

HBSA17



# HINKLEY POINT C CONNECTION PROJECT

ARCHAEOLOGICAL WATCHING BRIEF  
DCO REF. 2013 NO. 648

commissioned by LSTC  
on behalf of National Grid

January 2018



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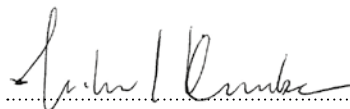
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## PROJECT SUMMARY

Headland Archaeology (UK) Ltd was commissioned by LTSC to undertake an archaeological watching brief on a series of trial pits and boreholes associated with the grid connection route for the Hinkley Point C Connection Project. The work took place in two phases; from the 13th March to 4th April, and then 7th August to the 12th September 2017. No archaeological features were identified, however, key peat horizons with organic sediments were recorded and sampled for further palaeobiological (palaeoenvironmental) assessment.

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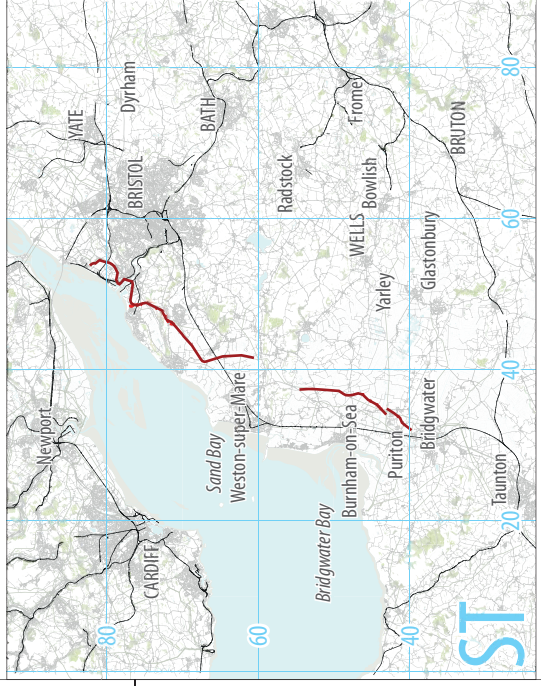
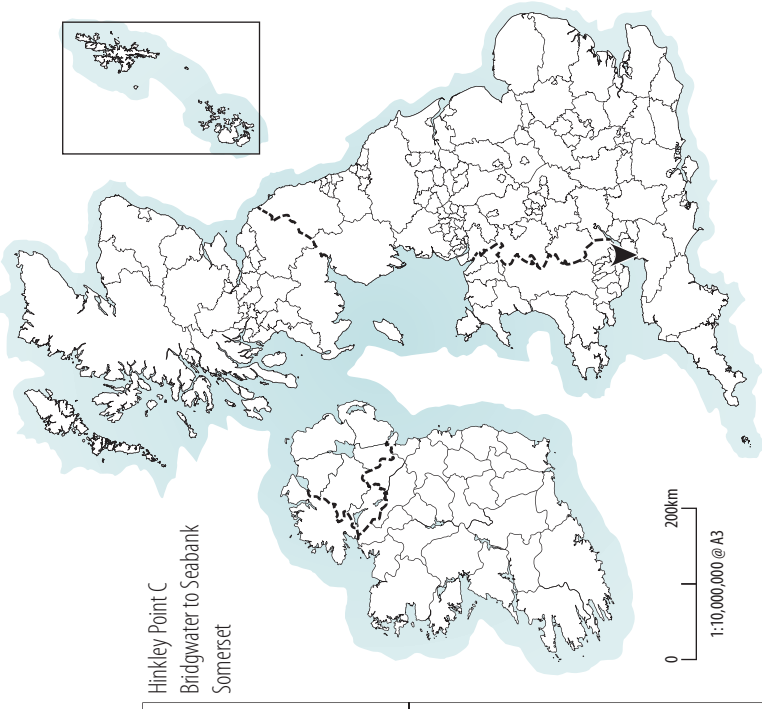
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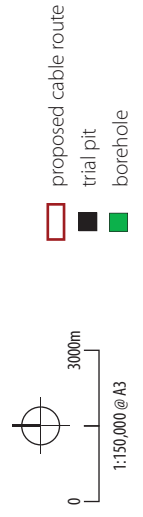
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ILLUS 1 Site location





# HINKLEY POINT C CONNECTION PROJECT

## ARCHAEOLOGICAL WATCHING BRIEF

### 1 INTRODUCTION

In advance of a Development Consent Order, a series of ground investigation boreholes, located between Bridgwater, Somerset and Seabank Substation, north of Avonmouth, as part of the Hinkley Point C Connection Project, were subject to archaeological monitoring (Illus 1). A WSI was produced by Headland Archaeology (UK) Ltd to define the scope of the monitoring (Kimber 2017). The pre-construction ground investigation works consisted of machine-dug trial pits and sleeved cores from geotechnical boreholes.

The trial pits along the new 400kv connection were also monitored for any previously unknown archaeological horizons, and to identify any organic horizons containing potential palaeoenvironmental material. Selected boreholes were also recorded in order to highlight organic horizons for palaeoenvironmental material, which could inform on the extent of palaeochannels in the immediate vicinity. This was at the request of North Somerset and Somerset County Councils, as advised by Historic England. Archaeological monitoring took place from 13th March 2017 to 12th September 2017. The peat layers within the collected samples were then studied at the Geotechnical Ltd. yard in Gloucestershire.

#### 1.1 SITE DESCRIPTION

The environmental groundworks covered portions of the scheme from Bridgwater to Avonmouth. The works were predominantly located around the Somerset levels; this area of coastal plain and wetland is known to contain peat and clay deposits that provide high levels of archaeological preservation and natural biodiversity. The majority of work took place in agricultural pastoral fields.

Geology varies across the scheme, but for the majority of the boreholes and trial pit locations, the solid geology is recorded as part of the Mercia mudstone group, with some locations situated

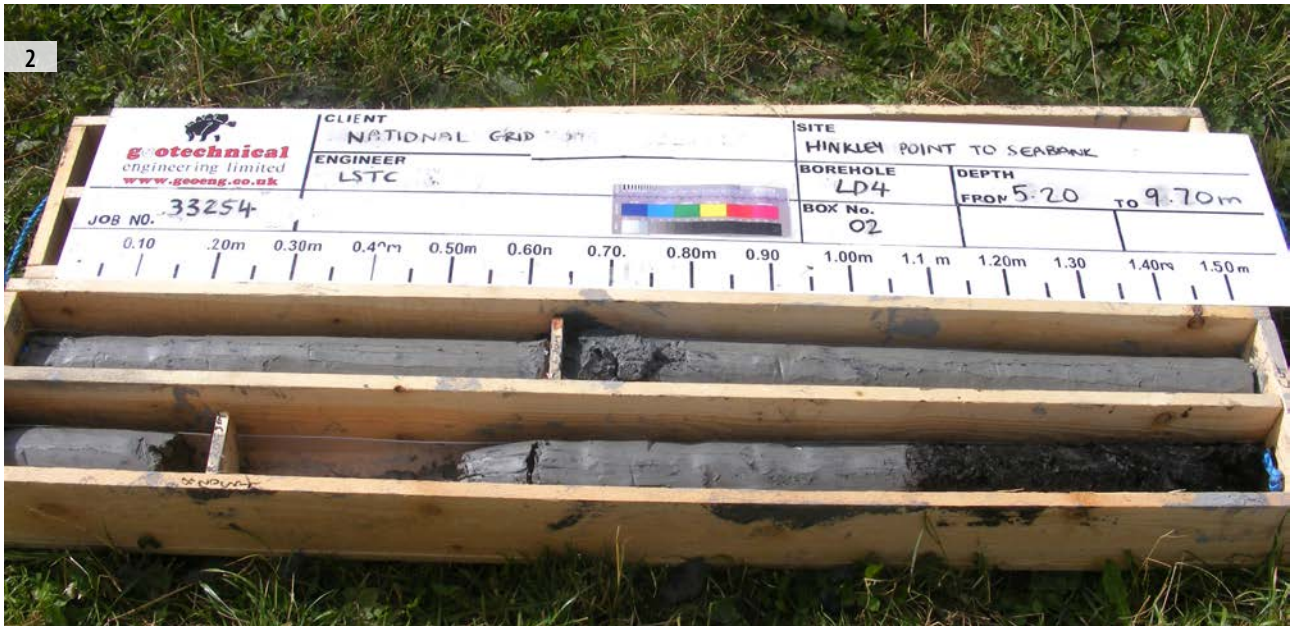
over limestone formations. Superficial geology is also variable but consists of predominantly alluvial deposits (NERC 2017).

#### 1.2 ARCHAEOLOGICAL BACKGROUND

The following is a brief outline of relevant archaeology in the vicinity. Detailed background information was prepared prior to groundworks; key resources include an environmental assessment detailing the local historic environment (National Grid 2014a) and a Geoarchaeological Desk-Based Assessment and Field Survey (National Grid 2014b). These documents should be consulted for a more comprehensive discussion on individual sites and their environs.

The Somerset Levels are an area of high palaeoenvironmental potential and moderate to high archaeological potential. Studies prior to groundworks identified six proposed locations for Palaeo-environmental sampling and analysis, based on previous studies. Six boreholes (8, 11, 12, 14, and 16-17) were located within, or in close proximity to, heritage asset PE3 – the course of the River Sigerare, with the potential to collect relevant information on the form and extent of this asset. Tickenham Moor was also identified as an area of palaeoenvironmental interest. Borehole 52 was located outside of the Tickenham Moor SSSI but appears to fall within the relevant land form of which it is a part.

