MINING REPORT

AT

GYNN ROAD, HONLEY
HOLMFIRTH, HD9 6JY

FOR

EASTWOOD HOMES

REPORT REF: EAST 3376

Engineering Geologists and Environmental Scientists



Ashton Bennett

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APRIL 2019

Ashton Bennett Limited Co Reg No: 3318828 is a member of the Ashton Bennett Consultancy group of companies

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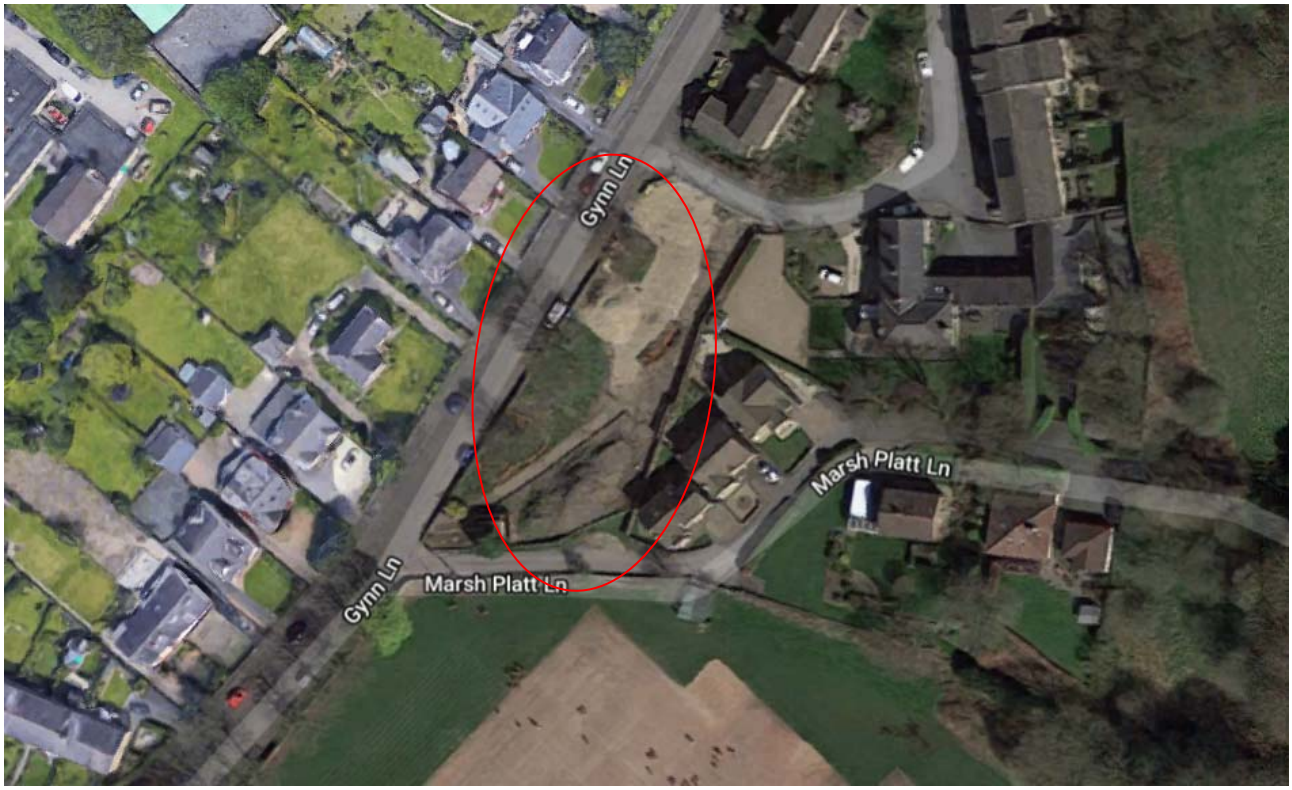

1. INTRODUCTION

This report describes the results of a Mining Investigation undertaken on a site adjacent to 20 Gynn Lane in Honley, West Yorkshire. The work was commissioned by Wood Associates of New Mill on behalf of Eastwood Homes, and was carried out by this Consultancy, the Ashton Bennett Consultancy.

The purpose of the Mining Investigation was to investigate the mined nature of the strata beneath the site and to determine the depth and condition of any underground coal seams. The results of the mining investigation were used to assess the extent of and to find solutions to any mining concerns to the development of the site for residential use with construction of a new build residential development.

This report presents the results of the intrusive mining investigation undertaken to ensure safe development of the proposed building.

2. THE SITE

2.1 Site Description

The site is located in the north east of Honley Centre, east of the River Holme and south of Huddersfield Town Centre. The site is currently unoccupied and previously existed as a residential garden, since over grown. A culverted stream, Ludhill Dike, runs through the site in a north east to the south westerly direction. Several large trees exist on site along the north west boundary.

The site is bounded to the north west by stone walling with Gynn Lane beyond and residential housing beyond that. The site is bounded to the north east by temporary fencing with Grove Houses beyond and residential properties beyond that. The site is bounded to the south west by

stone walling with Marsh Platts Lane beyond and recreational playing fields beyond that. The site is bounded to the south east by stone walling with a drive way and residential properties beyond.

Photographs of the site are presented in Appendix B.

