sandstone
	7.50 - 9.00	coal
	9.00 - 18.50	mudstone with weak bands
	18.50 - 19.50	coal
	19.50 - 30.00	mudstone

BH	CASING DIA	CASING DEPTH

GAS READING	

TOTALS	BH's	DRILL	CASE	CORE
TODAY	5	81		
PREVIOUS	6	69		
TO DATE	11	150		

KEY

- = GROUT
- = COAL
- = BROKEN
- = SOFT
- = VOID
- = UNABLE TO DRILL
- 0.12 = GROUT TAKE (COMPLETE)
- (0.12) = GROUT TAKE (ONGOING)
- = SURFACE FEATURE

SITE STRIP TO NATURAL STRATA TO CONFIRM SHAFTS ARE OUTSIDE OF SITE BOUNDARY

422408-075

422408-076

BOREHOLES TO BE ADJUSTED LOCALLY TO SUIT SITE BOUNDARY.

NOTE:
- LOCATIONS OF ALL SERVICES/ SEWERS CROSSING SITE TO BE CONFIRMED PRIOR TO COMMENCING WORK ON SITE.
- BOREHOLES TO PROPOSED SHARED DRIVEWAY BASED ON OFFSET 3m GRID.
- BOREHOLE SPACING MAY BE REDUCED AS SITE WORKS PROGRESS DEPENDENT ON BOREHOLE RESULTS.

Haigh Huddleston & Associates

Civil Structural Engineering Consultants

Unit 4, Midgley Business Park, Bar Lane, Midgley, WF4 4JJ t 01924 574074

e martin@haighhuddleston.co.uk

Client
DEMOLITION AND GEOTECHNICAL

Project
274 CUMBERWORTH LANE, DENBY DALE

Detail
DRILLING AND GROUTING GRID

Dwn	Chkd	Date	Scale	Dwg No.
OF	MD	FEB'26	1/200	E26/8406/033

Mining Remediation Authority

Permit to Enter or Disturb Mining Remediation Authority Interests

Permit 31212

Name and Address of Permit Holder:

FHH Developments Yorkshire Ltd
39 Wickleden Gate
Scholes

HD9 1QT

Site Location:

Land off
Cumberworth Lane
Denby Dale
Yorkshire
HD8 8QS

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

Ground investigation by 11 boreholes to 29m

within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of **12 months** from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings) is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH_4, CO_2, O_2 at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: ..... Granted Date: ***10 February 2026***

For and on behalf of the Mining Remediation Authority

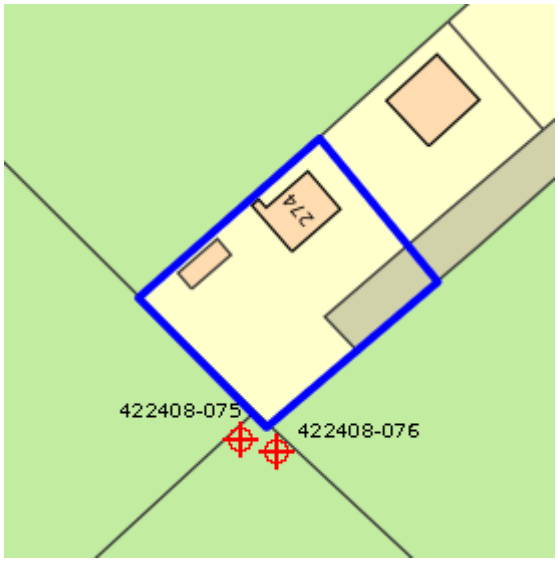
Nominated Representative: Helen Day, Permitting Manager;
Mining Remediation Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637450; E-Mail: licensingandpermissions@miningremediation.gov.uk

Mining Remediation Authority

Granted Permit Boundary

Permit Ref: 31212

Permit Boundary:



The Mining Remediation Authority is the trading name of the Coal Authority ('TCA') established pursuant to Section 1 of the Coal Industry Act 1994, of 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG. The Coal Authority remains the legal name of the Authority

Appendix 5

Gas Monitoring Sheets

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5759/26/E/8950	Client:	FHH Developments (Yorkshire) Ltd.	Visit:	1	Of	4
Site:	274 CumberworthLaneDenbyDale HD8 8QS	Date:	20.02.2026				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.0	0.0	0.0	0.0	0	0	0	0	20.4	20.4			0.0	0.0	DRY		1.16	
2	0.0	0.0	0.4	0.4	0	0	0	0	20.1	20.1			0.0	0.0	DRY		1.09	
3	0.0	0.0	0.0	0.0	0	0	0	0	20.1	20.1			0.0	3.3	DRY		1.10	
Max.	0.0	0.0	0.4	0.4	0	0	0	0	20.4	20.4	0	0	0.0	3.3	0.00			
Min.	0.0	0.0	0.0	0.0	0	0	0	0	20.1	20.1	0	0	0.0	0.0	0.00			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	Wet
Precipitation	0.2l/m2 in last 6 hours
Wind	27
Temperature	5
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GFM Series							
Serial No:	12168							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	20.11.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)	Peak	Steady
Max CH_4	0.1	0.2
Max CO_2	0.4	1.5
Max CO	0	0
Max H_2S	0	0
Max O_2	21.7	21.7
Min O_2	21.0	21.6
Flow rate	0.0	3.3