In addition, the Environmental Statement identified the potential for previously unknown remains to be present and masked by alluvial deposits across the Somerset, North Somerset Levels and the Avonmouth Levels. Some areas of hard geology would once have existed as islands in a flooded marshy environment and would have been an attractive setting for human activity, where individuals would have made use of the natural clays, flora and fauna of the area. These locations, in particular, have the potential to hold surviving archaeological remains (Kimber 2017).



ILLUS 2 Borehole 11 example of core showing clay and peat horizons between 9.45 and 9.00m BGL ILLUS 3 Trial Pit 68 looking south ILLUS 4 Trial Pit 54 looking north

## 2 METHOD

Borehole and trial pit locations were set out at pre-designated locations by the client and were marked out on site before the commencement of any work.

During the course of the works, 7 boreholes, 9 major trial pits and 1 minor trial pit, were excavated with an archaeologist present.

Seven boreholes were monitored during the scheme, as they were thought to present potential palaeoenvironmental data, in the form of alluvial peat and clay deposits. These boreholes were excavated to a depth of 1.20m by hand before the percussion rig was positioned over the hole in order to commence coring. The depths of these cores were variable but extended to a maximum of 35m below ground level. Hand excavation and machine coring took place under the supervision of the monitoring archaeologist, and a record was made of all deposits encountered during this process. After the cores had been excavated and recorded, they were sent for storage, with access available for more detailed specialist analysis of relevant palaeosols by a geoarchaeologist at a later date.

Major trial pits were excavated using a JCB 3cx mechanical excavator fitted with a toothless bucket. All excavation was monitored archaeologically in order to identify any archaeological remains uncovered during this excavation. All trial pits were excavated to a maximum depth of 3.20m, or shallower if the natural bedrock prevented excavation to this depth. The excavation was intermittently paused in order to check for any evidence of archaeological remains or deposits in the trial pits. During excavation, all spoil that was brought to the surface was visually scanned for any archaeological material by the monitoring archaeologist. A record of the stratigraphic sequence was produced for each trial pit.

One minor trial pit was monitored due to its close proximity to a designated heritage asset/the site of a Roman villa (EHNMR 634155). This was excavated under archaeological supervision, by hand, to a depth of 0.85m, at which point the underlying bedrock was encountered. As with the major trial pits, a record of the stratigraphic sequence was produced and all spoil was visually scanned for any archaeological material.

All recording followed ClfA Standards and guidance for an

archaeological watching brief (Clfa 2014b) and was carried out on pre-printed pro forma recording sheets. All deposits encountered were given a unique number and were recorded along with their depth below ground level (BGL). Sections and general views of each trial pit were photographed on 35mm black and white film with a graduated metric scale and supplemented by digital photographs.

### 3 RESULTS (APPENDICES 1–3)

#### 3.1 BOREHOLES

A total of seven boreholes, circular were monitored across the scheme in order to record potential layers of peat. Deposits of peat were observed in four of these. In Boreholes 05, 13 and 14, no peat layers were encountered.

Within Borehole 11 (BH11/LD4), up to seven humic deposits were present. These were observed between 22.65 and 3.5m below ground level (Illus 2). The base of the earliest peat deposit was identified at 22.71m BGL and measured 0.06m thick. A second, 0.45m thick black peat was encountered at a depth between 9.45 and 9.00m BGL, separated from the lower deposit by numerous sandy clay layers. Similar layers were observed to seal the peat deposit and separate it from the most recent peat accretion, the base of which was identified at a depth of 4.35m, extending up to 3.5m; by far the most substantial deposit noted in the core. The remaining humic deposits were thin, discontinuous and very sandy in character and were, therefore, not sampled.

The excavation of Borehole 12 (BH12/LD5) was attempted on two separate occasions, the first of which (12a) was aborted at a depth of 8.2m. The second attempt was excavated to a total depth of 35.25m BGL. Up to six deposits of peat were identified at depths ranging from 23.05m to 2.25m below ground level. The earliest of these was represented by a 0.05m thick deposit of peat, overlain by several layers of variably sandy clay, above which, at a depth of 16.95m (BGL) a second, 0.35m thick peat deposit was encountered. The remaining peat layers located at depths of 8.70m, 5.25m, 4.85m and 2.25 m, measured 0.70m, 0.05m, 1.05m, 0.05m thick respectively. The deposits located at 16.95m, 5.25m and 2.25m proved thin and discontinuous; and humic sediments from these deposits were not sampled (see Appendices 2 and 3 reports).

Four separate peat deposits were identified in Borehole 16 (BH16/LD13), the earliest of which was encountered a depth of 24.16m and represented a moderately humified deposit of very dry peat containing stratified plant macrofossils. This was separated from a second peat deposit, encountered at a depth of 18.00m and extending to 17.83m, by a series of mixed sand and clay deposits. Layers of coarse sand and clay, separated this from a third peat horizon, identified between 4.40m and 3.94m below ground level. A fourth layer of peat was the last of the humic deposits in the sequence, apparent from a depth of 3.80m, up to 3.88m.

In Borehole 52 (BH52/LD79), a layer of peat roughly 0.80m thick was observed at a depth of 0.30m, directly below the topsoil. There were no other peat deposits observed in this bore-hole.

#### 3.2 MAJOR TRIAL PITS

Trial pit 63 was located on low-lying marshy ground adjacent to a small stream. The earliest deposit encountered was mid beige-brown silty sand, with occasional sub-rounded stones, which was heavily waterlogged (6305). Preserved roots, some of which appeared to derive from small trees, were present throughout. The deposit was seen to extend from 2.30m below ground level to the limit of excavation, at 3.00m. This was interpreted to be formed from natural processes and may represent river basin deposition. Sealing this was a 1.95m thick peat deposit containing abundant waterlogged plant matter (6304). The peat was overlain by a 0.23m thick, mid brown-grey silty clay subsoil (6302), sealed by a thin layer of mid-greyish brown silty clay topsoil (6301)

Trial pits 68, 69 and 70, which were all located in the Portishead Nature Reserve, all showed a fairly uniform stratigraphy (Illus 3). This comprised a mid-blueish grey clay horizon with some patches of orange mottling throughout (eg 6804), encountered at depths between 0.70m and 1.04m. Decaying rootlets noted throughout suggest that this may represent some form of palaeosol. Above this, a mid-greyish brown slightly silty clay with patches of orange mottling throughout (eg 6803) was observed. This appeared to be some form of gley soil and was interpreted as a possible alluvial deposit. Overlying the alluvium was a mid-brownish grey silty clay subsoil (eg 6802), which varied in thickness between 0.14m and 0.28m. This, in turn, was sealed by mid-greyish brown silty clay topsoil (eg 6801), varying between 0.17m and 0.27m thick.

The majority of the remaining Trial Pits, 54, 55, 60, 64 and 65, showed a fairly consistent soil profile with little variation (Illus 4). In trial pits 54 and 55, the natural was recorded as being a mid-brownish red sandy clay with occasional degraded mudstone fragments (eg 5403). In trial pit 60 it was observed to be a mid-yellowish brown clay mottled with patches of mid-blueish grey and frequent medium sized stones (6003). In trial pits 64 and 65, the natural was recorded as being a mid-brownish red sandy clay with patches of poorly sorted gravels throughout (eg 6403). The depth at which the natural was encountered at depths between 0.45m and 1.04m BGL.

The composition of the subsoil varied slightly across the trial pits, consistent with the variation in the natural. The subsoil was generally observed to be a sandy clay in the more southern trial pits 54 and 55 (eg 5402), whereas, in the more northern Trial Pits, 60, 64 and 65, the subsoil was observed as being of a sandy silt composition (eg 6002). The colour of this subsoil remained consistent throughout; a mid-orangey brown. Across the trial pits, the subsoil varied in thickness between 0.18m and 0.55m and was generally seen to be shallower in the more northerly examples. The topsoil sealing the subsoil was a fairly consistent mid-greyish brown silty clay (eg 5401), which varied in depth between 0.23m and 0.45m.

Trial pit 88 was a hand dug minor test pit, measuring 0.35m to 0.30m. This was monitored due to its close proximity to the site of a possible Roman Villa (EHNMR 634155) Roman villa.

The limestone bedrock (8803), the upper 0.15m of which was partially weathered, was encountered at a depth of 0.49m below ground level. This was overlain by a mid-yellowish brown slightly clayey, sandy silt subsoil 0.25m thick (8802), which was, in turn, sealed by a

0.24m thick mid-greyish brown silty clay topsoil (8801)

No archaeological features or deposits were encountered during the excavation of any of the trial pits.

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## 4 CONCLUSION

Whilst no archaeological features or deposits were identified during the monitoring of the trial pitting works, the bore holing exercise revealed that the localised pattern of sedimentation has led to the preservation of organic remains (peats); which have significant palaeoenvironmental and archaeological potential.

Samples of these sediments, retrieved under laboratory conditions, have been retained for potential future analysis.

