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Mr P Butler
PB Planning
24 Fountayne Street
York
YO31 8HL

BY E-MAIL

Our Ref: PBP/01/MCBjc

21st August 2017

-- Dear Paul

Intrusive Investigation - Coal Mining Risk
Hollinberry Lane, Howbrook

In accordance with our commission, site visits were made on Tuesday 27th June and Monday 10th July 2017 to carry out the intrusive investigation previously recommended in our Coal Mining Stability Risk Assessment Report (PBP0111, 21st December 2016), and in the Coal Authority response to Barnsley Metropolitan Borough Council consultation letter, dated 5th January 2017.

The Coal Authority Report identified seven coal mine entries within 20m of the site. Of these, four entries were highlighted as being off site to the east (three adits and one mine shaft), and a further three adits are located by the Authority south of the site, running away from the boundary. However, one adit (reference number 432398-019), cannot be discounted in this way and has the potential to affect the stability of one of the three proposed houses (Plot C; Drawing SK.01). A second question concerned the location and condition of the Whinmoor Coal seam, which is indicated to outcrop on the site, and whether it contained shallow mine workings. There are no other significant seams beneath the Whinmoor Coal.

Site Works

Two approaches were used to investigate whether mine entries were present on site and if shallow coal mine workings exist beneath the site. Firstly, half of the site was subjected to a topsoil strip and because the recorded location of the adit is approximate, a buffer zone of at least 16m either side of the axis of the feature was investigated. Secondly, a number of trial trenches were dug across the site to intersect the coal seams and search for evidence of historical workings.

Search for Mine Entries - Topsoil Strip

A site visit was made on Tuesday 27th June 2017, to supervise the topsoil strip on the eastern half of the site, in order to locate a possible mine adit (reference number 432398-019), as shown on the appended intrusive investigation plan (Drawing SK.01). The topsoil was found to be between 0.2m and 0.5m thick and was removed and replaced in phases at the request of the present and

future site owners, due to the risk of heavy rainfall causing standing water on the site. It could be seen that across the exposed area, the underlying subsoil comprised mainly light brown slightly gravelly clay, with the gravel being angular of mainly mudstone and siltstone (Photo 1). In general, no made ground or disturbed natural strata were encountered, apart from a small area across the central area of Plot B, where a shallow land drain was encountered, running from the northwest of the site (Photo 4). As a result, no evidence of strata disturbance or patches of made ground that could represent a possible mine entry feature were encountered.

Investigation of Whinmoor Coal Seam and any Adits - Trial Pits/Trenches

A second site visit was made on Monday 10th July 2017 to excavate trial pits/trenches across the site, to check for any deeper evidence of the indicated mine adit and to intersect the Whinmoor Coal seam in order to determine its depth, thickness, if it has been worked and also to sample the coal for calorific value testing. A personal gas monitor (GSI-376 model ALT4X) was carried at all times and no elevated gas emissions were recorded.

Six trenches, referenced A, B, C, D, E and F were excavated by a 360º tracked excavator on the northern third of the site and along the eastern boundary. All but Trench C were of conventional trial pit size (approximately 0.6m wide by around 2m to 3m long). Trench C was an extended trench approximately 27m long. Beneath the topsoil, the trenches revealed a covering of clay to depths of between 2.1m (Trench B) and 2.4m (Trench E and F). Underlying the clay, coal was encountered to depths of between 2.4m (Trench B) and 3.0m (Trench F). The thickness of the coal seam was found to be between 0.3m (Trench B) and 0.6m thick (Trench F). All coal encountered was intact and had not been worked. At Trench A and B, a shallow weathered coal seam was encountered comprising clay with angular coal gravel (Trench A) at a depth of 1.2m and clayey gravel of coal (Trench B) at1.1m. The seam was found to be between 0.27m (Trench B) and 0.3m (Trench A) thick. Together, these trenches determine the dip and location of the seam at surface, and indicate it runs just north of the footprint of Plot A (possibly affecting the northeast corner of the foundations), through the middle of the footprint of Plot B and the southern part of Plot C, dipping to the northeast.

It was considered possible that the suspected adit could lie further south than the area of the topsoil strip, and pass below this area as a tunnel, so that the topsoil strip would not have detected any sign of the adit. Therefore, Trench C (approximately 27m long) was excavated down to bedrock along the southeastern boundary, to at least 10m either side of the approximate line of the adit given by the Coal Authority. Trial pit logs at four locations along the trench (Points 1- 4, Drawing SK.01) are enclosed.

