Archaeological borehole survey at

Land at Bower Farm, Bridgwater, Somerset

Worcestershire Archaeology

for RPS Group

January 2023

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LAND AT BOWER FARM, BRIDGWATER, SOMERSET

Archaeological borehole survey report

Worcestershire Archaeology
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SITE INFORMATION

Site name:	Bower Farm, Bridgwater, Somerset
Site code:	P6203
Local planning authority:	Sedgemoor District Council
Planning reference:	09/17/00031
Central NGR:	332070 136721
Commissioning client:	RPS Group
WA project number:	P6203
WA report number:	3089
HER reference:	tbc
Oasis reference:	fieldsec1-512575
Museum accession number:	tbc

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CONTENTS

Borehole Survey Bower Farm, Bower Lane, Bridgwater, Somerset

By Elizabeth Pearson and Graham Arnold

With contributions by Andy Howard and Dr Tom Hill

Illustrations by Graham Arnold and Abbie Horton

Summary

An archaeological borehole survey was undertaken at Bower Farm, Bower Lane, Bridgwater, Somerset (NGR ST 32070 36721). It was commissioned by RPS Group on behalf of Countryside Properties, in advance of a proposed residential development of the site. Outline planning permission has been granted by Sedgemoor District Council subject to a programme of archaeological works.

The site is located on the south-eastern edge of Bridgwater and is bounded by the M5 to the east, a main road to the south and residential areas to the west. The site covered an area of 8.4 hectares and the borehole transect was 370m in length, running perpendicular to the River Parrett.

In total 16 windowless boreholes were drilled, 25m apart, along a northeast to southwest aligned transect, during April and August 2022. They were all drilled to a depth of 6m below ground level under the supervision of an archaeologist and the locations were recorded using a Differential Global Positioning System. The cores were wrapped and labelled on site for further analysis under laboratory conditions.

The borehole survey largely confirmed the broadly tripartite sequence of the Somerset Levels Formation although only the Middle and Upper Somerset Levels Formation deposits appear to have been sampled during this borehole survey. The Middle Somerset Levels Formation deposits were a minimum and 4m thick and radiocarbon dating indicates that they formed between the late Mesolithic through to the early Iron Age. After which the 2m thick brown clay deposit of the Upper Somerset Levels Formation was deposited.

Peats and organic clays within the Middle Somerset Levels Formation were sub-sampled to assess their potential for pollen, plant macrofossil and diatom analysis. Of which only the diatom assemblage appears to have potential for further analysis. The assessment does however confirm that this deposit formed within the coastal zone for the duration of deposition, from the late Mesolithic through to the early Iron Age. This supports the Holocene coastal model that suggests this part of the Parrett Valley was under sea and or saltmarsh from around 5000 BC until the Roman period.

Report

1 Introduction

1.1 Background to the project

An archaeological borehole survey was undertaken by Worcestershire Archaeology (WA) in April and August 2022 at Bower Farm, Bower Lane, Bridgwater, Somerset (NGR ST 32070 36721) (Fig 1). This comprised 16 windowless boreholes along a 370m long transect, spaced 25m apart and 6m in depth. The project was commissioned by RPS Group on behalf of Countryside Properties, in advance of a proposed residential development of the site. Outline planning permission has been granted subject to a programme of archaeological works (planning reference 09/17/00031).

The archaeological advisor to the local planning authority, Steve Membery, the Senior Historic Environment Officer for Somerset County Council considered that the proposed development had the potential to impact upon possible heritage assets. A desk-based assessment of the site by Cotswold Archaeology had identified the potential for preserved palaeo-environmental evidence within the alluvium (CA 2017).

No brief was provided but a WSI was prepared by Richard Smalley (RPS Group 2021) and approved by Steve Membery, Senior Historic Environment Officer for Somerset County Council.

1.2 Site location, topography and geology

The site is located on the eastern side of Bridgwater, 1.7km east of the town centre. It is bounded on the east by the M5, to the south by the A372, to the west by residential development and by farmland to the north. The River Parrett is located c. 2km to the west and the site is relatively flat, laying at c. 5m AOD. The proposed development area overlays superficial deposits mapped as Tidal Flat deposits consisting of alluvial clays, silts, and sand and gravel. These overlay mudstone and halite-stone of the Mercia mudstone group. (BGS 2023).

2 Archaeological and Geological background

2.1 Introduction

An archaeological desk-based assessment (DBA) of the site was undertaken by Cotswold Archaeology in June 2017 (CA 2017). A brief synopsis of the findings presented in the DBA are available in the RPS WSI and are summarised below.