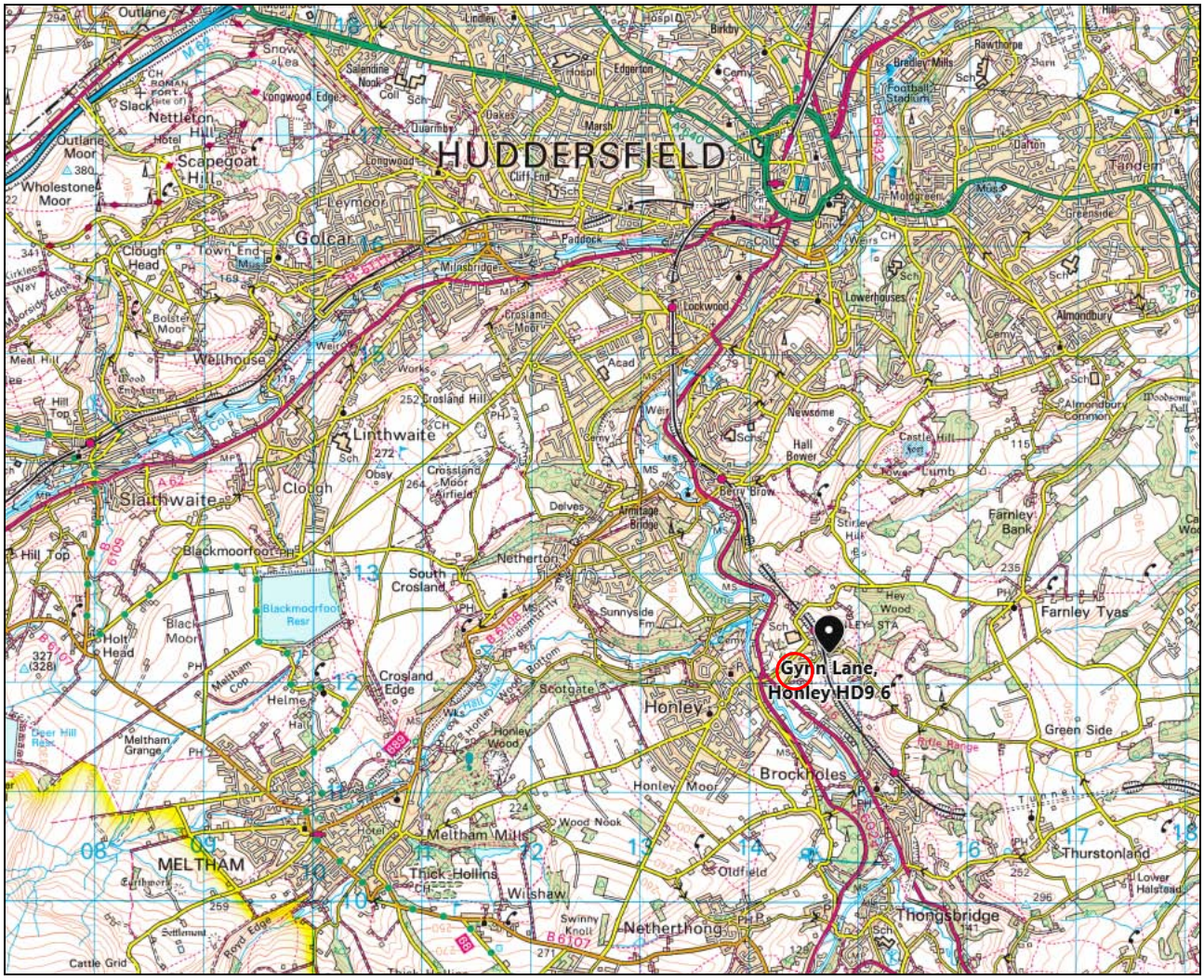

Figure 1 Site Location Plan



Figure 2 Site Plan

3. REPORT OBJECTIVE AND REPORT SCOPE

3.1 Report Objective

The objective of the mining investigation was to check for the presence, depth and condition of coal seams that lie at shallow depth beneath the site and outcrop within the site area and to make recommendations for any necessary stabilisation of mine voids, broken ground or roadways that could detrimentally affect the stability of the site in the future. The report undertaken is a Mining Investigation Report.

3.2 Report Scope

The information for this report is from sources recommended by the Institute of Civil Engineers (ICE), the Association of Geotechnical and Geoenvironmental Specialists (AGS), Construction Industry Research and Information Association (CIRIA) and the Department of the Environment Transport and the Regions (DETR). The report has been compiled in accordance with the latest ICE, DETR, Department of Environment, Food and Rural Affairs (DEFRA) and British Standard Draft Documents and British Standards.

In preparing this report we have considered the requirements of Investigation *of potentially contaminated sites – Code of Practice,* BS 10175-2011, *Code of Practice for Site Investigations* BS 5930:1999+A2:2010 and *Methods of Test for soil for civil engineering purposes* BS 1377:1990 and

the expertise and experience of the Ashton Bennett Consultancy together with all relevant DETR, DEFRA, Environment Agency and Contaminated Land Report(CLR) Guidance documents, CIRIA Reports and EC Directives and Eurocode 7 and CIRIA SP32 Construction over Abandoned Mine Workings (1984).

In addition, the following maps and reports were reviewed:

- The Coal Authority (CA) Coal Mining Report, reference:51000583963001.
- Woodbank Colliery-Plan of Abandonment in Hard Bed Coal Seam, Catalogue No: Plan of WM185
- British Geological Survey 1:10,000 geological map, SE11SW.
- Coal Mining Risk Assessment Report, Mason Clark Associates, July 2014.

4. HISTORIC MAPS

An inspection of archival maps from 1854 and 1894 indicated the site to be previously occupied by a saw mill and open ground with Sough Dike running north to south through the site. The maps are reproduced below.