Shallow bedrock was located in the trench at a depth of between 1.7m at Point 2 (sandstone) and 3.9m further southwest (Point 3, interbedded sandstone and mudstone). No made ground was encountered in the trench, apart from at a single point (Point 4, Drawing SK.01). At Point 4, made ground was encountered down to 1.4m depth, underlain by sandstone bedrock to at least 1.7m depth. The made ground was only approximately 200mm to 300mm wide, and comprised backfilled gravel and cobbles of sandstone (probable land drain). The made ground was

encountered on both sides of the trench, trending in a northwest direction. An additional trench (Trench D) was therefore, excavated further west in line with the approximate trend direction, in order to intersect any possible feature. However, Trench D revealed natural gravelly clay to 1.6m depth, overlying weathered sandstone, underlain by sandstone bedrock at 1.85m depth. No further made ground was encountered.

There was no evidence of any adit in Trench C, which was not unexpected given the shallow depth of the coal under Plot C.

Laboratory Testing

Three samples of coal taken from Trench C, E and F and were issued to the UKAS accredited Derwentside Environmental Testing Services in Consett for testing for calorific value only. The aim was to assess if deep weathering had rendered the coal unsuitable for use, and if so, this could have a bearing on whether it had been mined historically. The test certificate, which is appended, shows the samples to have a calorific value between 8.3MJ/kg (Trench E) and 31.8MJ/kg (Trench C). Domestic house coal has a general calorific value of around 30GJ/Tonne (30MJ/kg). The coals from Trench E and F therefore, are considered to have been weathered to a degree rendering them unsuitable for domestic use. However, the coal found within Trench C, further south on the site, was found to be essentially unweathered and within the domestic use range.

Comments and Conclusions

The site investigations detailed above found no evidence of any mine entry features either at the surface, or from the bankside leading to Plot C, and no evidence of mine workings were found within any of the coal seams encountered within the trenches. It is, therefore, concluded that any mine entry must be beyond the site boundary, to the northeast, and that the site is not at risk from ground instability from shallow coal mining. There is concluded to be no requirement for any ground stabilisation of mine workings or mine entries on the site.

However, with regard to any foundations penetrating coal seams, the foundation should be surrounded by a membrane to prevent sulphate attack, and there should be 250mm thickness of concrete on the outer face of the foundation, outside the membrane. This is a sacrificial barrier in the unlikely event of a fire in the seam approaching the house from the outside. The risk of combustion from inside is considered very remote, so there is no requirement for additional concrete on the inside of the footprint. If the foundation steps back up above the coal elsewhere on the plot, there is no requirement for these measures. The above recommendations assume that coal will not be extracted prior to development.

It is considered good practice to provide gas protection to properties constructed on ground where significant coal seams are encountered.

We trust the above information is sufficient for your purposes, but if you have any queries, please do not hesitate to contact us, at your convenience.

Yours sincerely
for ARP GEOTECHNICAL LTD

Mrs M C Beasley

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N O T E S

KEY

- Trench Location
- Approximate Mine Shaft Location (Ref No. 432398-020)
- Area of Topsoil Strip
- Approximate Adit Location (Ref No. 432398-019)
- Made ground feature.
- Conjectured Coal Outcrop (9 degree dip)
- Coal Outcrop (2.2m bgl)

Rev	By	Date	Revision	Chk
	JFR	.	Issued for approval	MCB

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TITLE
INTRUSIVE INVESTIGATION PLAN

PROJECT
HOLLINBERRY LANE, HOWBROOK

CLIENT
MR S WRAGG

Scale	Date	Drawn	Chk.
1:200 @ A1	AUG'17	JFR	MCB

Drg. No. PBP/01/SK.01 Rev

Trial Pit Log

Trialpit No
Trench A
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 1.55	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Dark brown clayey TOPSOIL.
				0.40			Stiff brown mottled grey slightly gravelly CLAY. Gravel is angular to tabular, of siltstone.
				1.20			Firm dark grey gravelly CLAY. Gravel is angular, of COAL (Weathered coal).
				1.50			Stiff brown gravelly CLAY. Gravel is angular of mudstone (completely weathered mudstone).
				1.55			End of pit at 1.55 m