Archaeological works have identified a series of potential late Prehistoric or early Roman period field systems and settlements to the east of the site. The site has been identified as being within reclaimed salt marsh land, the reclamation of which was carried out during the Early Medieval or Medieval period. Therefore, any pre-Medieval archaeology is likely to comprise paleoenvironmental remains, which would be deeply buried based on the post-Roman alluvial build up across the site and surrounding landscape. From at least the Medieval period onwards, the site has been primarily used for agricultural practices, with development of later 20th century date. Any archaeological remains associated with agricultural activity of Medieval or later date, or stray finds would be of limited, if any, archaeological significance (RPS 2021).

Given the potential for the preservation of palaeo-environmental remains it was recommended a transect of boreholes were excavated across the site to retrieve deposits for further assessment.

2.2 Geological background by Andy Howard

As noted by Cotswold Archaeology the site is within a deeply alluviated landscape and therefore if present, prehistoric and Roman palaeoenvironmental remains are likely to be preserved at depth given the significant sedimentation attributable to the medieval period.

It is important to recognize that such an observation is not simply restricted to the palaeoenvironmental record but may also apply to cultural remains that may be buried at depth (Howard and Macklin, 1999), as amply demonstrated by the work of Brunning (2013). Such stratified cultural remains may include those sites situated on gravel islands buried close to, but below the present-day land surface. For example, it is interesting to note that approximately 430m east of the site, an extensive area of cropmarks indicative of multi-period (later prehistoric/early Roman) activity have been recorded, together with two findspots of worked and burnt flints; such significant settlement would not be expected in an environment dominated by tidal sedimentation, suggesting that it may be associated with a buried gravel island.

The superficial sediments of the site are mapped as 'Tidal Flat Deposits' (alluvial clays, silts, sands and gravels) overlying Triassic bedrock of the Mercia Mudstone Group (BGS 2023). The 'Tidal Flat Deposits' are associated with aggradation during the current postglacial, largely in response to sea level rise since the end of the Last Glacial Maximum.

Geotechnical investigations of the site undertaken by Hydrock indicate that the stratigraphic sequence can be divided into three key superficial units that are consistently mappable across the site. From the contemporary ground surface, they comprise:

- Around 2-4 m of clay with minor peat, in turn underlain by a thin layer of peat;
- Around 16 m of clay and silt with minor bands of sandy material;
- Around 2m of basal sand and gravel resting on bedrock.

It should also be noted that approximately 2 km east of the site, sediments of the Burtle Formation are mapped, a complex of marine deposits relating to one of more pre-Holocene temperate episodes (Hunt, 2006). The presence of such deposits locally demonstrates that not all sediments within the immediate vicinity relate to the last glacial/interglacial transition and current postglacial.

Past fieldwork has demonstrated that the postglacial sequence of the Somerset Levels and Moors can be divided into a broadly tripartite sequence of fine-grained sediments: early Holocene silts indicative of mudflat and saltmarsh environments; mid Holocene peats and interbedded silts indictive of higher intertidal / supra-tidal saltmarsh and late Holocene silts indicative of mudflat and saltmarsh. Together, these fine-grained sediments are known as the Lower, Middle and Upper Somerset Levels Formation, correlating directly with the Wentlooge Formation of the Severn Estuary Levels (Allen, 2000, 2006; Allen and Rae, 1987).

Whilst this tripartite sequence provides the broad framework, there is a degree of subtlety to the stratigraphy, especially through the intercalation of peats in the Lower and Middle parts of the Formation. The silts are usually pale greyish- to bluish-green, though in the upper sequence they are commonly mottled pale brown.

According to Brunning (2013), radiocarbon dates across the lower part of the sequence are sparse, though the data that is available suggests that early postglacial sea-level rise was very rapid: around 7500 cal BC, Mean Sea Level (MSL) was around -25 to -26m OD; between 6200 to 5900 cal. BC, it was -12.5 to -14m OD; by 5000 cal. BC, it was around -8m OD. After 5000 cal. BC, sea level rise slowed, which allowed organic sedimentation to become the dominant process, in turn leading to peat formation. However, the timing of peat development varies across the region, both spatially and temporally, a pattern influenced by local conditions and distance from the coast. For example, around Minehead, three episodes of peat formation are evident on the foreshore, dating to between 5400 and 4500 cal. BC; in contrast, at the mouth of the river Parrett downstream of Bridgwater, peat formation is dated to around 4000 cal. BC. In the middle Parrett Valley, the base of the peat is dated to around 3900 cal. BC.