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## 5 REFERENCES

Kimber M 2017 *Hinkley Point C Connection Project - Detailed Archaeological Method Statement for monitoring and recording of site investigation boreholes and trial pits* [unpublished client document] Headland Archaeology

Chartered Institute for Archaeologists (CIfA) 2014a *Code of Conduct* (Reading) <http://http.www.archaeologists.net/sites/default/files/CodesofConduct.pdf> accessed 14 September 2017

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National Grid 2014a *Environmental Statement: Historic Environment Appendix 11A Part 1 – Historic Environment Desk Based Assessment Hinkley Point C Connection Project* Application Ref. EN020001

National Grid 2014b *Environmental Statement: Historic Environment Appendices 11D to 11E – Environmental Statement and Archaeological Trial Trenching Survey Hinkley Point C Connection Project* Application Ref. EN020001



## 6 APPENDICES

### APPENDIX 1 BOREHOLE/TRIAL PIT AND CONTEXT REGISTER

DBGL = Depth below ground level

BH05/ZGA8			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.33	0.35	–	0.70
Context	Description	DBGL (m)	
0501	Topsoil – Mid-brown grey silty clay. Rare small sub-angular stones.	0 – 0.23	
0502	Subsoil – Mid-grey orange silty clay. Occasional small sub-angular stones.	0.23 – 0.53	
0503	Natural – Light grey orange silty clay. Occasional small sub-angular stones.	0.53 – 0.70	
0504	Bedrock	0.70+	
Summary			
No archaeological horizons observed.			
BH11/LD4			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.30	0.30	–	35m (30.5m observed)
Context	Description	DBGL (m)	
1101	Topsoil – Mid-grey brown loamy clay. Frequent root intrusion	0 – 0.27	
1102	Subsoil – No true subsoil present		
1103	Natural – predominantly silts and clays with some peat layers	0.27+	
	Light grey mottled clay.	0.27 – 1.90	
	Light blue grey silty clay with organic (roots/wood) inclusions.	1.90 – 3.50	
	Black peat, firm and fibrous, becoming browner and more densely wooded after 4m BGL.	3.50 – 4.80	
	Light blue grey silty clay with organic (roots/wood) inclusions.	4.80 – 9.20	
	Black peat, firm and fibrous, with browner patches	9.20 – 9.70	
	Lost Sample	–	
	Light blue grey clay with rare organic (roots/wood) inclusions.	10.55 – 10.80	
	Light blue grey clay and silt layers, with some areas predominantly silt, and others predominantly clay. Some sandier layers also. A lens of peat from 14.85 – 14.87m BGL.	10.80 – 15.25	
	Mid-brown, highly organic clay that is not quite peat, with frequent shell inclusions.	15.25 – 15.35	

	Light blue grey clay and silt layers, with some areas predominantly silt, and others predominantly clay. Organic (roots/wood) inclusions, varying in frequency. A lens of peaty material from 15.65 – 15.68m BGL.	15.35 – 19.15	
	Light blue grey clay and silt layers, with some areas predominantly silt, and others predominantly clay.	19.15 – 22.40	
	Light blue grey silty clay with organic (roots/wood) inclusions.	22.40 – 22.55	
	Mid-brown peat, firm and fibrous, with some clay.	22.55 – 22.70	
	Dark brown, highly organic clay that is not quite peat, with frequent shell inclusions.	22.70 – 22.80	
	Mid-grey silty clay with occasional black organic (roots/wood) or charcoal inclusions.	22.80 – 23.00	
	Light blue grey silty clay with organic (roots/wood) inclusions.	23.00 – 23.90	
	Mid to dark blue grey clay, with occasional brownish-green mottling, and very rare shell inclusions.	23.90 – 26.50	
	Extremely weak calcareous mudstone	26.50 – 28.10	
	Weak calcareous mudstone containing fossils	28.10 +	
Summary			
Significant layers of peat and organic material, potentially relating to paleochannels.			
BH12a			
L (m)	W (m)	Min. D (m)	Max. D (m)
–	–	–	8.20
Context	Description	DBGL (m)	
1201a	Topsoil – Dark grey brown silty clay, friable.	0 – 0.25	
1202a	Subsoil – Mid-grey silty clay mottled red, rust coloured veins.	0.25 – 1.2	
1203a	Natural – predominantly clays with some peat layers	1.2+	
	Grey clay, sticky towards the surface.	1.20 – 3.70	
	Brown peat, fibrous and woody.	3.70 - 4.20	
	Grey clay, soft and sticky.	4.20 – 4.60	
	Peat.	4.60 – 4.90	
	Grey clay.	4.90 – 5.20	
	Peat.	5.20 – 5.50	
	Grey clay, soft and sticky.	5.50 – 6.70	
	Grey clay, soft and sticky.	6.70 – 8.20	
Summary			
A series of clay deposits with some peat layers. Borehole not fully excavated due to the job having been stopped.			
BH12/LD5			
L (m)	W (m)	Min. D (m)	Max. D (m)

0.35	0.35	–	35.25
Context	Description	DBGL (m)	
1201	Topsoil – Dark grey brown silty clay. Occasional pebbles.	0 – 0.30	
1202	Subsoil – Mid-grey silty clay mottled red, rust coloured veins. Rare small pebbles.	0.30 – 0.80	
1203	Natural – predominantly silts and clays with some peat layers	0.80 +	
	Mid-grey clay with red mottling. A lens of peat from approximately 2.35 – 2.40m BGL, with fibrous rooting surrounding this lens.	0.80 – 3.80	
	Peat, fibrous and woody.	3.80 – 4.85	
	Mid-blue grey clay. There is a 0.05m lens of peat at approximately 6m BGL, with fibrous rooting surrounding this lens.	4.85 – 8.00	
	Peat, with some clay peat bands.	8.00 – 8.70	
	Blue grey clay.	8.70 – 13.20	
	Mid to light grey clay sand, with some areas that are predominantly clay.	13.20 – 23.00	
	Dark brown peat.	23.00 – 23.05	
	Dark grey silty clay.	23.05 – 23.20	
	Mid-grey clay with orange mottling and shell inclusions. Becomes darker and firmer after approximately 24m.	23.20 – 25.05	
	Extremely weak calcareous mudstone with shell fragments/fossils.	25.05 – 29.18	
	Very weak calcareous mudstone with shell fragments/fossils.	29.18 – 31.45	
	Weak calcareous mudstone with shell fragments/fossils.	31.45 +	
Summary			
Mostly a series of clays and sands with silty elements. Some significant areas of peat, concentrated primarily towards the top of the borehole. Second visit to Borehole 12.			
BH13/LD6			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.44	0.43	–	1.20
Context	Description	DBGL (m)	
1301	Topsoil – Mid-brown grey silty clay. Rare very small sub-angular stones. Friable.	0 – 0.25	
1302	Natural – Mid-orange grey clay. Plastic.	0.25 +	
Summary			
No archaeological horizons observed.			
BH14/LD9			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.38	0.37	–	1.20
Context	Description	DBGL (m)	

1401	Topsoil – Dark brown silty clay. Rare small sub-angular stones. Soft.	0 – 0.40	
1402	Alluvium – Light grey clay. Occasional very small stones. Plastic.	0.40 +	
Summary			
No archaeological horizons observed. Water table at 1m.			
BH16/LD13			
L (m)	W (m)	Min. D (m)	Max. D (m)
–	–	–	35.00
Context	Description	DBGL (m)	
1601	Natural – predominantly alluvial clay with some peat	1.20 +	
	Alluvial clay.	1.20 – 3.60	
	Peat.	3.60 – 4.20	
	Grey clay and silt layers, with some areas predominantly silt, and others predominantly clay. Sandier elements towards the base of the deposit.	4.20 – 17.70	
	Peat.	17.70 – 18.00	
	Grey clay sand and silt layers.	18.00 – 22.65	
	Peat.	22.65 – 22.70	
	Grey silty clay. Friable.	22.70 – 26.50	
	Mudstone.	26.50 +	
Summary			
First 1.2m not monitored. Sequence of silty clays with some peat present. No inclusions located.			
BH52/LD79			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.35	0.35	–	8.20
Context	Description	DBGL (m)	
5201	Topsoil – Dark brown loam.	0 – 0.30	
5202	Natural – Initial deposits of peat, followed by sandy clay layers	0.30 +	
	Peat	0.30 – 1.10	
	Dark grey silty sand	1.10 – 1.20	
	Dark grey brown sandy clay to a redder/orange sandy clay	1.20 – 8.20	
	Limestone fragments	8.20 +	
Summary			
Thick layer of peat close to the surface, followed by sandy clays.			
TP54			
L (m)	W (m)	Min. D (m)	Max. D (m)
3.00	2.00	–	1.20

Context	Description	DBGL (m)	
5401	Topsoil – Mid-grey brown silty clay. Sand and common hardcore (brick, concrete etc) inclusions.	0 – 0.23	
5402	Subsoil – Mid-orange brown sandy silty clay. Rare small stone inclusions.	0.23 – 0.63	
5403	Natural – Mid-brown red sandy clay. Abundant yellow grey degraded mudstone inclusions.	0.63 +	
Summary No archaeological horizons observed.			
TP55			
L (m)	W (m)	Min. D (m)	Max. D (m)
2.60	2.10	–	–
Context	Description	DBGL (m)	
5501	Topsoil – Mid-grey brown silty clay.	0 – 0.45	
5502	Subsoil – Mid-orange brown sandy clay.	0.45 – 0.90	
5503	Natural – Mid-brown red sandy clay. Occasional small degraded mudstone flecks.	0.90 +	
Summary No archaeological horizons observed.			
TP60			
L (m)	W (m)	Min. D (m)	Max. D (m)
–	–	–	–
Context	Description	DBGL (m)	
6001	Topsoil – Mid-grey brown silty clay.	0 – 0.45	
6002	Subsoil – Mid-orange brown sandy clay.	0.45 – 0.90	
6003	Natural – Mid-brown red sandy clay. Occasional small degraded mudstone flecks.	0.90 +	
Summary No archaeological horizons observed.			
TP63			
L (m)	W (m)	Min. D (m)	Max. D (m)
–	–	–	–
Context	Description	DBGL (m)	
6301	Topsoil – Mid-grey brown silty clay. Rare small stones.	0 – 0.17	
6302	Subsoil – Mid-brown grey slightly silty clay. Firm.	0.17 – 0.35	
6304	Peat – Frequent sticks and organic matter. Waterlogged.	0.35 – 2.30	
6305	Mid-beige brown silty sand. Waterlogged. Roots have been preserved in this material. Possibly natural.	2.30 +	
Summary			