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Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench B
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 3.20	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			Dark brown clayey TOPSOIL.
				1.10			Stiff brown mottled grey slightly gravelly CLAY. Gravel is angular, of siltstone.
				1.37			Dark grey/black COAL, arising as clayey fine to coarse angular gravel.
				2.10			Firm grey gravelly friable CLAY. Gravel is angular, of mudstone (completely weathered mudstone).
				2.40			Black COAL, arising as fine to coarse angular gravel.
				2.80			Stiff grey gravelly CLAY. Gravel is angular, of mudstone (completely weathered mudstone).
				3.00			Grey fine to coarse clayey angular GRAVEL of mudstone (highly weathered mudstone).
				3.20			Grey MUDSTONE, arising as angular gravel and cobbles.
							End of pit at 3.20 m

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Remarks: Groundwater seepage encountered at 2.1m. Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench C - Point 1
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 2.90	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Firm light brown mottled grey gravelly CLAY. Gravel is angular, of mudstone and occasional coal.
				1.40			Firm dark grey gravelly CLAY. Gravel is angular, of mudstone and coal.
				1.80			Stiff light brown mottled grey gravelly CLAY. Gravel is angular, of mudstone (completely weathered mudstone).
	2.40 - 2.60	D		2.20			Dark grey/black COAL, arising as fine to coarse angular gravel.
				2.70			Dark grey MUDSTONE, arising as angular gravel and cobbles.
				2.90			*Terminated on hard strata.* End of pit at 2.90 m

1 2 3 4 5

Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench C - Point 2
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 1.70	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Dark brown clayey TOPSOIL.
				0.40			Firm brown very gravelly CLAY. Gravel is angular, of sandstone.
				1.00			Brown clayey fine to coarse angular/tabular GRAVEL of sandstone (highly weathered sandstone).
				1.40			Brown SANDSTONE, arising as tabular gravel and cobbles.
				1.70			*Terminated on hard strata.* End of pit at 1.70 m

Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench C - Point 3
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 4.00	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Firm brown mottled grey gravelly CLAY. Gravel is sub-angular to angular, of sandstone.
				1.50			Grey/light brown sandy fine to coarse angular/tabular GRAVEL of sandstone (highly weathered sandstone).
				1.80			Grey SANDSTONE, arising as tabular gravel and cobbles.
				3.60			Dark grey MUDSTONE, arising as angular gravel and cobbles.
				3.90			Brown SANDSTONE, arising as tabular gravel and cobbles.
				4.00			*Terminated on hard strata.* End of pit at 4.00 m

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Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench C - Point 4
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 1.70	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Dark brown clayey TOPSOIL.
				0.40			MADE GROUND: Brown sandy fine to coarse angular/ tabular GRAVEL of sandstone with high cobbles content (reworked natural).
				1.40			Brown SANDSTONE, arising as tabular gravel and cobbles.
				1.70			*Terminated on hard strata.* End of pit at 1.70 m

Remarks: Slight instability within upper 1.0m.

Stability:

Trial Pit Log

Trialpit No
Trench D
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 1.90	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Dark brown clayey TOPSOIL.
				0.25			Firm brown mottled grey slightly gravelly CLAY. Gravel is angular, of sandstone (completely weathered sandstone).
				1.60			Brown clayey sandy fine to coarse angular/tabular GRAVEL of sandstone (highly weathered sandstone).
				1.85			Brown SANDSTONE, arising as tabular gravel and cobbles.
				1.90			*Terminated on hard strata.* End of pit at 1.90 m

Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench E
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 3.00	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Dark brown clayey TOPSOIL.
				0.30			Stiff brown mottled grey gravelly CLAY. Gravel is angular, of mudstone (completely weathered mudstone).
	2.50 - 2.70	D		2.40			Black COAL, arising as fine to coarse angular gravel with low cobble content.
				2.90			Stiff grey friable gravelly CLAY. Gravel is angular, of mudstone (completely weathered mudstone).
				3.00			End of pit at 3.00 m

1 2 3 4 5

Remarks: Sides remained stable throughout.