During the 2nd millennium cal. BC peat formation generally ceased marking the transition from the Middle to Upper Somerset Levels Formation. Around this time, a number of trackways were constructed around the Severn Estuary marking the increasing wetness associated with greater tidal influence.

The Romano-British period marked the first extensive reclamation of the wetlands of the Levels marked by the establishment of drove roads to allow cattle to graze the fertile pastures of the saltmarsh and by salterns in the tidal creeks (Allen and Fulford, 1986). In Late Roman times, a transgressive phase is evident within the sedimentary record, which probably made some areas unusable until a later phase of medieval land reclamation.

3 Project aims

The scope of the works, after discussions with the Senior Historic Environment Officer (Steve Membery) were:

- to excavate 16 boreholes in a transect running in a north-east to south-west orientation through the centre of the site and perpendicular to the river Parrett that lies due west of the site.

The aim of the survey is:

- to recover, record and analyse paleo-environmental samples from within the site in order to add and enhance data to the local archaeological record and aid in the further understanding of early Prehistory within the site and its immediate surrounds.
- The project should inform the development and implementation of local, regional and national research agendas with specific reference to the South West Archaeological Research Framework Research Strategy 2012-2017 (Grove and Croft 2012).

4 Project methodology

A Written Scheme of Investigation (WSI) was prepared by Richard Smalley, RPS Group (RPS 2021). Fieldwork was undertaken in two stages, due to demolition work programming, with Boreholes 1-8 recovered between 31st March and 1st April 2022 and boreholes 9-16 recovered between 15th and 16th August 2022.

Sixteen boreholes were drilled along the 370m long transect, 25m apart. The location of the boreholes and their ground level spot heights are indicated in Figure 2. The boreholes were placed along a transect running in a north-east to south-west orientation, through the centre of the site and perpendicular with the course of the River Parrett that lies due west of the site.

The boreholes were taken using a mechanical windowless sampler, operated by a professional drilling team. All boreholes were drilled to a depth of 6m below the ground level. Given that geotechnical investigations demonstrate the Late glacial / postglacial sediments have a thickness of around 22m, these geoarchaeological boreholes penetrate a little less than one third of the superficial sequence.

The borehole drilling was monitored and coordinated by Graham Arnold and Jamie Wilkins, Project Officers from Worcestershire Archaeology. All borehole locations, including ground level spot heights, were recorded using a using a GNSS device with an accuracy limit set at <0.04m.

The windowless samples were recovered as continuous 1m long columns of material retained in plastic tubes. On-site, individual tubes were wrapped, labelled and orientated (top/bottom) by the archaeologist, to ensure their stratigraphic integrity.

The tube samples were transported from site to the workshop of Landscape Research & Management where they were opened, cleaned and photographed; the sediments were recorded using standard geological nomenclature (Jones et al., 1997). To ensure palaeoenvironmental remains did not degrade between fieldwork campaigns, samples were taken from Boreholes 1-8 immediately after recovery and off-site recording; these samples were kept under refrigerated conditions.

Once all boreholes had been described fully, sub-samples were selected for further palaeoenvironmental assessment. In total, four sub-samples were selected for bulk macrofossil assessment (Liz Pearson, Worcestershire Archaeology) and eight sub-samples for pollen and diatoms (Dr Tom Hill, PERCS Ltd). Four sub-samples were also selected for radiocarbon dating during macrofossil assessment.

5 Borehole results

5.1 Introduction

The site and borehole locations are shown in Figures 1-2 and general views of the site, drilling in progress and the initial collection of cores is shown in Plates 1 -11.

A table of the borehole sample inventory and some field notes are provided below. Further analysis of the borehole cores was undertaken by Andy Howard.