Figure 3 OS Plan 1854

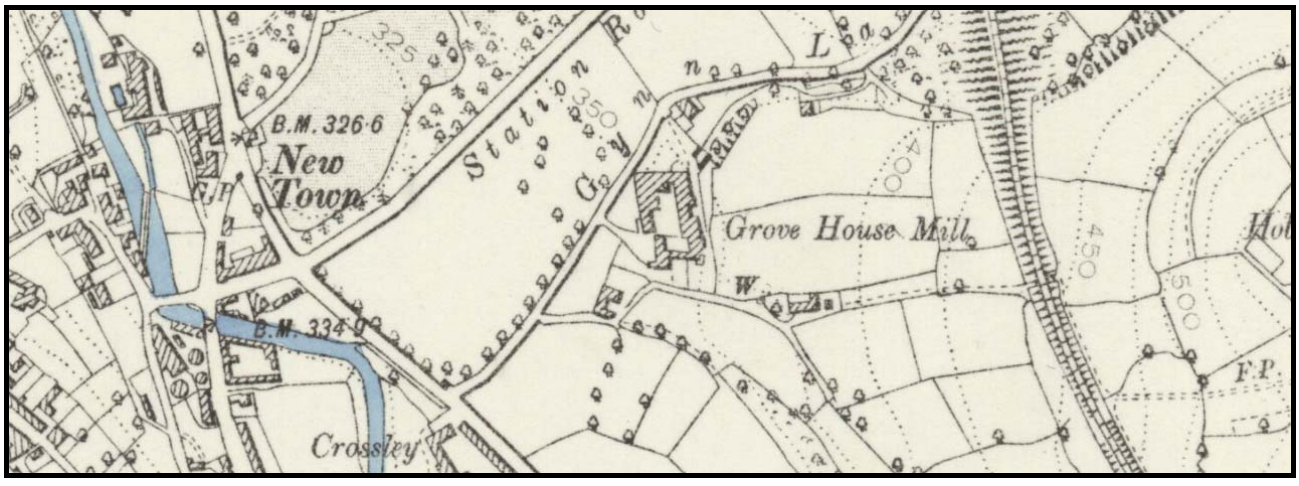

Figure 4 OS Plan 1894

5. SITE GEOLOGY

5.1 Geology

The published British Geological Survey Map (BGS) SE11SW at 1:10,000 shows the site to be underlain by strata of the Carboniferous Period namely the Lower Coal Measures Formation consisting of mudstone, siltstone and sandstone. The site is underlain by mudstone with the interbedded Pot Clay Coal Seam outcropping on site. This is underlain by the Rough Rock and Rough Rock Flags Sandstone to depth. The BGS maps indicate that superficial deposits overlie the solid strata in the form of Diamiction Head.

5.2 Geological Faults

The BGS map does not indicate the presence of any known or recorded geological faults surrounding the site area. It is possible that smaller faults sub parallel to these may exist in the strata causing fissuring and fracturing to the rock. Due to the cessation of tectonic activity in the area, faulting is unlikely to detrimentally affect the site stability.

5.3 Engineering Geology

Any made ground present on the site is expected to be in a loose to very loose state of compaction. Superficial deposits are unlikely to provide suitable founding strata for development of houses. The bedrock comprises mudstone and sandstone which generally provide good bearing strata where unweathered for low rise development.

Any excavations for services will require temporary support in the short and long term and may require sump pumping if groundwater is encountered.