Stability:

Trial Pit Log

Trialpit No
Trench F
Sheet 1 of 1

Project Name: Hollinberry Lane	Project No. PBP/01	Co-ords: - Level:	Date 10/07/2017
Location: Howbrook, Sheffield		Dimensions (m): Depth 3.20	Scale 1:25
Client: PB Planning			Logged ARP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Firm brown mottled grey gravelly CLAY. Gravel is angular, of mudstone.
	2.40 - 2.60	D		2.40			Black COAL, arising as fine to coarse angular gravel.
				3.00			Firm gravelly CLAY. Gravel is angular, of mudstone (Completely weathered mudstone).
				3.20			End of pit at 3.20 m

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Remarks: Sides remained stable throughout.

Stability:

Topsoil Strip – 27.06.17



Photo 1: Rear of Plot C, note the natural clay strata beneath the topsoil.



Photo 2: Rear of Plot B, note the natural clay strata beneath the topsoil.



Photo 3: Under Plot B, note the natural clay strata beneath the topsoil.



Photo 4: A small area of made ground at Plot B, where a thin drainage pipe was encountered.



Phot 5: At Plot C, note the natural clay strata beneath the topsoil.



Photo 6: Front of Plot B, note the natural clay strata beneath the topsoil.

Trial Pit Trenches – 10.07.17



Photo 7: Trench A - Weathered coal seam is visible.



Photo 8: Trench B – Two intact coal seams are visible.



Photo 9: Trench C – Looking Northeast towards Point 2.

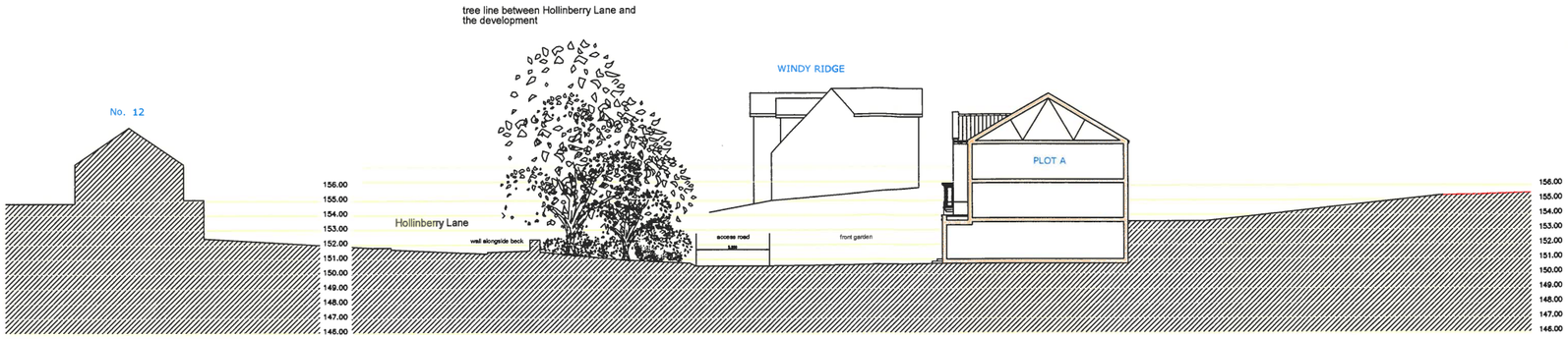


Photo 10: Trench E – Intact coal is visible near the base.

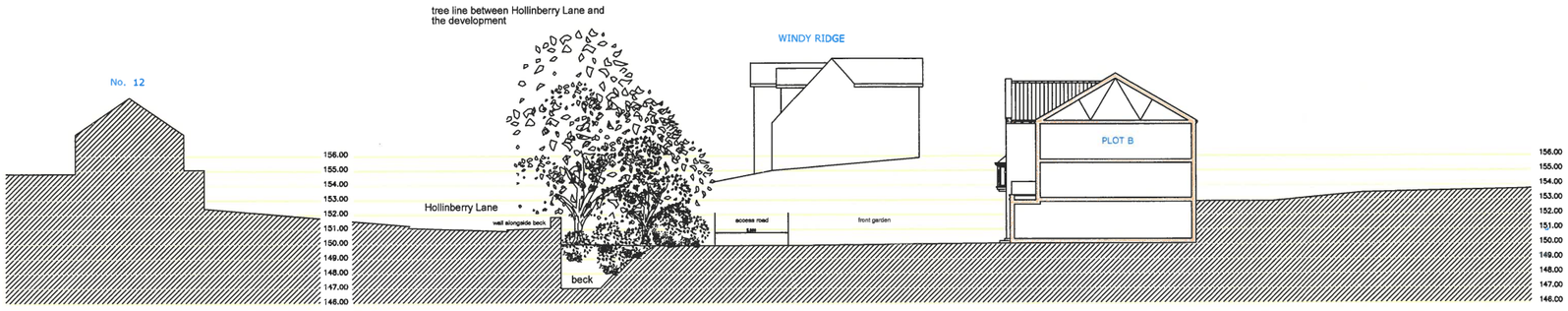


Photo 11: Trench F – Intact coal seam is visible near the base.