No archaeological horizons observed.			
TP64			
L (m)	W (m)	Min. D (m)	Max. D (m)
3.80	2.30	–	3.00
Context	Description	DBGL (m)	
6401	Topsoil – Mid-grey brown sandy silt. Occasional small stones.	0 – 0.23	
6402	Subsoil – Mid-orange grey sandy silt. Common small to medium stones.	0.23 – 0.54	
6403	Natural – Mid-brown red clay. Patches of coarse, poorly sorted gravel.	0.54 +	
Summary No archaeological horizons observed.			
TP65			
L (m)	W (m)	Min. D (m)	Max. D (m)
–	–	–	–
Context	Description	DBGL (m)	
6501	Topsoil – Mid-grey brown sandy silt. Rare to occasional small stones.	0 – 0.27	
6502	Subsoil – Mid-orange brown sandy silt. Frequent medium sub-rounded stones.	0.27 – 0.45	
6503	Natural – Mid-brown red sandy clay. Firm. Frequent small to medium sub-rounded stones and some patches of silty sand near the top.	0.45 +	
Summary No archaeological horizons observed.			
TP68			
L (m)	W (m)	Min. D (m)	Max. D (m)
3.80	2.60	–	3.00
Context	Description	DBGL (m)	
6801	Topsoil – Mid-grey brown silty clay. Rare small stones.	0 – 0.22	
6802	Subsoil – Mid-brown grey silty clay with yellow brown mottling.	0.22 – 0.50	
6803	Alluvium – Mid-blue brown mottled silty clay. Rare small stone inclusions.	0.50 – 1.04	
6804	Natural – Mid- to light grey brown clay mottled with bands of light blue grey clay. At c.1m BGL the deposit becomes stiff grey blue clay. This could be a possible palaeo deposit.	1.04 +	
Summary No archaeological horizons observed.			
TP69			
L (m)	W (m)	Min. D (m)	Max. D (m)
4.70	3.10	–	3.00

Context	Description	DBGL (m)
6901	Topsoil – Mid-grey brown slightly sandy silty clay. Rare small stones.	0 – 0.17
6902	Subsoil – Mid-blue brown silty clay.	0.17 – 0.31
6903	Alluvium – Mid-brown grey silty clay. Interface quite diffuse.	0.31 – 0.70
6904	Natural – Mid-blue grey clay with orange brown mottling throughout.	0.70 +

Summary  
No archaeological horizons observed.

TP70			
L (m)	W (m)	Min. D (m)	Max. D (m)
3.10	2.20	–	3.20

Context	Description	DBGL (m)
7001	Topsoil – Mid-grey brown slightly sandy silty clay. Rare small stones.	0 – 0.27
7002	Subsoil – Mid-brown grey silty clay. Very rare small stones.	0.27 – 0.42
7003	Alluvium – Mid-grey brown slightly silty clay with orange brown mottling.	0.42 – 0.92
7004	Natural – Mid- to light blue grey clay with orange brown mottling throughout.	0.92 +

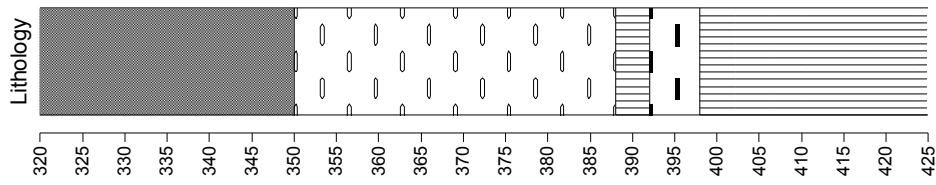
Summary  
No archaeological horizons observed.

TP88			
L (m)	W (m)	Min. D (m)	Max. D (m)
0.35	0.30	–	0.85

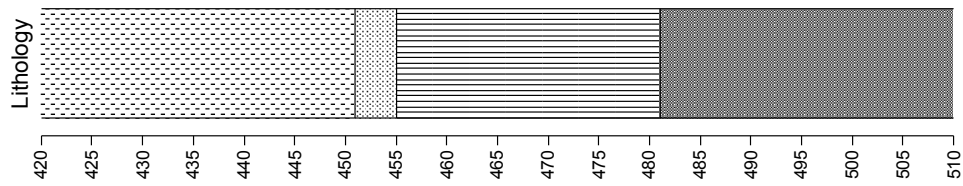
Context	Description	DBGL (m)
8801	Topsoil – Mid-grey brown silty sandy clay. Occasional small stones.	0 – 0.24
8802	Subsoil – Mid-yellow brown slightly clayey sandy silt. Common small stones.	0.24 – 0.49
8803	Natural – Large broken limestone fragments with a sandy silt matrix between. Approximately 0.15m of this before the level of the bedrock was reached.	0.92 +

Summary  
No archaeological horizons observed.

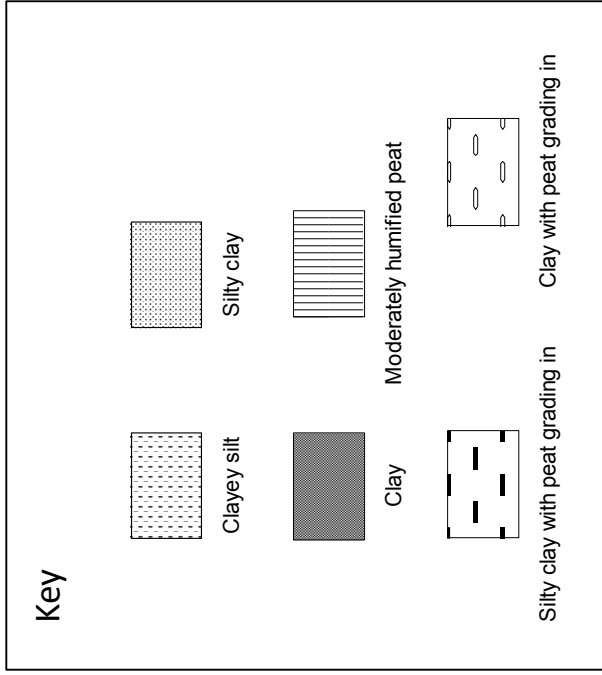
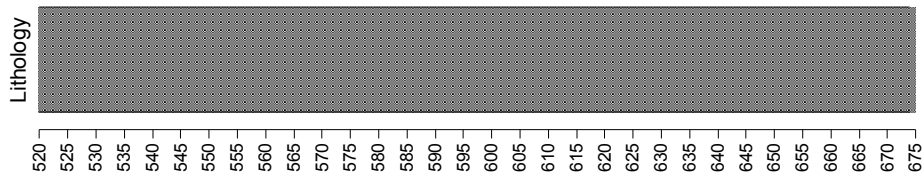
### BH12\_3



### BH12\_4



### BH12\_5



## APPENDIX 2 SEDIMENT DESCRIPTION AND SUBSAMPLING

### Introduction

Sections of boreholes 12 and 16 were described and subsampled at Geotechnical's facility in Olympus Park, Gloucester. Subsamples were obtained for potential radiocarbon dating and pollen analysis, and also for the purposes of sediment description.

### Methodology

#### Sediment description

Core sections recorded as containing peat during the boring process were subsampled and described. For each core section, the profile was cleaned back using a sterile metal spatula so that changes in colour, texture and composition could be recorded. Sediments were characterised following the Troels-Smith (1955) system, wherein the following attributes are scored 0–4, where a score of 0 means an attribute is completely absent, and a score of 4 means it is as strongly present as possible (eg for 4, dryness, 4: 0 means the sediment is saturated with water, while 4: 4 means it is completely desiccated):

1. Darkness
2. Stratification
3. Elasticity
4. Dryness
5. Calcareousness
6. Colour
7. Structure
8. Sharpness of lower boundary
9. Humicity
10. Composition

Attributes highlighted in bold are descriptive so were not scored using the 0–4 system. Colours were assigned using a Munsell Colour Chart (USDA, 2000) in consistent artificial lighting conditions. The methods detailed in the USDA National soil survey handbook were used to characterize composition based on texture and behaviour of the sediment through finger texturing (after Nortcliff, 1994). Small subsamples from each sediment unit were tested for reaction with hydrochloric acid to see whether or not they were calcareous. Humicity (9) was recorded for peat, based on the visibility and preservation of any plant macrofossils, and the colour/opacity of water oozing from the peat when squeezed. For lower boundary, or 'limes' (8) the scores relate to specific depths over which the transition from one sediment unit to another occurs, as follows:

Limes		Boundary zone
0	–	10mm or more
1	diffusas	2–10mm
2	conspicuous	1–2mm
3	manifestus	0.5–1mm
4	acutus	less than 0.5mm

Profiles were drawn using Tilia v.1.7.16 (Grimm, 1991–2011).

### Subsampling

Owing to the location of the samples it was not possible to attain sterile laboratory conditions (ie there is a small possibility of atmospheric pollen contamination), but steps were taken to minimise the possibility of contamination. Clean nitrile gloves were worn when handling the cores to avoid contact with skin, and a sterile metal spatula was used to transfer material to ziplock sample bags. All equipment was cleaned thoroughly with distilled water before each subsample was collected, and the surface of the sediment/peat was cleaned back immediately before subsampling to expose fresh sediment/peat. Subsamples were taken from the peats and also from over- and underlying sediments for pollen analysis and radiocarbon dating. All subsamples are currently in cold storage at the University of Sheffield's Department of Archaeology.

### Results

Please see Illus A2.1 for simplified records of the stratigraphy within the core sections. Detailed sediment descriptions and a record of subsamples taken are provided in Table A2.1.