Borehole Number	Surface Height (m AOD)	Number of Cores	Notes
BH 1	5.66	6	
BH 2	5.60	6	Water ingress into core 2-4m below ground level (bgl); liner cracked 4-5m bgl and rehoused; borehole on side of field boundary ditch.
BH 3	5.42	6	Water ingress into core 2-4m; liner cracked 4-5m bgl and rehoused
BH 4	5.43	6	Good recovery
BH 5	5.43	6	Liner cracked at 4-5m bgl and rehoused.
BH 6	5.5	6	Peat at 3-4m bgl partially washed out by water.
BH 7	5.44	6	Moved out of hardstanding slightly south of original location.
BH 8	5.39	6	Peat at 2-3m and 3-4m bgl partially washed out by water.
BH 9	5.21	6	-
BH 10	5.13	6	-
BH 11	4.99	6	-
BH 12	5.24	6	-
BH 13	5.22	6	-
BH 14	5.10	6	-

BH 15	5.09	6	-
BH 16	5.25	6	-

6 Artefactual evidence

Recovery of artefacts was undertaken according to standard Worcestershire Archaeology practice (WA 2012). In the event no artefacts were identified which were suitable for analysis. Whilst no cultural archaeological remains were recorded during the borehole survey, such environments have the potential to preserve remains at depth within the sedimentary sequence.

7 Environmental assessment

7.1 Geoarchaeological assessment by Andy Howard

The sixteen windowless sample boreholes drilled across the site revealed a generally uniform stratigraphy indicating a tripartite sequence that corroborated with the established stratigraphy of the Somerset Levels Formation (Figure 3; Appendices 1 and 2).

Across the majority of the transect line, a thin topsoil was underlain by around 2m of brown [7.5YR 4/3) silty clay, firm and strongly oxidised and gleyed (greenish-grey 5YY 4/1). The formation of iron pan and manganese are associated with local water table fluctuations.

In three of the boreholes (BH 7, BH 15 and BH 16), crushed aggregate between 0.30 and 0.70m thick was recorded at the surface; these Made Ground deposits are associated with the recent infrastructure of the site.

From around 1.30 to and 1.60m b.g.l, the silty clay often includes a zone of laminated sandier horizons (silty sand), which are interpreted as signifying a period of higher energy tidal action; this does not necessarily indicate changing flow rates but rather the spatial distribution of active tidal channels within the area.

In all boreholes, the red-brown silty clay was underlain by around 0.10 to 0.20m of black silty peat; generally, it was well-humified though occasional woody material and plant remains were observed. Both the upper and lower bounding surfaces of the peat were often sharp and irregular, suggesting probable erosional contacts.

The spatially extensive upper peat deposit was underlain by firm and homogenous, blue-grey clayey silts, with occasional intact and degraded shell material (gastropods). Bands of peaty silt, silty peat and peat were recorded periodically within the clayey silts all the way down to 6m b.g.l. The organic-rich bands were generally less than 0.05m thick and sometimes laminated, which generally denoted a higher silt content; contacts were often sharp and erosive. Occasionally, the silts and peaty sediments formed more significant laminated stacks of sediment denoting the subtle interplay of depositional processes.

In total, four sub-samples have were for bulk macrofossil assessment and eight sub-samples for pollen and diatom analysis. Subsamples sent for radiocarbon dating indicated a late Mesolithic date (4440 - 4330 & 4540 - 4370 cal. BC) at 0.17 – 0.23m OD, late Neolithic date (2580 - 2460 & 3370 - 3100 cal. BC) at 1.84-1.76 m OD and an early Iron Age date (760 - 410 & 810 - 770 cal BC) at 3.74-3.66m OD. The results of palaeoenvironmental analyses and radiocarbon dating are reported below.

7.2 Pollen and Diatoms assessment by Dr Tom Hill

7.2.1 Introduction

A total of 8 pollen and 8 diatom samples were submitted for assessment from the boreholes extracted during ground investigations. BH01 was deemed to contain a stratigraphic sequence most representative of the deposits encountered and selected for analysis. The stratigraphy present was typified by up to 6m of alluvium in which discrete peat units were encountered. The number of peat units varied between cores. Three peat units were recognised in BH01 based on the sample distribution and will be referred to as the lower, middle and upper peat unit hereon in.

Landscape Research and Management Ltd, in conjunction with Worcester Archive and Archaeology Service, devised a palaeoenvironmental strategy to assess the value of the depositional archive, which included the application of pollen, diatom and radiocarbon dating analyses to the sequence.

Table 2 summarises the sampling strategy applied to the sequence, from which selected samples were chosen for the assessment of both pollen and diatoms. Simplified stratigraphic descriptions are also provided to assist subsequent discussions.