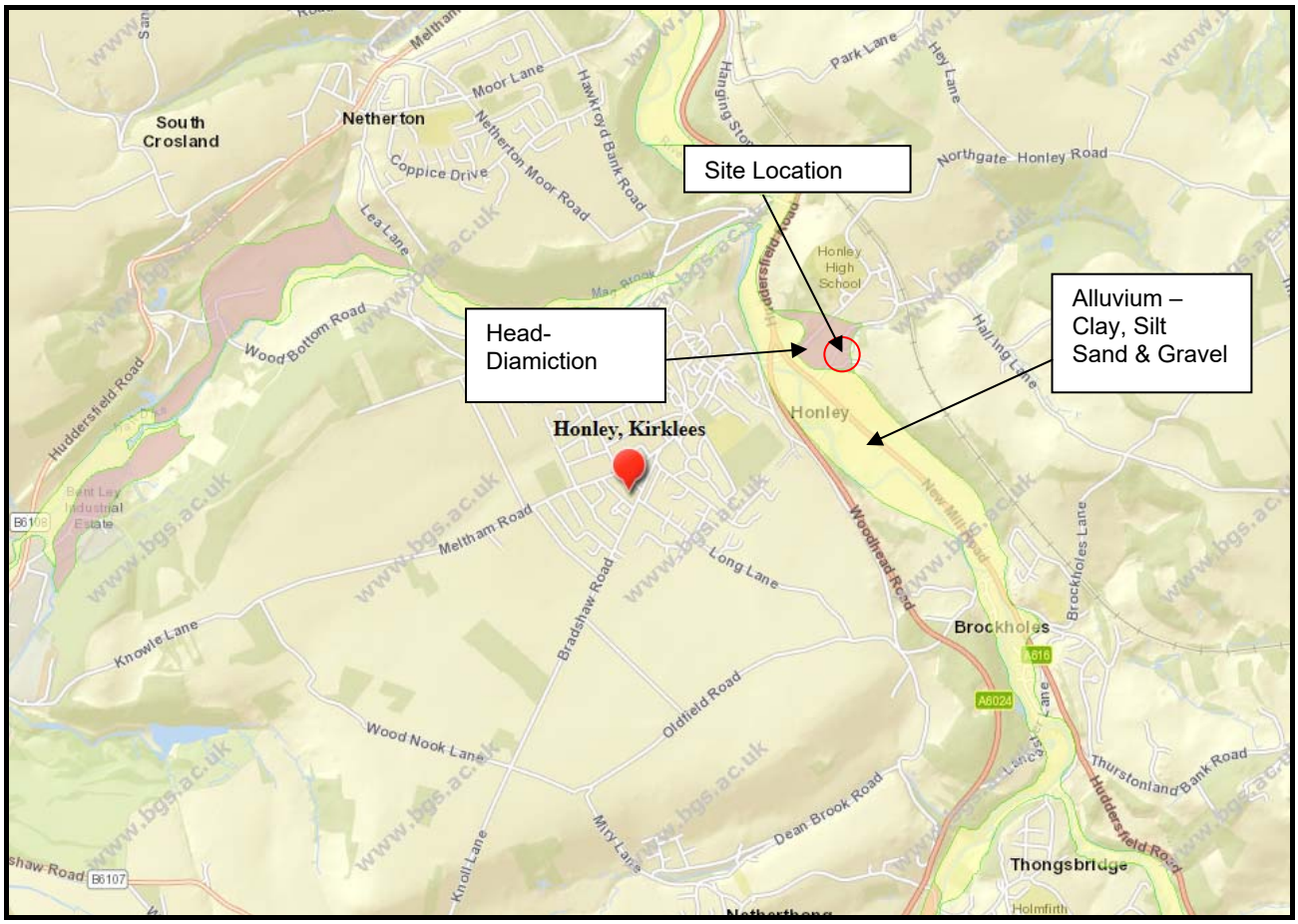

Figure 5 Superficial Geology Plan

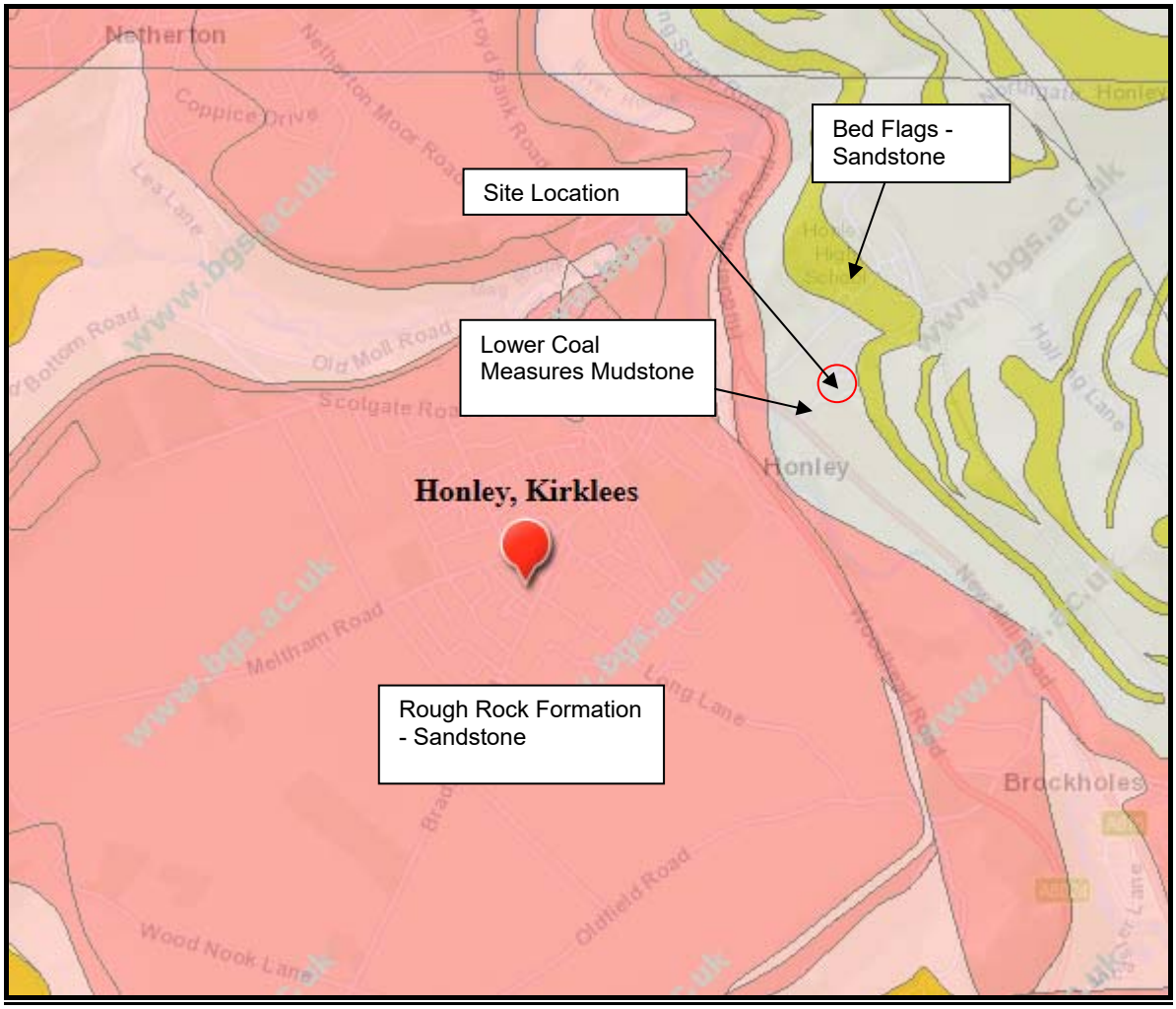

Figure 6 Bedrock Geology Plan

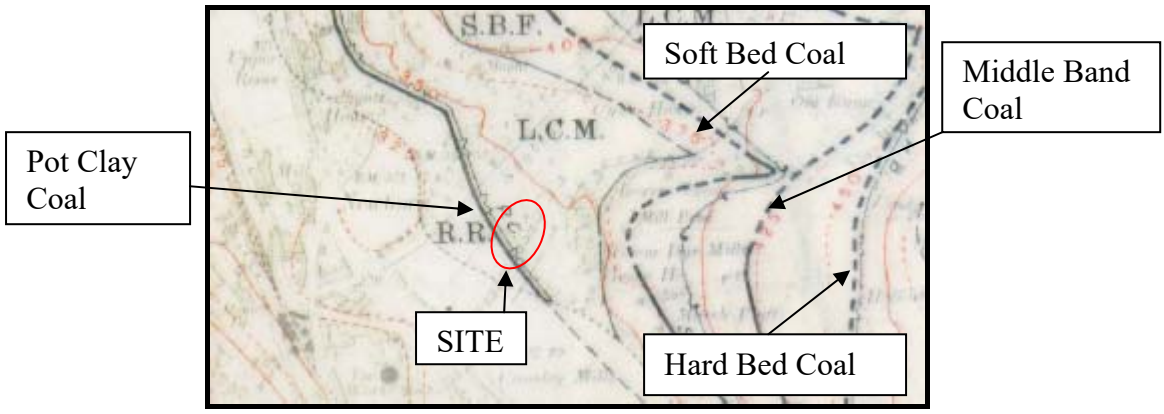

Figure 7 Detailed Geology Plan

5.4 Previous Boreholes

TABLE 1
Summary of Historical Borehole Logs

BGS Reference	Depth bgl in m	Brief Summary of Ground Conditions In mbgl	Water Level in mbgl
SE11SW3A and B Crossley Mills	190.50m	Clay and gravel GL to 4.27m Shale 4.27 to 14.02m Sandstone 14.02 to 55.93m Coal at 85.65 Coal at 114.60 Sandstone and shale to 190.50m	Not recorded
SE11SW4 Newtown Laundry	106.98m	Clay and gravel GL to 7.62m Sandstone 10.67 to 30.18m Mudstone, siltstone and sandstone to 106.98m	Water rest level at 5.94m bgl
SE11SW160 Reins Hill	50m	Made ground GL to 2.00m Sand and gravel 2.00 to 15.00m Gravel 15.00 to 18.00m Shale 18.00 to 50.00m	22.00m bgl.