### References

- Grimm EC (1991–2011) *Tilia 1.7.16*. Springfield, Illinois
- Nortcliff S (1994) *A guide to field assessment of texture for mineral soils*, Reading
- Troels-Smith J (1955) *Karakterisering af løse jordarter (Characterization of unconsolidated sediments)*, Copenhagen
- USDA 2018 *National soil survey handbook, title 430-VI* <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey> accessed 8 January 2018
- USDA (2000) *Munsell Soil Colour Chart*, New Windsor, New York

TABLE A2.1 Detailed sediment descriptions and a record of subsamples taken

BH	Sample/core-section	Sediment unit or patch within unit?	Upper boundary/ cm BGL	Lower boundary/ cm BGL	Darkness	Stratigraphy	Elasticity	Dryness	Calcareous?	Colour (Munsell)	Structure	Lower boundary sharpness	Humification (peats)	Composition
12	3	sediment unit	320	350	1	0	2	2	yes	10yr 5/1 grey	homogeneous	1 (diffuse)	NA	Smooth, sticky clay, no inclusions.
12	3	sediment unit	350	388	1	0	2	2	yes	10yr 5/1 grey	homogeneous	1 (diffuse)	NA	Smooth, sticky clay. Tiny patches of organics (peat) grading in.
12	3	patch	388	392	4	0	1	2	clay yes, peat no	2.5yr 2.5/1 reddish black	fibrous/grainy	3 (manifest)	moderately humified	Patch of peat consisting of small fragments of plant macrofossils.
12	3	sediment unit	392	398	2	0	2	2	clay yes, peat no	10yr 3/1 very dark grey	partially striated - clay grading into peat	1 (diffuse)	NA	Silty clay with small black patches of peat/organics grading in.
12	3	sediment unit	398	425	4	0	1	2	no	2.5yr 2.5/1 reddish black	fibrous/grainy	NA	moderately humified	Peat consisting of small fragments of plant macrofossils.
12	4	sediment unit	420	451	1	0	0	0	yes	5yr 5/1 grey	homogeneous	1 (diffuse)	NA	Clayey silt with gritty texture in places owing to small fragments of plant macrofossils.
12	4	sediment unit	451	455	1	0	1	1	yes	5yr 4/1 dark grey	homogeneous	3 (manifest)	NA	Silty clay with gritty texture in places owing to small fragments of plant macrofossils. Markedly stickier than overlying layer.
12	4	sediment unit	455	481	4	0	1	2	no	10yr 2/1 black	fibrous/grainy	2 (conspicuous)	moderately to well-humified	Peat – small fragments of plant macrofossils present, but smoother and more degraded than peat in sample/ core 3.
12	4	sediment unit	481	510	1	0	2	2	no	10yr 4/1 dark grey	homogeneous	NA	NA	Smooth, sticky clay, no inclusions.
12	5	sediment unit	520	674	1	0	2	2	yes	5y 4/1 dark grey	homogeneous	NA	NA	Smooth, sticky clay, no inclusions.
16	3	sediment unit	320	380	2	0	2	2	yes	10yr 5/2 greyish brown	homogeneous with some gritty inclusions	3 (manifest)	NA	Clay with occasional small gritty fragments of stone (possibly tiny concretions - rust-like appearance when cracked)
16	3	patch	362	363	2	0	2	2	clay yes, peat no	10yr 5/1 and 10yr 3/1 (grey and very dark grey)	homogeneous/ fibrous	3 (manifest)	NA	Small patch of peaty clay. Mixture of smooth, sticky clay and fibrous organic/peat.
16	3	patch	377	378	2	0	2	2	yes	10yr 4/1 and 10yr 3/1 (dark grey and very dark grey)	homogeneous/ fibrous	3 (manifest)	NA	Small patch of peaty clay. Mixture of smooth, sticky clay and fibrous organic/peat.

BH	Sample/core section	Sediment unit or patch within unit?	Upper boundary/ cm BGL	Lower boundary/ cm BGL	Darkness	Stratigraphy	Elasticity	Dryness	Calcareous?	Colour (Munsell)	Structure	Lower boundary sharpness	Humification (peats)	Composition
16	3	sediment unit	380	388	4	0	1	2	no	10yr 2/1 black	fibrous/grainy	2 (conspicuous)	moderately humified	Peat consisting of small fragments of plant macrofossils.
16	3	sediment unit	388	394.5	3	0	2	2	yes	5y 3/1 very dark grey	homogeneous	2 (conspicuous)	NA	Smooth, sticky clay, no inclusions.
16	3	sediment unit	394.5	440	4	0	0	3	no	10yr 2/1 black	fibrous/grainy	NA	moderately humified	Peat consisting of small fragments of plant macrofossils - drier and more friable than peat in overlying layers.
16	13	sediment unit	1751	1756	2	0	2	2	yes – strongly	2.5y 3/1 very dark grey	homogeneous	2 (conspicuous)	NA	Clayey, medium-coarse sand (patch).
16	13	sediment unit	1720	1783	1	0	0	3	yes – strongly	5y 3/2 dark olive grey	homogeneous	3 (manifest)	NA	Medium-coarse sand, no inclusions.
16	13	sediment unit	1783	1800	4	0	0	3	no	10yr 2/1 black	fibrous/grainy	3 (manifest)	moderately to well-humified	Friable grainy/fibrous peat, slightly clayey.
16	13	sediment unit	1800	1870	1	0	0	3	yes – strongly	5y 3/2 dark olive grey	homogeneous	NA	NA	Medium-coarse sand, no inclusions.
16	17	sediment unit	2270	2398	1	0	0	3	yes – strongly	5y 3/2 dark olive grey	homogeneous	1 (diffusas)	NA	Medium-coarse sand, no inclusions.
16	17	sediment unit	2398	2414	1	1	2	2	yes – strongly	5y 4/1 dark grey	homogeneous	1 (diffusas)	NA	Silty clay, no inclusions.
16	17	sediment unit	2414	2416	2	1	2	2	yes – strongly	5y 2.5/1 black	homogeneous	1 (diffusas)	NA	Silty clay, gritty with small fragments of shell.
16	17	sediment unit	2416	2420	4	2	0	3	no	2.5y 2.5/1 black	striated, fibrous	NA	moderately humified	Stratified plant macrofossils (wood?)/ peat – very dry.



## APPENDIX 3 GEOARCHAEOLOGICAL REPORTING OF CORE SAMPLES

### Introduction

A site visit was made to the core store of Geotechnical Engineering Ltd at Olympus Park, Gloucester, to inspect a series of cores derived from two boreholes containing sediments with palaeoenvironmental potential. These boreholes are identified by Geotechnical Engineering as LD4 and LD5 (though they are also referred to as Borehole 11 and 12 by the archaeological team).

This report builds upon an earlier visit to the core store by Dr Emily Forster (University of Sheffield) to inspect other cores from Hinkley; the results of her visit are reported separately and to distinguish the work, the present report is termed Phase 2.

The boreholes were drilled on the Somerset Levels to the east of the village of East Huntspill and close to the contemporary Huntspill River. British Geological Survey mapping records this area as comprising a thick sequence of tidal flats (sands, silts and clays), which reflects the influence that global sea level rise has had on this region since the demise of the last British ice sheet around 17,000 years ago.

Whilst global sea levels have increased since the end of the last glacial, local factors such as tectonic uplift and subsidence, glacioisostatic processes and variation in coastal sedimentation patterns have caused sea levels to rise and fall locally at episodic points during the postglacial (Holocene) period (termed relative sea level change).

Such subtle changes in sea levels have allowed freshwater (riverine) processes to also influence the pattern and character of sedimentation, leading to the preservation of organic remains (peats), which have significant palaeoenvironmental potential. In contrast, during episodes of historical sea level rise, estuarine and brackish water conditions have resulted in the deposition of inorganic silts and clays, commonly blue grey in colour. It is these alternating sediment types which are identified in the borehole records.

In addition to the environmental potential of the deposits, the wetland landscape of the Somerset levels has provided an attractive, resource-rich environment that has been exploited by humans for thousands of years and prior to large-scale drainage and reclamation of the levels, the waterlogged nature of the deposits has afforded excellent conditions for the preservation of cultural remains (Brunning, 2013). The predominance of vertical accretion of sediments within the Somerset Levels means that such remains may be buried, within and beneath the thick fine grained sequences that infill this coastal basin.

### *Geoarchaeological assessment of Boreholes BH11/LD4 and BH12/LD5*

#### Stratigraphy Recorded by Geotechnical Engineers

Boreholes LD4 and LD5 were drilled in close proximity; hence, their stratigraphic records are broadly similar (see end of Appendix 3). In

summary, the sequences comprise:

DBGL (m)	Description
0 – 3	Blue-grey silty clays and silts (estuarine/brackish origin)
3 – 5	Black fibrous peats with woody fragments (freshwater)
5 – 8	Blue-grey silty clays and silts (estuarine/brackish)
8 – 10	Black fibrous peats with woody fragments (freshwater)
10 – 15	Blue-grey silty clays, silts and sands, shelly (estuarine/brackish)
15 – 17	Organic clays, sometimes peaty and woody (freshwater)
17 – 22	Blue-grey silty clays, silts and sands, shelly (estuarine/brackish)
22 – 24	Organic clays, sometimes peaty and woody (freshwater)
24 – 26	Blue-grey silty clays, silts and sands (estuarine/brackish)
26 +	Calcareous mudstone (bedrock)

This broad stratigraphy indicates 5 episodes of marine transgression (ie relative sea level rise) separated by four periods of regression (relative sea level fall) affecting this part of the Somerset Levels.