Borehole	Core section	sample depth (cm)	Elevation m OD	Generalised stratigraphy
1	2	93-94	3.73-3.72	Peat
	4	48-49	2.18-2.17	Clayey silt
		51-52	2.15-2.14	Organic silt
		53-54	2.13-2.12	Peat
		57-58	2.09-2.08	Clayey silt
		78-79	1.88-1.87	Organic silt
		83-84	1.83-1.82	Peat
	5	68-69	0.98-0.97	Peat

Table 2: Summary of the samples submitted for pollen and diatom consideration from BH01 Bower Farm, Bridgwater

7.2.2 Methodology

For diatom preparations, 0.5g of sediment was required. Due to the high silt and clay content of the majority of these samples, all were first treated with sodium hexametaphosphate and left overnight, to assist in minerogenic deflocculation. Samples were then treated with hydrogen peroxide (30% solution) and/or hydrochloric acid (10% solution) depending on organic and/or calcium carbonate content, respectively. Samples were finally sieved using a 10μm mesh to remove fine minerogenic sediments. A minimum of 100 diatoms were to be identified for each sample depth. If diatoms were found to be in low abundance, 10 slide traverses were undertaken. Diatom species would be identified with reference to van der Werff and Huls (1958-74), Hendy (1964) and Krammer & Lange-Bertalot (1986-1991). Ecological classifications for the observed taxa were then achieved with reference to Vos and deWolf (1988; 1993), Van Dam *et al*, (1994), Denys (1991-92; 1994) and Round *et al* (2007).

For pollen assessment, pollen preparation (extraction) followed the methodology outlined by Moore *et al* (2001) including potassium hydroxide (KOH) digestion, hydrofluoric acid (HF) treatment and acetylation. A total of 10 microscope slide traverses, or a count of at least 100 total land pollen grains (TLP) excluding aquatics and spores, is required to undertake an assessment of potential. The presence of non-polleniferous palynomorphs (NPP), microscopic charcoal and pre-Quaternary spores was also noted, if present. Pollen nomenclature follows Moore *et al* (1991) with the amendments suggested by Bennett *et al* (1994).

7.2.3 Results

Diatom preservation was found to be high in all samples under assessment. In contrast, pollen preservation/abundance was found to vary between samples. A summary of the results is provided below.

BH01 Diatoms

Diatoms were well preserved in all 8 samples under assessment. Diatoms were found to be highly abundant in all samples, except for the uppermost sample which contained diatoms in moderate abundance. Diatom diversity was found to vary between moderate and high.

Table 3 provides a summary of the diatoms encountered in BH01. Whilst the assemblages are relatively similar throughout the profile, there are clear variations between samples, with certain species being more common than others, varying through the sequence.

Marine, marine-brackish and brackish diatoms were most often encountered across the samples under assessment. Benthic diatoms were most common, although planktonic diatoms were encountered in low but persistent numbers throughout. Brackish-fresh and fresh diatoms were present, but their presence remained limited in general, with higher numbers most often associated with the peat units under investigation.

The two basal samples (0.97-0.98m, 1.82-1.83m OD), derived from peat deposits, are most typified by benthic marine-brackish species including *Navicula peregrina* and *Nitzschia sigma*, but there are a number of lower salinity taxa encountered, with species of *Surirella*, *Mastogloia*, *Tryblionella* and *Epithemia* of note. However, the brackish-marine taxa *Melosira nummuloides*, a species often either found living as an epiphyte (attached to aquatic plant) or in coastal plankton, is relatively common, in addition to the presence of marine plankton including *Actinoptychus senarius*, *Paralia sulcata* and *Thalassiosira* sp.

The overlying sample (1.87-1.88m OD), derived from organic silts, contains a broadly similar diatom assemblage to those encountered in the underlying peats, although *M nummuloides* is no longer present, replaced by an increase in the abundance of the marine plankton *Paralia sulcata*.

The clayey-silt from 2.08-2.09m OD, in addition to the overlying peat sample (2.12-2.13m OD) contain a different floral assemblage, with diatom diversity being lower and the most typical species now being the marine-brackish benthic diatoms *Nitzschia navicularis* and *Diploneis didyma*. There is however a stronger marine planktonic signal in the clayey-silt sample, which is not evident in the overlying peat sample and differentiates the overall assemblages encountered in these two samples.

The samples from the overlying organic silt and clayey silt (2.14-2.15m OD, 2.17-2.18m OD) contain broadly similar assemblages to one another and are suitably different to those encountered below. *Diploneis interrupta*, a marine-brackish aerophilous species, is super-abundant within these samples. As such, *D interrupta* almost wholly dominates the assemblage, with few other species encountered during assessment. Others present of note include the marine-brackish epipelic species *2569*, *N punctata* and *Diploneis didyma*, *D interrupta* is most commonly encountered in the supratidal zone, requiring periods of tidal submergence and emergence.