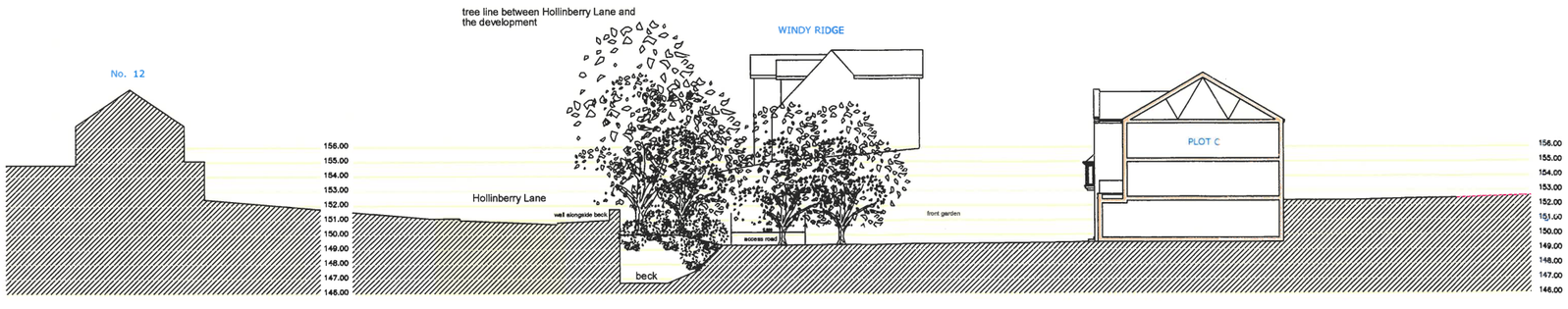
1) This drawing and the design and details depicted thereon are the copyright of Peter Dimberline Chartered Architect.
2) All dimensions on this drawing are to be checked by the Contractor and any discrepancies are to be reported to the Architect.
3) Do not scale critical dimensions off this drawing.
4) Contractor to ensure that all Health & Safety requirements (CDM Regulations) in relation to this project will be complied with.



SECTION THROUGH PLOT A



SECTION THROUGH PLOT B



SECTION THROUGH PLOT C

REVISIONS

PETER DIMBERLINE Dip Arch, RIBA
CHARTERED ARCHITECT

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CLIENT	Mr S Wragg
PROJECT	Proposed residential development
LOCATION	Hollinberry Lane, Howbrook Nr Sheffield
DRAWING	Cross sections through site
SCALES 1:200	DATE Aug' 16
DRWG No. 2016/18/01 sh.2 REV.	DRAWN BY PD

Certificate of Analysis

Certificate Number 17-05107

17-Jul-17

Client ARP Geotechnical
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Our Reference 17-05107

Client Reference PBP/01

Order No (not supplied)

Contract Title HOLLINBERRY LANE, HOWBROOK

Description 3 Soil samples.

Date Received 12-Jul-17

Date Started 12-Jul-17

Date Completed 17-Jul-17

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 10725 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 17-05107
Client Ref PBP/01
Contract Title HOLLINBERRY LANE, HOWBROOK

			Lab No	1203242	1203243	1203244
			Sample ID	TRENCH C POINT	TRENCH E	TRENCH F
			Depth			
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	10/07/17	10/07/17	10/07/17
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Inorganics						
Calorific Value MJ/kg	DETSC 5008	1	MJ/kg	31.8	8.3	25.9

Key: n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 17-05107
Client Ref PBP/01
Contract HOLLINBERRY LANE, HOWBROOK

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1203242	TRENCH C POINT A SOIL	10/07/17	PG		
1203243	TRENCH E SOIL	10/07/17	PG		
1203244	TRENCH F SOIL	10/07/17	PG		

Key: P-Plastic G-Bag

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months