#### Geoarchaeological recording and sampling

Geotechnical Engineering Ltd retained the entire sequences from both boreholes and these were inspected to confirm the general stratigraphy recorded by the logging teams.

In addition to this broad assessment, key horizons with organic sediments were recorded and sampled for further palaeobiological (palaeoenvironmental) assessment. Sedimentological properties were examined and described using a range of standard geological criteria (Jones et al, 1999). These descriptions considered unit colour, texture, internal structure, grain size, lithology, fossil content, chemical signature and artefactual content. As well as written descriptions, cores were photographed.

To reduce the risks of contamination, clean nitrile gloves were worn when handling the cores to avoid contact with skin, and a sterile metal spatula was used to transfer material to ziplock sample bags. All equipment was cleaned thoroughly before each sub-sample was collected, and the surface of the sediment/peat was cleaned back immediately before sub-sampling to expose fresh material. Sub-samples were taken from the peats for a range of environmental proxies (macroscopic plant remains, insects, pollen) and radiocarbon dating. The palaeoenvironmental focus was on the organic remains, not the inorganic silts and clays deposited within higher-energy tidal environments where significant mixing of materials will occur.

Given the relatively small amount of organic material preserved within each borehole core and the need to assess statistically meaningful samples, bulk sampling was undertaken in 10cm spits with additional material collected at each 10cm midpoint for micropalaeontological analysis (pollen; diatoms?).

During recording and sampling, every effort was made to identify cultural material and/or horizons; none were noted during completion of this work. All sub-samples are currently stored under

refrigerated conditions at Landscape Research & Management’s office in Bridgnorth, Shropshire.

**Borehole BH11/LD4** Two major and one minor organic horizons were recorded during the visit to the core store (Table A3.1). Each organic-rich horizon was both underlain and overlain by blue grey silty clays deposited under estuarine conditions. Upper and lower contacts were clear and sharp, reflecting the higher energy conditions associated with these brackish-water environments. Humic material was also noted by geotechnical engineers between 14m and 16m, but upon inspection, these horizons proved thin, discontinuous and were very sandy in character; therefore, humic sediments at this level were not sampled.

**TABLE A3.1** Organic horizons and sample positions along borehole LD4/BH11

DBGL(m)	Description	Bulk samples for plant and insect remains (m)	Samples for micropalaeontology (pollen; diatoms?)
3.50 – 4.35	Black peat, moist and friable, though with occasional more compacted areas, some of which show laminations. Visible plant remains, including root material. Sharp clear contact with overlying and underlying blue grey silty clays	3.50 – 3.60	3.50 – 3.60 (3.55)
		3.60 – 3.70	3.60 – 3.70 (3.65)
		3.70 – 3.80	3.70 – 3.80 (3.75)
		3.80 – 3.90	3.80 – 3.90 (3.85)
		3.90 – 4.00	3.90 – 4.00 (3.95)
		4.00 – 4.10	4.00 – 4.10 (4.05)
		4.10 – 4.20	4.10 – 4.20 (4.15)
		4.20 – 4.35	4.20 – 4.35 (4.25)
		N = 8	N = 8
9.00 – 9.45	Black peat, moist and friable, though with occasional more compacted areas, some of which show laminations. Visible plant remains, including root material. Sharp clear contact with upper blue silty clay, but basal contact was not observed (first 0.80m of core commencing at 9.70m was missing with blue grey silty clay not encountered until 10.50m depth).	9.00 – 9.10	9.00 – 9.10 (9.05)
		9.10 – 9.20	9.10 – 9.20 (9.15)
		9.20 – 9.30	9.20 – 9.30 (9.25)
		9.30 – 9.45	9.30 – 9.45 (9.35)
			N = 4
			N = 4
22.65 – 22.71	Olive grey to black silty peat/peaty silt. Visible plant remains and sharp upper and lower contacts.	22.65 – 22.68	Sub-samples to be taken from bulk samples if so desired.
		22.68 – 22.71	
		N = 2	

**Borehole BH12/LD5** Two major and one minor organic horizons were recorded during the visit to the core store (Table 2). Each organic-rich horizon was both underlain and overlain by blue grey silty clays deposited under estuarine conditions. Upper and lower contacts were clear and sharp, reflecting the higher energy conditions associated with these brackish-water environments.

Humic material was also noted by geotechnical engineers between 16m and 17m, but upon inspection, these horizons proved thin and discontinuous; therefore, humic sediments at this level were not sampled.

**TABLE A3.2** Organic horizons and sample positions along borehole LD5/BH12

DBGL (m)	Description	Bulk samples for plant and insect remains	Samples for micropalaeontology (pollen; diatoms?)
3.85 – 4.40	Black peat with visible plant remains, moist. Clear, sharp upper and lower contact.	3.85 – 3.95	3.85 – 3.95 (3.90)
		3.95 – 4.05	3.95 – 4.05 (4.00)
		4.05 – 4.15	4.05 – 4.15 (4.10)
		4.15 – 4.25	4.15 – 4.25 (4.20)
		4.25 – 4.35	4.25 – 4.35 (4.30)
		4.35 – 4.40	4.35 – 4.40 (4.38)
		N = 6	N = 6
8.60 – 8.80	Black peat with visible plant remains, moist. Clear, sharp upper and lower contact.	8.60 – 8.70	8.60 – 8.70 (8.65)
		8.70 – 8.80	8.70 – 8.80 (8.75)
			N = 2
		N = 2	
22.98 – 23.04	Indurated, desiccated black peat with visible plant remains. Clear, sharp, upper and lower boundaries	22.98 – 23.04	Sub-sample to be taken from bulk sample if so desired
		N = 1	

**Summary comment**

Inspection of cores from Hinckley have confirmed geotechnical reports of organic remains within borehole logs LD04 and LD 05. These remains comprise well-preserved peat deposits and have been sampled for further environmental analysis.

Given the close proximity of the boreholes and similar stratigraphic sequences, it is suggested that only a selection of the samples need be analysed if environmental assessment is taken further.

**References**

Brunning R (ed) (2013) *Somerset’s Peatland Archaeology: Managing and Investigating a Fragile Resource* The Results of the Monuments at Risk in Somerset Peatlands (MARISP) Project, Oxford

Jones AP, Tucker ME & Hart JK (eds) (1999) *The Description and analysis of Quaternary stratigraphic field sections* Technical Guide 7, Quaternary Research Association, London

Geotechnical Logs for boreholes BH11/LD4 and BH12/LD5

Geotechnical Engineering Limited

**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 8 September 2017  
 End Date 13 September 2017

**LD04**

Sheet 1 of 4  
 Scale 1 : 50  
 Depth 35.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru-ment	description	depth (m)	reduced level (m)	legend
08/09/17 0830hrs	1B	0.30 - 0.50					Grass over soft brown slightly sandy silty CLAY with frequent rootlets.	0.20		
	2B	0.70 - 0.90					Soft locally firm brown silty CLAY.	0.60		
	3B	1.00 - 1.20					Very soft light grey mottled orange clayey becoming very clayey SILT.	1.20		
	4D	1.20 - 1.65	Nil	S 1						
	5L	1.20 - 2.20								
	6UT	2.20 - 2.80						Firm locally soft indistinctly laminated purplish grey mottled bluish grey and greyish orange silty CLAY. Rare rootlets.	1.75	
	9L	2.20 - 3.20					1.65m: Rare extremely closely spaced subhorizontal light greyish brown silt laminae.	1.90		
	7D	2.65 - 2.75					Soft bluish grey mottled greyish orange silty CLAY with subangular fine gravel sized stiff clay. Rare rootlets.	2.65		
	8D	2.75 - 2.80					Soft indistinctly fissured bluish grey mottled dark grey organic silty CLAY. Frequent decomposed roots (up to 4mm diam) and rootlets.	2.65		
	10D	3.20 - 3.70	3.20	S<1			Very soft bluish grey organic silty CLAY. Frequent decomposed roots (up to 4mm diam) and rootlets. Rare pockets (up to 10mm) of black peat.	3.50		
	11L	3.20 - 4.20					Plastic black amorphous locally fibrous PEAT.	4.00		
	12UT	4.20 - 4.80					Firm black oxidising to brown fibrous PEAT.	4.00		
	15L	4.20 - 5.20								
	13D	4.65 - 4.70					4.70 - 4.80m: Frequent wood fragments (up to 20x1mm).	4.80		
	14D	4.75 - 4.80								
	16D	5.20 - 5.65	5.20	S 5			Soft bluish grey silty CLAY with frequent becoming rare wood fragments (up to 40x5mm).			
	17L	5.20 - 6.70								
	18UT	6.70 - 7.30								
	19L	6.70 - 8.20								
Continued Next Page								(8.00)		

EQUIPMENT: Geotechnical Pioneer rig.  
 METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (128mm) 1.20-2.20m and (113mm) 2.20-24.50m. Waterflush rotary core drilled (116mm) 24.50-35.00m.  
 CASING: 140mm diam to 24.50m.  
 BACKFILL: On completion, hole collapsed 35.00m-16.46m. Borehole backfilled with bentonite pellets 16.46-0.60m and arisings 0.60-0.00m.  
 REMARKS: Flush returns maintained throughout borehole.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks	AGS	CONTRACT <b>33254</b>	CHECKED
				Groundwater not encountered prior to use of water flush.			

Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 8 September 2017  
 End Date 13 September 2017

**LD04**

Sheet 2 of 4  
 Scale 1 : 50  
 Depth 35.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
08/09/17 1505hrs 1.66m	20D 21L	8.20 - 8.65 8.20 - 9.70	8.20	S<1				8.70		
11/09/17 0900hrs 1.19m							Firm black fibrous PEAT with rare wood fragments (20x1mm). 8.80m: Pocket (up to 10mm) of light brownish red wood fragments.			
	UT 22L	9.70 - 10.30 9.70 - 11.20					Very soft bluish grey silty CLAY with frequent decomposed wood fragments (up to 20mm).	9.70		
							Very soft indistinctly laminated bluish grey slightly sandy clayey SILT with rare black staining.	10.40		
							Very soft bluish grey clayey SILT.	10.80		
	23D 24L	11.20 - 11.65 11.20 - 12.70	11.20	S<1				11.60		
							Very soft bluish grey slightly sandy clayey SILT.	11.90		
							Soft indistinctly fissured bluish grey silty CLAY.	12.00		
							Very soft bluish grey clayey SILT.			
	UT 25L	12.70 - 13.30 12.70 - 14.20						13.10		
							Very soft dark grey indistinctly laminated slightly sandy silty CLAY.			
							Medium dense bluish grey silty fine and medium SAND.	13.70		
	26L	14.20 - 14.85 14.20 - 15.70	14.20	S 16				14.85 - 14.87m: Black fibrous peat.		
								15.25		
							15.20 - 15.25m: Soft indistinctly fissured bluish grey silty CLAY.	15.35		
	27D 28L	15.70 - 16.15 15.70 - 17.20	15.70	S 13				15.80		
							Firm fissured brown rarely black organic CLAY with rare locally frequent intact shells (up to 3mm). Fissures are horizontal extremely closely spaced planar smooth. Rare rootlets.			
							Very soft indistinctly fissured bluish grey silty CLAY. Frequent decomposed wood fragments and roots (up to 4mm diam) with rare black staining.			
							15.60 - 15.65m: Dark brown organic clay. Rare pockets (up to 5mm) of peat.			
							15.65 - 15.80m: Rare shell fragments (4x5x1mm).			
	29D 30L	17.20 - 17.65 17.20 - 18.70	17.20	S 17				17.60		
							Firm bluish grey slightly sandy clayey SILT. Rare decomposed wood fragments (up to 10mm).			
							Very soft dark grey fissured locally indistinctly fissured silty CLAY. Fissures are 40° extremely closely spaced stepped			
							Continued Next Page	(18.00)		
water strikes (m)	casing (m)	rose to (m)	time to rise (m)	remarks	AGS		CONTRACT	CHECKED		
				Groundwater not encountered prior to use of water flush.			33254			



Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 8 September 2017  
 End Date 13 September 2017

**LD04**

Sheet 3 of 4  
 Scale 1 : 50  
 Depth 35.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru-ment	description	depth (m)	reduced level (m)	legend	
	31UT 33L	18.70 - 19.30 18.70 - 20.20					smooth. Rare decomposed wood fragments (up to 35mm).				
	32D	19.15 - 19.25					Bluish grey slightly sandy SILT with rare decomposed wood fragments (up to 5mm).	19.20			
	34D 35L	20.20 - 20.65 20.20 - 21.70	20.20	S<1			19.80 - 19.90m: Becoming clayey. Soft fissured bluish grey silty CLAY with rare decomposed wood fragments (up to 5mm). Fissures are subhorizontal extremely closely spaced planar smooth. Soft bluish grey slightly sandy clayey SILT. Rare decomposed wood fragments (up to 10mm) Soft indistinctly fissured bluish grey slightly sandy silty CLAY. Rare locally frequent decomposed wood fragments (up to 7mm)	20.00 20.70			
	36UT 37L	21.70 - 22.30 21.70 - 23.20					Bluish grey clayey fine and medium SAND.	21.60			
	38D 39L	23.20 - 23.65 23.20 - 24.50	23.20	S 23			Soft fissured bluish grey slightly sandy silty CLAY. Fissures are subhorizontal extremely closely spaced undulating planar smooth. Frequent decomposed wood fragments (up to 7mm). Firm thinly laminated dark brown and black organic CLAY. Frequent wood fragments (up to 50x20x1mm).	22.40 22.55 22.70			
11/09/17 1705hrs 2.27m											
12/09/17 0855hrs 1.87m											
	40D 41C	24.50 - 24.95 24.50 - 26.00	24.50	S 37	100	NA	Stiff dark purplish grey and dark bluish grey fissured slightly sandy slightly gravelly silty CLAY. Gravel is fine angular and subangular limestone gravel. Fissures are subhorizontal and subvertical extremely closely spaced undulating and planar smooth with dark grey staining. 22.80 - 23.00m: Firm light grey silty clay with frequent decomposed roots and wood fragments (up to 10mm).	23.90 24.50			
	42D 43C	26.00 - 26.27 26.00 - 27.50	24.50	S*130	23 29 5		Stiff fissured bluish grey and grey mottled dark bluish grey silty CLAY with rare subangular and subrounded gravel sized stiff clay. Fissures are subhorizontal and subvertical undulating and stepped smooth. Rare greyish orange staining. Stiff becoming very stiff dark grey fissured silty CLAY. Fissures are 30-40° extremely closely spaced undulating planar smooth.	26.50			
	44C	27.50 - 29.00			25 36		Extremely weak friable dark grey calcareous MUDSTONE locally disintegrated to very stiff clay. Fractures are subhorizontal to 10° and 75° to subvertical very closely spaced smooth. Incipient fractures are subhorizontal extremely closely spaced planar and curvilinear smooth. Rare shell fragments (up to 3mm). Extremely weak friable dark grey calcareous MUDSTONE. Fractures are subhorizontal extremely closely spaced planar smooth.	27.10			
Continued Next Page								(28.00)			
water strike (m) casing (m) rose to (m) time to rise (m) remarks							AGS	CONTRACT	CHECKED		
Groundwater not encountered prior to use of water flush.								33254			

Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 8 September 2017  
 End Date 13 September 2017

**LD04**

Sheet 4 of 4  
 Scale 1 : 50  
 Depth 35.00 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp /core range	ly	instru -ment	description	depth (m)	reduced level (m)	legend
								27.70 - 27.85m: 50° undulating smooth fracture.	28.10		
	45C	29.00 - 29.06 29.00 - 30.50	24.50	C*750	94 33 16			Weak locally medium strong medium bedded dark grey and light grey calcareous MUDSTONE with rare locally frequent intact and fragmented shells (up to 15mm). Fractures are subhorizontal and 80° to vertical very closely and closely (rarely widely) spaced planar rough.			
	46C	30.50 - 32.00			100 80 27			29.40 - 29.55m: Vertical rough stepped fracture.			
	47C	32.00 - 32.03 32.00 - 33.50	24.50	C**	100 87 30			Medium strong thickly bedded grey and dark grey calcareous MUDSTONE with rare locally frequent intact and fragmented shells (up to 10mm) and ammonite cast fossils (up to 30mm). Fractures are subhorizontal closely locally medium spaced planar smooth. 31.10 - 31.20m: Two vertical planar rough fractures.	30.75		
	48C	33.50 - 35.00			97 96 96			32.55 - 35.00m: Extremely to very closely spaced thin laminae of light grey calcareous mudstone.			
12/09/17 1635hrs 4.98m											
13/09/17 0820hrs 5.22m											
13/09/17 1000hrs 3.58m		35.00 - 35.03	24.50	C**				Borehole completed at 35.00m.	35.00		
									(38.00)		
water strike (m) casing (m) rose to (m) time to rise (m) remarks								AGS CONTRACT 33254		CHECKED	
Groundwater not encountered prior to use of water flush.											

Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 1 September 2017  
 End Date 7 September 2017

**LD05**

Sheet 1 of 4  
 Scale 1 : 50  
 Depth 35.25 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
01/09/17 1430hrs	1B	0.30 - 0.50					Grass over firm brown slightly sandy silty CLAY with frequent rootlets and rare roots (up to 8mm diam). (MADE GROUND)	0.30		
	2B	0.70 - 0.90					Firm greyish brown locally mottled orangish brown clayey SILT with rare rootlets.	0.60		
01/09/17 1455hrs Dry	3D	0.70 - 0.90								
	4B	1.00 - 1.20					Soft indistinctly fissured light purplish grey mottled bluish grey and light orangish grey silty CLAY with frequent pockets (up to 5mm) of orangish brown slightly sandy silt.			
	5D	1.20 - 1.65		Nil S 4						
04/09/17 0625hrs Dry	6L	1.20 - 2.20								
	7UT	2.20 - 2.80		Nil			Firm light bluish grey rarely mottled orangish grey silty CLAY.	2.20		
	10L	2.20 - 3.20					Soft locally very soft bluish grey clayey SILT. Rare rootlets.			
	8D	2.65 - 2.75								
	9D	2.75 - 2.80								
	11D	3.20 - 3.65		Nil S<1			Very soft bluish grey silty CLAY with frequent black and light brown pockets (up to 5mm) of amorphous peat. 3.10 - 3.11m: Black peat	3.10		
	12L	3.20 - 4.20								
	13UT	4.20 - 4.80		Nil			Firm black fibrous PEAT.	3.80		
	15L	4.20 - 5.20								
	14D	4.65 - 4.75					4.65 - 4.85m: Frequent light yellowish brown wood fragments (up to 20mm)	4.85		
	16D	5.20 - 5.65		5.20 S 6			Soft fissured bluish grey silty CLAY. Fissures are horizontal to 20° extremely closely spaced planar smooth becoming indistinctly fissured. Frequent wood fragments (up to 30mm) and decomposed rootlets.			
	17L	5.20 - 6.70								
	18UT	6.70 - 7.30		6.70						
	19L	6.70 - 8.20								
							Soft fissured bluish grey silty CLAY. Fissures are extremely closely spaced randomly orientated smooth rarely stained black.	7.40		
							Continued Next Page	8.00 (8.00)		

EQUIPMENT: Geotechnical Pioneer rig.  
 METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (128mm) 1.20-8.20m, (113mm) 8.20-24.25m. Waterflush rotary core drilled (116mm) 24.25-35.25m.  
 CASING: 140mm diam to 24.25m.  
 BACKFILL: On completion, hole collapsed 35.25-17.39m. Borehole backfilled with bentonite pellets 17.39-0.00m and the surface reinstated.  
 REMARKS: Flush returns maintained throughout borehole.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks	AGS	CONTRACT 33254	CHECKED
				Groundwater not encountered prior to use of water flush.			

Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 1 September 2017  
 End Date 7 September 2017

**LD05**

Sheet 2 of 4  
 Scale 1 : 50  
 Depth 35.25 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. core range	instru-ment	description	depth (m)	reduced level (m)	legend	
	20D 21L	8.20 - 8.65 8.20 - 9.70	8.20	S <1			7.40 - 8.00m: Strong organic odour. 7.95 - 8.00m: Dark purplish grey. Frequent pockets (up to 5mm) of peat. Firm black and dark brown fibrous PEAT. 8.40 - 8.50m: Grey silty CLAY (boundary inclined 15°)	8.80			
	22UT 23L	9.70 - 10.30 9.70 - 11.20	9.70				Very soft laminated bluish grey and brownish grey silty CLAY. Laminae are subhorizontal. 8.85 - 8.90m: Firm black fibrous PEAT (boundary inclined 30°). Soft indistinctly fissured bluish grey organic silty CLAY with frequent partings of black and dark grey silt. 9.50 - 9.51m: Black peat	9.50			
	24D 25L	11.20 - 11.65 11.20 - 12.70	11.20	S <1			Very soft locally soft indistinctly fissured bluish grey rarely mottled dark brown and dark grey silty CLAY. Frequent wood fragments (up to 20mm) and decomposed rootlets.	10.15			
	26UT 27L	12.70 - 13.30 12.70 - 14.20	12.70				Light grey silty fine and medium SAND.	12.70			
04/09/17 1605hrs 2.37m	28D 29L	14.20 - 14.65 14.20 - 15.70	14.20	S 15			14.20m: Medium dense.	14.80			
05/09/17 0900hrs 1.18m	30D 31L	15.70 - 16.15 15.70 - 17.20	13.70	S 7			Very soft thinly laminated fissured dark grey slightly sandy silty CLAY. Fissures are subhorizontal to 20° extremely closely spaced undulating and planar smooth. 15.20m: intact shell (7mm diam). Firm fissured brown and light brown silty organic CLAY with frequent intact shells (up to 5mm diam). Fissures are horizontal extremely closely spaced planar smooth. 15.48 - 15.50m: Dark brown.	15.35			
	32D 33L	17.20 - 17.65 17.20 - 18.70	17.20	S 13			Soft indistinctly fissured bluish grey silty CLAY with rare black and dark grey staining. Rare decomposed wood fragments (up to 10mm). 15.65 - 16.00m: Bluish grey silty fine and medium sand. Medium dense bluish grey silty fine and medium SAND.	16.40			
							Continued Next Page	(18.00)			
water strike (m) casing (m) rose to (m) time to rise (m) remarks							AGS	CONTRACT	CHECKED		
Groundwater not encountered prior to use of water flush.								33254			



Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 1 September 2017  
 End Date 7 September 2017

**LD05**

Sheet 3 of 4  
 Scale 1 : 50  
 Depth 35.25 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru-ment	description	depth (m)	reduced level (m)	legend
	34D 35L	18.70 - 19.15 18.70 - 20.20	18.70	S 18			18.20 - 18.40m: Rare decomposed wood fragments (up to 10mm).			
	36L	20.20 - 20.85 20.20 - 21.70	20.20	S 24			Stiff bluish grey sandy clayey SILT.	20.60		
	37D 38L	21.70 - 22.15 21.70 - 23.20	21.70	S 26			21.00 - 21.45m: Subvertical decomposed root (up to 20mm diam) and wood fragments (up to 10mm). 21.50 - 21.70m: Indistinctly laminated.			
	39UT 42L	23.20 - 23.80 23.20 - 24.25	23.20				Bluish grey silty fine and medium SAND. 22.70 - 22.80m: Clayey.	22.30		
	40D 41D	23.65 - 23.75 23.75 - 23.80					22.95 - 23.00m: Soft thinly laminated bluish grey and brownish grey silty CLAY with frequent decomposed wood fragments (up to 5mm). Rare intact shells (up to 3mm). 23.00 - 23.05m: Firm fissured brown silty organic clay. Fissures are horizontal extremely closely spaced planar smooth.	23.05 23.20		
05/09/17 1630hrs 5.83m	43D	24.25 - 24.83	23.20	S*67			Firm locally soft indistinctly fissured greyish brown silty CLAY with rare decomposed wood fragments (up to 5x1mm). 23.15m: Lens of light grey silty (10x5mm).	24.25		
06/09/17 0825hrs 5.74m	44C	24.25 - 25.75			58	NA	Stiff fissured dark grey and bluish grey mottled orangish grey silty CLAY. Fissures are 20° extremely closely spaced undulating and planar smooth. 23.50 - 24.00m: Rare shell fragments (up to 5mm). 24.00 - 24.25m: Bluish grey.	25.10		
	45D 46C	25.75 - 25.91 25.75 - 27.25	24.25	S*214	91 87 0	NA	Very stiff thinly laminated fissured dark grey and grey mottled greyish orange silty CLAY. Fissures are subhorizontal extremely closely spaced planar smooth. 24.94 - 24.95m: Dark greyish orange staining Extremely weak dark grey MUDSTONE. Fractures are horizontal extremely closely spaced planar smooth. 25.25 - 25.30m: Rare shell fragments (up to 7mm). 25.45 - 25.50m: Very stiff fissured dark grey CLAY. Fissures are horizontal extremely closely spaced planar smooth. 25.50 - 25.70m: Rare shell fragments (up to 5mm). 26.53m: Light grey calcareous mudstone with frequent non-intact ammonite fossils (up to 40mm). 26.58 - 26.65m: Very weak light grey calcareous mudstone. Frequent ammonites (up to 30mm diam).	27.25		
	47C	27.25 - 28.75			91 85 0	NA				
Continued Next Page								(28.00)		
water strike (m) casing (m) rose to (m) time to rise (m) remarks							AGS	CONTRACT		CHECKED
Groundwater not encountered prior to use of water flush.								33254		

Geotechnical Engineering Limited  
**BOREHOLE LOG**



CLIENT NATIONAL GRID  
 SITE HINKLEY TO SEABANK  
 Start Date 1 September 2017  
 End Date 7 September 2017

**LD05**

Sheet 4 of 4  
 Scale 1 : 50  
 Depth 35.25 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru-ment	description	depth (m)	reduced level (m)	legend	
							26.95 - 27.25m: Locally disintegrated to very stiff indistinctly fissured dark grey CLAY.				
	48C	28.75 - 28.81 28.75 - 30.25	24.25	S*600	93 90 6	Ni 3 30	Extremely weak tending to very weak dark grey calcareous MUDSTONE. Fractures are horizontal to subhorizontal extremely closely and very closely spaced planar smooth. Rare ammonite fossils (up to 50mm diam). 28.00 - 28.01m: Light grey. 28.10m: Ammonite fossil (up to 50mm diam). Weak dark grey calcareous MUDSTONE. Fractures are horizontal to subhorizontal extremely closely spaced and very closely spaced planar smooth. Rare ammonite fossils (up to 50mm diam).	29.10 30.10			
	49C	30.25 - 31.75			95 81 0	Ni 2 17	Weak dark grey calcareous MUDSTONE. Fractures are horizontal and vertical extremely closely spaced planar smooth. Vertical fractures infilled (up to 2mm) with grey and off-white calcite. Incipient fractures are horizontal extremely closely spaced planar smooth.	31.45			
	50C	31.75 - 31.79 31.75 - 32.25	24.25	C**	100 80 20	Ni 35 90	Medium strong thinly bedded dark grey and grey calcareous MUDSTONE with rare locally frequent shell fragments (up to 15mm). Fractures are horizontal closely spaced planar smooth. Incipient fractures are horizontal extremely closely spaced planar smooth.	32.45			
	51C	32.25 - 33.75			100 90 0	Ni 70 270	32.15m: Two intersecting fractures. 15° planar locally undulating rough with a veneer of light grey silt. Medium strong thinly laminated dark grey calcareous MUDSTONE with rare locally frequent shell fragments (up to 4mm). Fractures are horizontal closely spaced planar smooth. Fractures rarely infilled with a veneer of light grey clay. Incipient fractures are horizontal extremely closely spaced planar smooth.	33.75			
06/09/17 1705hrs 3.99m											
07/09/17 0850hrs 4.36m	52C	33.75 - 33.79 33.75 - 35.25	24.25	C**	190 95 43	300	Medium strong dark grey calcareous MUDSTONE. Fractures are horizontal medium spaced planar smooth. Medium strong light and dark grey calcareous MUDSTONE. Fractures are horizontal very closely and closely spaced planar smooth.	34.10 34.85			
07/09/17 1150hrs 4.00m						490	Medium strong light grey calcareous MUDSTONE. Fractures are horizontal medium spaced planar smooth. 35.15 - 35.20m: Dark grey. Rare light grey lenses of mudstone (5x3mm). 35.20 - 35.25m: Fractures are very closely spaced. Borehole completed at 35.25m.	35.25			
		35.25 - 35.27	24.25	C**				(38.00)			
water strike (m) casing (m) rose to (m) time to rise (m) remarks							AGS	CONTRACT	CHECKED		
Groundwater not encountered prior to use of water flush.								33254			





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