	Start	End
Barometric Pressure	987	987

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5759/26/E/8950	Client:	FHH Developments (Yorkshire) Ltd.	Visit:	2	Of	4
Site:	274 CumberworthLaneDenbyDale HD8 8QS	Date:	27.02.2026				

Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.0	0.0	0.0	0.0	0	0	0	0	20.7	20.7			0.0	0.0	DRY		1.16	
2	0.0	0.0	0.5	0.5	0	0	0	0	20.5	20.5			0.0	0.0	DRY		1.09	
3	0.0	0.0	0.8	0.8	0	0	0	0	19.7	19.7			0.0	0.0	DRY		1.10	
Max.	0.0	0.0	0.8	0.8	0	0	0	0	20.7	20.7	0	0	0.0	0.0	0.00			
Min.	0.0	0.0	0.0	0.0	0	0	0	0	19.7	19.7	0	0	0.0	0.0	0.00			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information

General Ground Condition	Wet
Precipitation	0.2l/m2 in last 12 hours
Wind	6
Temperature	10
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications

Gas Monitor Used:	GFM Series							
Serial No:	12168							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	20.11.2025							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)

	Peak	Steady
Max CH_4	0.1	0.2
Max CO_2	1.5	1.5
Max CO	0	0
Max H_2S	0	0
Max O_2	21.7	21.7
Min O_2	21.0	21.6
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	986	986

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5759/26/E/8950	Client:	FHH Developments (Yorkshire) Ltd.	Visit:	3	Of	4
Site:	274 CumberworthLaneDenbyDale HD8 8QS	Date:	06.03.2026				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

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Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.1	0.1	0.2	0.2	0.0	0.0	0	0	21.7	21.7			0.0	0.0	DRY		1.16	
2	0.1	0.1	0.5	0.5	0.0	0.0	0	0	21.6	21.6			0.0	0.0	DRY		1.09	
3	0.0	0.1	1.3	1.3	0.0	0.0	0	0	21.0	21.6			0.0	0.0	DRY		1.10	
Max	0.1	0.1	1.3	1.3	0.0	0.0	0	0	21.7	21.7	0	0	0.0	0.0				
Min.	0.0	0.1	0.2	0.2	0.0	0.0	0	0	21.0	21.6	0	0	0.0	0.0				

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	Wet
Precipitation	6l/m2 in last 12 hours
Wind	10
Temperature	5
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.1	0.2
Max CO_2	1.5	1.5
Max CO	0	0
Max H_2S	0	0
Max O_2	21.7	21.7
Min O_2	21.0	21.6
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	1001	1002

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/5759/26/E/8950	Client:	FHH Developments (Yorkshire) Ltd.	Visit:	4	Of	4
Site:	274 CumberworthLaneDenbyDale HD8 8QS	Date:	13.03.2026				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
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Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
1	0.1	0.1	0.6	0.6	0	0	0	0	21.7	21.7			0	0	DRY		1.16	
2	0	0.1	0.1	0.2	0	0	0	0	21.5	21.5			-0.1	0	DRY		1.09	
3	0.1	0.2	1.5	1.5	0	0	0	0	20.2	20.2			0	0	DRY		1.1	
Max	0.1	0.2	1.5	1.5	0	0	0	0	21.7	21.7	0	0	0	0	0			
Min.	0	0.1	0.1	0.2	0	0	0	0	20.2	20.2	0	0	-0.1	0	0			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information

General Ground Condition	Wet
Precipitation	12l/m2 in last 12 hours
Wind	22
Temperature	4
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications

Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)

	Peak	Steady
Max CH_4	0.1	0.2
Max CO_2	1.5	1.5
Max CO	0	0
Max H_2S	0	0
Max O_2	21.7	21.7
Min O_2	21.0	21.6
Flow rate	0.0	0.0

	Start	End
Barometric Pressure	970	971

Operative Details.	M.Tuck

Appendix 6

Laboratory Testing & Contamination Analyses

Rogers Geotechnical Services Ltd
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WD18 8YS

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Analytical Report Number : 26-010352