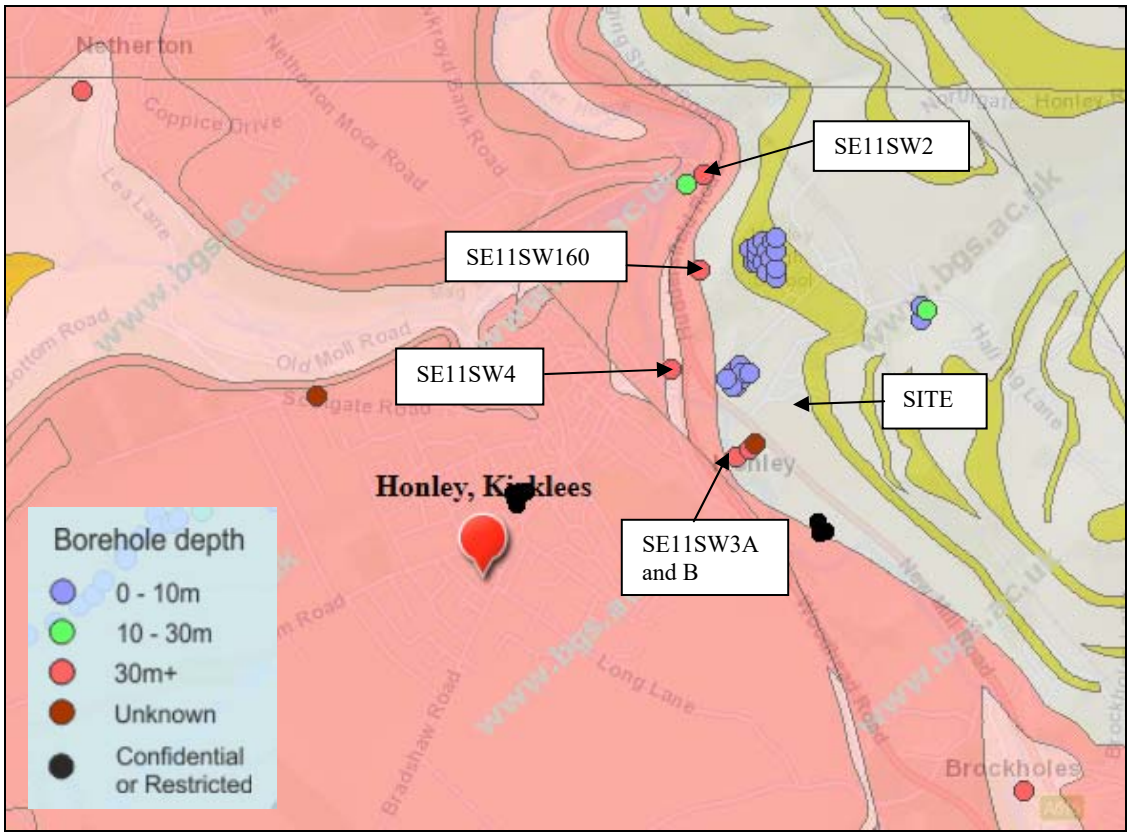

Figure 8 Previous Local Borehole Locations

Local boreholes sunk to the west of the site indicate alluvial gravels overlying shale and sandstone with high groundwater levels.

6. MINING

6.1 Coal Authority Report

The results of a Coal Authority Report 2014 are presented below.

Past

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

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

Present

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

Future

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

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

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

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

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

Mine entries

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

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.
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 Coal Authority indicates that the site lies within a high risk area for development due to the Pot Clay Coal seam crossing the land to the immediate south of the site and dipping beneath the site at shallow depth as detailed in Figures 9 and 10.



Figure 9 High Risk Development Areas

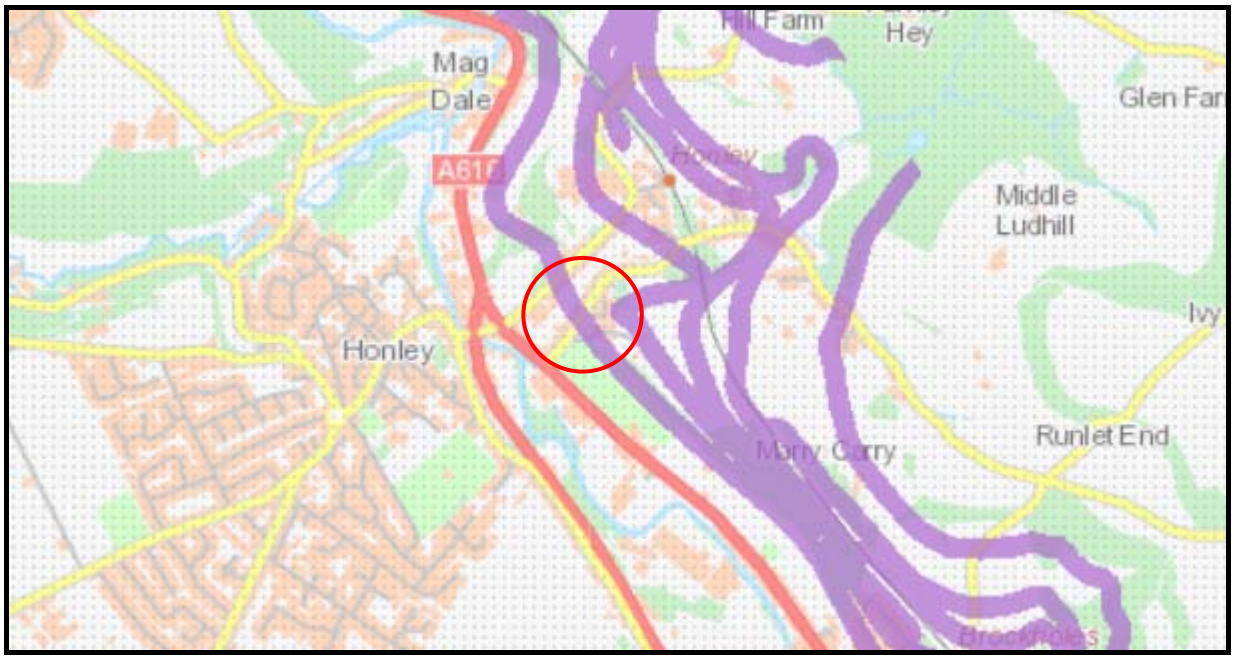

Figure 10 Outcrop of Coal Seams in Honley

6.2 Coal Seams

The only coal seam to underlie the site is the Pot Clay Coal which lies directly above the Rough Rock Sandstone. The coal was often worked locally in association with the overlying Hard Bed and Soft Bed Coals which were of greater thickness and outcrop to the east of the site and dip to the north east and do not underlie the site.