Project / Site name:	274 Cumberworth Lane	**Samples received on:**	27/02/2026
Your job number:	C5759 26 E 8950	**Samples instructed on/ Analysis started on:**	27/02/2026
Your order number:	PO-3730	**Analysis completed by:**	10/03/2026
Report Issue Number:	1	**Report issued on:**	10/03/2026
Samples Analysed:	3 soil samples		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 26-010352
Project / Site name: 274 Cumberworth Lane
Your Order No: PO-3730

Lab Sample Number				844985	844986	844987
Sample Reference				TPA	TPB	TPC
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.20	0.30	0.50
Date Sampled				25/02/2026	25/02/2026	25/02/2026
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status			
Stone Content	%	0.1	NONE	35.1	52.1	29.4
Moisture Content	%	0.01	NONE	15	13	15
Total mass of sample received	kg	0.1	NONE	1.1	1.2	0.9
Whole Sample Crushed	N/A	N/A	NONE	-	Crushed	-
Asbestos						
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KMC	KMC	KMC
Analysis completed	N/A	N/A	N/A	06/03/2026	06/03/2026	06/03/2026
General Inorganics						
pH (L099)	pH Units	N/A	MCERTS	6.8	6.1	7.6
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.031	0.026	0.042
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	160	170	240
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	80.6	84.5	121
Organic Matter (automated)	%	0.1	MCERTS	0.7	0.7	0.9
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.06	0.06	0.06
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.13	0.07	0.07
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.1	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80

Analytical Report Number: 26-010352
Project / Site name: 274 Cumberworth Lane
Your Order No: PO-3730

Lab Sample Number				844985	844986	844987
Sample Reference				TPA	TPB	TPC
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				0.20	0.30	0.50
Date Sampled				25/02/2026	25/02/2026	25/02/2026
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.4	7.1	6.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	12	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	19	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	19	24	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	16	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	18	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	63	92
Petroleum Hydrocarbons						
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	< 10	< 10
VOCs						
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 26-010352
Project / Site name: 274 Cumberworth Lane

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
844985	TPA	None Supplied	0.2	Brown clay and sand with gravel and stones
844986	TPB	None Supplied	0.3	Brown clay and sand with gravel and stones
844987	TPC	None Supplied	0.5	Brown clay and sand with gravel and stones

Analytical Report Number : 26-010352
Project / Site name: 274 Cumberworth Lane

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 26-010352
Project / Site name: 274 Cumberworth Lane

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Whole Sample Crushed	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis	In house method, applicable to dry samples only	L019B	D	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

Rogers Geotechnical Services Ltd: Soil Screening Value (SSV) Comparison Sheet

Job Number	C5759/26/E/8950
Job Name	274 Cumberworth Lane Denby Dale
Date	01.04.26
Client	FHH Developments

A = WS Atkins PLC, Atrisk Soil Screening Values.
A+ = Values updated June 2017.
A* = Atrisk's SSV is lower than i2's detectable limit for this compound.
B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.
C = Category 4 Screening Levels (C4SLs) based on 6% soil organic matter.
D = Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 102 should be used.

KEY
- Exceeds SSV
- Exceeds 2017, Below 2015
- Below limit of detection (LOD)

Determinand	Units	Ref	LOD	Residential With Plant Uptake 1%		Sample Location	TPA	TPB	TPC								
				Atrisk 2015 (No Free Product	Atrisk 2017	Depth Top	0.2	0.3	0.5								
						Depth Base											
Cadmium	mg/kg	C	0.2		22.1		< 0.2	< 0.2	< 0.2								
Chromium (Hexavalent)	mg/kg	B/C	1.8	20.5	3.62		< 1.8	< 1.8	< 1.8								
Copper	mg/kg	A+	1.0		4730		13	19	13								
Mercury	mg/kg	A/D	0.3		8.81		< 0.3	< 0.3	< 0.3								
Nickel	mg/kg	A+	1.0		136		15	16	23								
Lead	mg/kg	C	1.0		200		19	24	21								
Zinc	mg/kg	A+	1.0		20000		55	63	92								
Vanadium	mg/kg	A+	1.0		136		19	18	28								
Arsenic	mg/kg	C	1.0		37		6.4	7.1	6.8								
Selenium	mg/kg	A	1.0		375		< 1.0	< 1.0	< 1.0								
Cyanide (Free)	mg/kg	A	1.0		34		< 1.0	< 1.0	< 1.0								
Total Phenols	mg/kg	A	1.0		267		< 1.0	< 1.0	< 1.0								
Naphthalene	mg/kg	A+	0.05	0	0.829		< 0.05	< 0.05	< 0.05								
Acenaphthylene	mg/kg		0.05				< 0.05	< 0.05	< 0.05								
Acenaphthene	mg/kg	A+	0.05	608	157		< 0.05	< 0.05	< 0.05								
Fluorene	mg/kg	A+	0.05	0	735		< 0.05	< 0.05	< 0.05								
Phenanthrene	mg/kg		0.05				0.06	0.06	0.06								
Anthracene	mg/kg	A+	0.05	0	10200		< 0.05	< 0.05	< 0.05								
Fluoranthene	mg/kg	A+	0.05		983		0.12	< 0.05	< 0.05								
Pyrene	mg/kg	A+	0.05		668		0.13	0.07	0.07								
Benzo[a]anthracene	mg/kg	A	0.05	4.52	1.71		0.07	< 0.05	< 0.05								
Chrysene	mg/kg	A	0.05	585	0.44		0.07	< 0.05	< 0.05								
Benzo[b]fluoranthene	mg/kg	A	0.05	7.72	1.22		0.1	< 0.05	< 0.05								
Benzo[k]fluoranthene	mg/kg	A	0.05	84.4	0.686		0.05	< 0.05	< 0.05								
Benzo[a]pyrene	mg/kg	B/C	0.05	4.95	1.51		0.07	< 0.05	< 0.05								
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.05	7.31	0.0614		< 0.05	< 0.05	< 0.05								
Dibenz(a,h)Anthracene	mg/kg	A	0.05	0.838	0.00393		< 0.05	< 0.05	< 0.05								
Benzo[g,h,i]perylene	mg/kg	A	0.05	96.2	0.0187		< 0.05	< 0.05	< 0.05								
Total Of 16 PAH's	mg/kg		0.8														
Aliphatic TPH >C5-C6	mg/kg	A+	0.01	0	42.7		< 0.010	< 0.010	< 0.010								
Aliphatic TPH >C6-C8	mg/kg	A+	0.01	0	99.3		< 0.010	< 0.010	< 0.010								
Aliphatic TPH >C8-C10	mg/kg	A+	0.01	0	13.9		< 0.010	< 0.010	< 0.010								
Aliphatic TPH >C10-C12	mg/kg	A+	1.0	81.7	49.9		< 1.0	< 1.0	< 1.0								
Aliphatic TPH >C12-C16	mg/kg	A+	2.0	385	20.9		< 2.0	< 2.0	< 2.0								
Aliphatic TPH >C16-C21	mg/kg	A+	8.0		210000		< 8.0	< 8.0	< 8.0								
Aliphatic TPH >C21-C35	mg/kg	A+	8.0		210000		< 8.0	< 8.0	< 8.0								
Aliphatic TPH >C35-C44	mg/kg		10.0														
Total Aliphatic Hydrocarbons	mg/kg		10.0														
Aromatic TPH >C5-C7	mg/kg	A+	0.01		0.137		< 0.010	< 0.010	< 0.010								
Aromatic TPH >C7-C8	mg/kg	A+	0.01	0	113		< 0.010	< 0.010	< 0.010								
Aromatic TPH >C8-C10	mg/kg	A+	0.02	0	20.5		< 0.020	< 0.020	< 0.020								

Rogers Geotechnical Services: Soil Screening Values Comparison Sheet

Rogers Geotechnical Services Ltd: Soil Screening Value (SSV) Comparison Sheet

Job Number	C5759/26/E/8950
Job Name	274 Cumberworth Lane Denby Dale

A = WS Atkins PLC, Atrisk Soil Screening Values.
A+ = Values updated June 2017.
A* = Atrisk's SSV is lower than i2's detectable limit for this compound.
B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.
C = Category 4 Screening Levels (C4SLs) based on 6% soil organic matter.
D = Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 102 should be used.

KEY
- Exceeds SSV
- Exceeds 2017, Below 2015
- Below limit of detection (LOD)

Date	01.04.26			**Sample Location**		TPA	TPB	TPC								
Client	FHH Developments			Depth Top		0.2	0.3	0.5								
				Depth Base												
Determinand	**Units**	**Ref**	**LOD**	**Residential With Plant Uptake 1%**												
Aromatic TPH >C10-C12	mg/kg	A+	1.0		70	< 1.0	< 1.0	< 1.0								
Aromatic TPH >C12-C16	mg/kg	A+	2.0	165	155	< 2.0	< 2.0	< 2.0								
Aromatic TPH >C16-C21	mg/kg	A+	10.0		319	< 10	< 10	< 10								
Aromatic TPH >C21-C35	mg/kg	A+	10.0		1120	< 10	< 10	< 10								
Aromatic TPH >C35-C44	mg/kg		10.0													
Total Aromatic Hydrocarbons	mg/kg		10.0													
Total Petroleum Hydrocarbons	mg/kg		10.0													
pH			N/A			6.8	**6.1**	**7.6**								
Sulphate (2:1 Water Soluble) as SO4	mg/l		1.25			**80.6**	84.5	**121**								
ACM Type			N/A													
Asbestos Identification	%					None detected	None detected	None detected								
Organic Matter	%		0.1			**0.7**	**0.7**	**0.9**								