TABLE 2
Coal Seams beneath Site

Strata	Thickness in m	Depth in m bgl	Workings recorded by Coal Authority beneath the site	Probability of unrecorded workings
Mudstone				
Pot Clay Coal	0.00-0.15	GL	No	No
Mudstone				
Rough Rock Sandstone				
Mudstone				

The Coal Authority have no records of the Pot Clay Coal being mined beneath the site. The coal is expected to outcrop across the site and dip to the north east, underlying the north of the site at shallow depth.

The risk that collapse of underground workings could cause subsidence at the ground surface above is normally empirically assessed using the T10 rule (developed by the National Coal Board in 1973 and based on experience) whereby if a thickness of 10 x the worked seam thickness of competent cover (i.e. rock) is present over the worked seam then it is deemed sufficient to be able to choke the voided ground without giving rise to surface settlement.

7. GROUND INVESTIGATION

7.1 Fieldwork

A ground investigation was undertaken between Wednesday March 20th and Friday April 5th 2019 and comprised the excavation of five trial pits and drilling of four boreholes with a Rotary Openhole Drill Rig.

All exploratory points were marked out on site by reference to existing physical features on the site. Three borehole positions were selected within the area of the proposed new building and a fourth to the south west of the proposed footprint to establish ground conditions across the site, including made ground depths and potential coal outcropping.

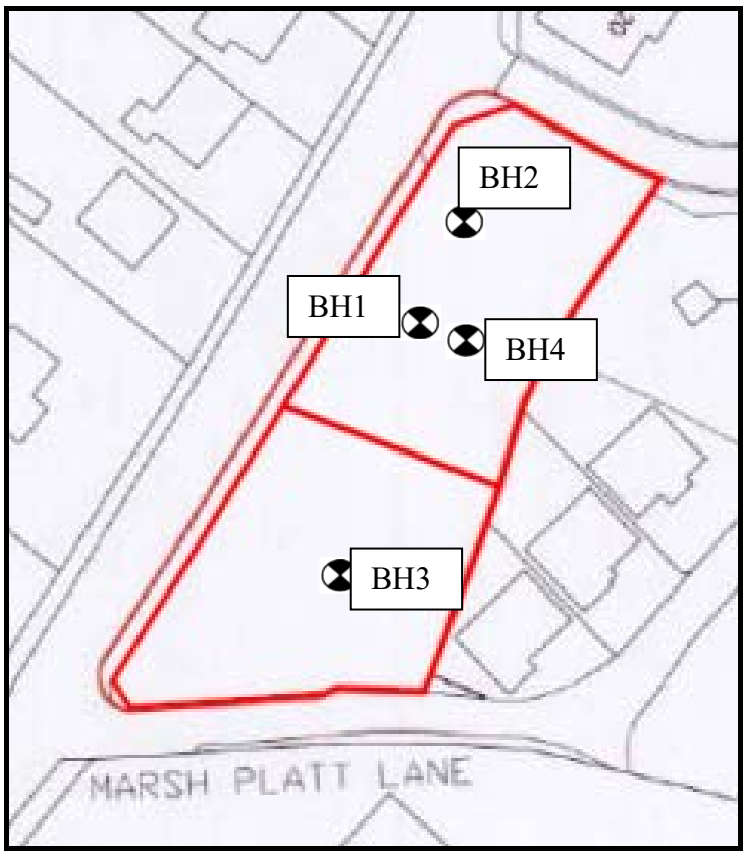

Figure 11 Borehole Location Plan

7.2 Ground Conditions

The ground conditions encountered in the five trial pits were made ground comprising loose reworked clay with small gravel and gravel of coal and sandstone. The made ground extended to depths of 2.20m to 2.80m bgl and the base of the made ground was not encountered.

Due to the depth of made ground and possibility of shallow mining in the Pot Clay Coal, four boreholes were sunk on the site to establish ground conditions.

The ground conditions in the four borehole locations within the site encountered 1.50m to 4.00m of very loose made ground/topsoil comprising aggregate, stones, sandstone, gravelly sandy clay and topsoil and reworked mudstone with coal gravel. The made ground was generally underlain by clay/weathered mudstone becoming grey mudstone. Sandstone was encountered in BH1 and BH2 at depths of 15.00m and 17.50m bgl and continued to the depth of both holes, while neither

borehole encountered any coal seams or voids throughout. BH3 and BH4 were terminated within the natural mudstone having proved the depth of made ground present.

Due to the loose state of compaction of the made ground present across the site casing for drilling was taken to a depth of 4.5m in BH2 to BH4. During the drilling of BH1 the casing depth was 1.5m only and therefore the fill was being washed up with the arisings from the base of the borehole. This gave unreliable results in BH1 log, which stated the fill was evident to a depth of 22m bgl with sandstone evident from 15.00 – 22.00 bgl. Following the completion of the remaining boreholes this became obvious, thus BH4 was located next to BH1 for comparison where, with casing at 4.5m bgl natural bedrock was evident at 4.50m bgl.

Borehole Logs are presented in Appendix A.

TABLE 3
Ground Conditions Encountered

Borehole	Made Ground/Topsoil/Clay In mbgl	MUDSTONE In mgl	SANDSTONE In mbgl
BH1	GL – 4.50	4.50 - 15.00	15.00 – 22.00
BH2	GL – 4.00	4.00 – 17.5	17.5 – 30.00
BH3	GL – 4.30	4.30 – 7.00+	
BH4	GL – 4.50	4.50 – 6.00+	

7.3 Gas Conditions

Gas monitoring during drilling of the boreholes did not exhibit any elevated levels of methane gas. Due to the presence of made ground on the site and local mining of coal it is recommended that a methane membrane is incorporated in construction.

7.4 Groundwater Conditions

Groundwater was encountered at circa 4.00 – 5.00m bgl during the drilling of the boreholes, though due to the use of water flush during drilling an exact water level is not possible to predict. Boreholes were all cased through the made ground to 4.50m bgl. Groundwater levels on completion of the boreholes varied 1.40m to 3.90m bgl.

8. GEOTHERMAL POTENTIAL

8.1 Geology and Hydrogeology

Water bearing strata exists beneath the site in the form of the Rough Rock Sandstone and Rough Rock Flags which comprise a Secondary A Aquifer. During the ground investigation the Rough Rock was located at 15.00m and 17.50m bgl while water was struck in the boreholes at circa 4.00m to 5.00n bgl.

Boreholes sunk at Crossley mills to the west of the site was sunk to a depth below the Rough Rock Flags to 76.2m bgl to obtain water for dyeing. Records of pumping rates are not available as they were lost in a flood. A borehole was sunk to the north west into the Rough Rock Sandstone to 106.98m bgl for the Newtown Laundry for water supply. It is recorded that rest water level was 5.72 to 5.94m bgl, pumping at a rate of 2000gallons per hour for 72 hours dropped the water level to 54.28m bgl. The water recovery rate was not documented apart from the word ‘fast’. A third local borehole sunk at Reins Hill House struck water at 22m bgl from a 50m borehole. Water level rose to 12.40m bgl and pumping at 2m3 per hour decreased the water level to 16.80m bgl. Recovery to 13.50m took 4 hours.

These test results indicate a good reservoir within the Rough Rock Sandstone.

8.2 Blow Out Test Results

A Blow Out Test was undertaken on BH2. The casing was installed to a depth of 4.5m bgl within the mudstone, in order to seal off the made ground at 4.00m bgl.
The test revealed a substantial reservoir of water in the sandstone strata.

Groundwater levels in the boreholes varied 1.40m to 3.90m bgl following drilling of the boreholes. As BH2 was drilled to 30m bgl with nearly 15.00m within the Rough Rock Sandstone, a rising head test was undertaken on this borehole. The water was blown out by compressed air to 5.00m bgl and it took 3minutes for the water to recover to 3.60m bgl.

It is considered that the water supply is suitable to use for an open loop ground source heating system. A borehole to circa 50m bgl with a submersible pump at circa 40m bgl should supply sufficient water to run 1 or 2 houses with ground source heating. It is estimated that a 12kw heat pump will be required for each of 2 houses which can utilise water from the same borehole. Alternatively, two houses could share a 26kw heat pump. Water meters can be installed on the systems which should link to underfloor heating for maximum efficiency.

9. CONCLUSIONS AND RECOMMENDATIONS

It is understood from the client that the future use of the site will be for one residential house with gardens and with hard cover parking.

The site is underlain by made ground to depths of generally 4.50m bgl. The made ground is unsuitable material on which to construct foundations for a residential property due to its loose state of compaction and variable nature both laterally and vertically. The underlying mudstone and sandstone of the Coal Measures are suitable founding strata for low rising housing development with a bearing capacity of 150kN/m2.

Due to the depth of made ground it is recommended that piled foundations are employed to support the development, sunk at least 5 times the pile diameter into competent strata. Strip or pad foundations are an unsuitable design for foundations for the development. Raft foundations could be utilised however, it is not possible to determine the extent of settlement that would occur within the made ground with imposed ground loading, due to the variable nature of the made ground vertically and horizontally. Settlement within 4.50m of made ground could exceed 25mm.

Excavations will be unstable in the short and long term within the made ground and support may be required for any service excavations.

It is not expected that groundwater will be encountered during construction that cannot be dealt with by sump pumping.

The Pot Clay Coal was not encountered to 30m bgl. Based on the depth of made ground it is assumed that the coal was excavated and replaced with reworked mudstone. As a coal mine was present nearby to the immediate north east and as the adjacent Grove House Mill and sawmill would have required coal for energy this is considered the most likely reason for not encountering the coal seam. It is considered a low risk that the site could be detrimentally affected by shallow or deep mining.

10. GENERAL REMARKS

This report truly reflects the conditions found during the ground investigation. Whilst the ground investigation was undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research, the results portrayed only pertain to the information attained, and it is possible that other undetected information and undetected ground and gas conditions, undetected mining conditions and undetected contamination may exist. The investigation was only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the report is read in full to ensure that all recommendations have been understood.

This report is provided for the sole use of the client (Eastwood Homes) and no responsibility will be accepted by this Consultancy to any other parties who rely on this report entirely at their own risk. The copyright for this report is held by Ashton Bennett Consultancy and no reproduction of any part or all of the report can be undertaken or any other reproduction undertaken without the written approval of this Consultancy.

Tristan T A Bennett
BSc

Frances A Bennett
BSc, CGeol, FGS, FIMMM, C.WEM, MCIWEM, CEnv, AIEMA, MIEnvSci

Appendix **A**



Ace Drilling Services

DRILLER'S DAILY BOREHOLE LOG

5 Charles View, Hall Green, Wakefield,
West Yorkshire, WF4 3QH

Telephone: (01924) 249386 Mobile: 07710 390 021
stuart.smallwood@btinternet.com

Contract No.	Site:	Borehole No:
Rig Beretta T41		Borehole Dia:
Driller Gavin Williamson		Type of Bit/ Barrel:
Date 3/04/19		Type of Flush:

CASING USED

Size

Depth to

WATER STRIKES

Depth

Inflow (Fast med seepage)

Water level after 20 mins

Depth sealed off

HOURS ON SITE

From To

Open holing (OH) hrs

Coring (C) hrs

Casing borehole hrs

Moving between boreholes hrs

Dayworks hrs

(Details)

Delays hrs

(Reasons)

CREW

Driller G. Williamson hrs

2nd Man Ronny hrs

3rd Man hrs

Strata Description	Strata FROM	Strata TO	Drilling / Coring TYPE OHC	RUN NO.	TIME TAKEN	DEPTH FROM	DEPTH TO	RUN LENGTH	CORE RECOVERED	FLUSH RETURNS	Penetration Tests 75 MM	75 MM	75 MM	75 MM	75 MM	75 MM
Mob to site																
Set up Rig																
Dig Pit Backfill Rubble	0.0	1.2														
open hole																
Backfill Rubble Clay	1.2	1.8														
Fill	1.8	22.0														
From 15.0 - 22.0 traces Grey Sand Stone																

REMARKS:

SIGNED (Driller) G. Williamson

SIGNED (for Client)

Ace Drilling Services

DRILLER'S DAILY BOREHOLE LOG

5 Charles View, Hall Green, Wakefield,
West Yorkshire, WF4 3QH

Telephone: (01924) 249386 Mobile: 07710 390 021
stuart.smallwood@btinternet.com

Contract No.
Rig BERETTA TH1
Driller I BAMFORTH
Date 4.4.19

Site: GYNN LANE

Borehole No: 2
Borehole Dia: 4 1/2
Type of ~~Bit~~ Barrel: CLAYRE
Type of Flush: AIR MIST

CASING USED
Size PVF
Depth to 4.5m

WATER STRIKES
Depth
Inflow (Fast med seepage)
Water level after 20 mins
Depth sealed off

HOURS ON SITE
From To
Open holing (OH) hrs
Coring (C) hrs
Casing borehole hrs
Moving between boreholes hrs
Dayworks hrs
(Details)
Delays hrs
(Reasons)

CREW
Driller I BAMFORTH hrs
2nd Man R DURRAN hrs
3rd Man J SMITH hrs

Strata Description	Strata FROM	Strata TO	Drilling / Coring TYPE OHC	RUN NO.	TIME TAKEN	DEPTH FROM	DEPTH TO	RUN LENGTH	CORE RECOVERED	FLUSH RETURNS	Penetration Tests 75 MM	75 MM	75 MM	75 MM	75 MM	75 MM
MOVE RIG TO BH2										100						
DIG PIT																
SANDSTONE BLAST	0.0	0.5														
SOIL	0.5	1.2														
SET UP RIG																
SOIL/CLAY	1.2	3.0														
MUDSTONE WEATHERED/FILL	3.0	4.0														
MUDSTONE GREY	4.0	7.0														
MUDSTONE DARK	7.0	12.7														
MUDSTONE GREY	12.7	16.0														
MUDSTONE DARK	16.0	17.5														
SANDSTONE GREY WEAK	17.5	20.0														
SANDSTONE GREY	20.0	30.0														
UT 3.9m																

REMARKS: WATER PRESENT IN BH FROM 3m INCREASING WITH DEPTH

SIGNED (Driller) I BAMFORTH

SIGNED (for Client)

Ace Drilling Services

5 Charles View, Hall Green, Wakefield,
West Yorkshire, WF4 3QH

Telephone: (01924) 249386 Mobile: 07710 390 021
stuart.smallwood@btinternet.com

DRILLER'S DAILY BOREHOLE LOG

Contract No.
Rig RETTA TH1
Driller I DAWFORTH
Date 5-4-19

Site: GYNN LANE

Borehole No: 4
Borehole Dia: 4 1/2
Type of Bit/ ~~Barrel~~ CHORE
Type of Flush: AIR MIST

CASING USED
Size PW
Depth to 4.5

WATER STRIKES
Depth
Inflow (Fast med seepage)
Water level after 20 mins
Depth sealed off

HOURS ON SITE
From To
Open holing (OH) hrs
Coring (C) hrs
Casing borehole hrs
Moving between boreholes hrs
Dayworks hrs
(Details)
Delays hrs
(Reasons)

CREW
Driller hrs
2nd Man hrs
3rd Man hrs

Strata Description	Strata FROM	Strata TO	Drilling / Coring TYPE OHC	RUN NO.	TIME TAKEN	DEPTH FROM	DEPTH TO	RUN LENGTH	CORE RECOVERED	FLUSH RETURNS	Penetration Tests 75 MM	75 MM	75 MM	75 MM	75 MM	75 MM
MOVE RIG TO BH4																
DIG PIT																
SANDSTONE BALAST	0.0	0.3														
CLAY/SOIL	0.3	1.2														
SET UP RIG																
SOIL/CLAY	1.2	2.3														
MUDSTONE WEAK	2.3	4.5														
MUDSTONE DARK	4.5	6.0														
CASED TO 4.5m																
LOT 1.8																
MOVE RIG TO BH2																
SET UP RIG																
CASE TO 4.5																
BLOW OUT BH		1MIN	2MIN	3MIN	4MIN	5MIN	10MIN	15m	20mm	25	30	1HR				
RISING HEAD TEST		5.1	4.1	3.75	3.74	3.6	3.64	3.67	3.63	3.6	3.6	3.6				
RECOVER CASING																

1HR DIRATE

REMARKS:

SIGNED (Driller)

SIGNED (for Client)

Ace Drilling Services

DRILLER'S DAILY BOREHOLE LOG

5 Charles View, Hall Green, Wakefield,
West Yorkshire, WF4 3QH

Telephone: (01924) 249386 Mobile: 07710 390 021
stuart.smallwood@btinternet.com

Contract No.
Rig DERETTA T41
Driller I DAMFORTH
Date 5.4.19

Site: CAMAN QUARRY

Borehole No: 3
Borehole Dia: 4 1/2"
Type of Bit/ ~~Barrel~~: CLORE
Type of Flush: AIR MIST

CASING USED
Size PC
Depth to 4.5

WATER STRIKES
Depth
Inflow (Fast med seepage)
Water level after 20 mins
Depth sealed off

HOURS ON SITE

From	To	
Open holing (OH)		hrs
Coring (C)		hrs
Casing borehole		hrs
Moving between boreholes		hrs
Dayworks		hrs
(Details)		
Delays		hrs
(Reasons)		

CREW
Driller I DAMFORTH hrs
2nd Man R DURRY hrs
3rd Man J SMITH hrs

Strata Description	Strata FROM	Strata TO	Drilling / Coring TYPE OHC	RUN NO.	TIME TAKEN	DEPTH FROM	DEPTH TO	RUN LENGTH	CORE RECOVERED	FLUSH RETURNS	Penetration Tests 75 MM	75 MM	75 MM	75 MM	75 MM	75 MM
MOVE R.G TO BH 3																
DIG PIT																
SOIL	0.0	0.7														
SOIL/CLAY	0.7	1.2														
SET UP RIG																
SUBSOIL/CLAY	1.2	2.0														
MUDSTONE WEATHERD/FALL	2.0	3.8														
GRAVEL	3.8	4.3														
MUDSTONE DARK	4.3	7.0														
CASED TO 4.5																
LOT 1.4																

REMARKS:

SIGNED (Driller) I Damforth

SIGNED (for Client)

Appendix **B**







Ludhill Dyke flowing through site





Views South from North of site



Rotary open hole Rig at BH2