The uppermost sample, derived from the upper peat, contained diatoms only in moderate abundance, and it was common to encounter fragmented diatom frustules. The fresh-brackish aerophilous species Pinnularia viridis was most common, supported by lower less saline tolerant taxa including *Hantzschia amphioxys*, *Epithemia turgida*, *Eunotia monodon* and *Anomoeoneis sphaerophora*. There however remains a distinct saline influence, represented by both benthic species (e.g. *N navicularis*, *N peregrina*) and planktonic species *(Paralia sulcata*, *A senarius*, *Pseudomelosira westii*). This sample also contained microcharcoal in abundance, in addition to chrysophyte cysts.(see Table 3)

BH01 Pollen

Pollen was found to vary in abundance and diversity in between samples. As a general trend, pollen was found to be abundant within the minerogenic units, but floral diversity was found to be relatively low. In contrast, and perhaps surprisingly, the organic units returned pollen in both low abundance and diversity. A summary of pollen encountered can be found in Table 4. Generalised summaries will be provided, splitting samples between those form the organic units and those from the minerogenic units.

All organic samples were found to be relatively barren of pollen. Two of the samples yielded <10 TLP (1.83-1.84m, 2.12-2.13m OD), with the remaining sample yielding only slightly better assemblages of 20-40 TLP (0.97-0.98m, 3.73-3.74mOD). When present, the majority of grains were herbs, notably Chenopodiaceae (goosefoot) and Poaceae (wild grasses). Isolated grains of *Corylus-Myrica* type (hazel or sweetgale), *Quercus* (oak) or *Pinus* (pine) were also noted. The samples did however contain spores in relatively abundance, with Pteropsida (monolete) undif. (ferns) encountered in all samples, with the spore being super abundant in 2.12-2.13m OD. The spore *Glomus*-type was also occasionally present. However, the presence of microcharcoal was of particular note. Microcharcoal was encountered in moderate abundance in the two lowermost organic samples (0.97-0.98m , 1.82-1.83m OD), but was superabundant in the upper two samples (2.12-2.13m, 3.72-3.73m OD). Charcoal was in fact so abundant in these two samples, that the pollen residues required diluting in order to ensure the charcoal did not obscure the microscopy field of view. Pollen however remained restricted in abundance and diversity within these samples, but the continued abundance of charcoal may have been obscuring pollen grains.

The minerogenic units found interbedded between the peat units contained better floral assemblages, with pollen in high overall abundance, but low diversity. This is represented by the fact that all 4 samples were almost wholly dominated by Chenopodiaceae, with other herbs such as Poaceae, Cyperaceae (sedges), *Plantago* (plantains) only occasionally encountered. Shrubs were restricted to occasional grains of *Corylus-Myrica* type and trees were restricted to often isolated grains of *Alnus* (alder), *Betula* (birch), *Pinus*, *Quercus* and *Tilia* (lime). Spores were once again primarily represented by an abundance of Pteropsida (monolete) undif, but occasional spores of Polypodium (polypody) and Pteridium (bracken) were noted. Charcoal was encountered in low to moderate abundance, in addition to the fungal spore *Glomus*-type. (Table 4).

		Elevation (m OD)							
		BH01							
		peat	cl-silt	org silt	peat	cl-silt	org silt	peat	peat
		3.73-3.72	2.18-2.17	2.15-2.14	2.13-2.12	2.09-2.08	1.88-1.87	1.83-1.82	0.98-0.97
Planktonic Taxa	*Actinoptychus senarius*	4				2	6	3	10
	Actinoptychus splendens			1					
	Cyclotella sp.								1
	Melisira nummuloides							17	15
	Paralia sulcata	7		1	1	16	15		5
	Pseudomelosira westii	2			1	11	3	1	1
	Pseudopodosira stelligera	2				4	1		1
	Thalassiosira sp.				2		1	1	4
	Triceratum favus					1			
Tychoplanktonic Taxa	*Delphineis surirella*						1	1	
	Rhaphoneis amphiceros	2				2	1		
Brnthic Taxa	*Achnanthes brevipes*							1	
	Amphora ovalis	3				1			
	Anomoeoneis sphaerophora	7				1			1
	Caloneis amphisbaena	1					1		
	Caloneis formosa		6	3	2				7
	Caloneis silicula						1		
	Campylodiscus clypeus	4							
	Campylodiscus echeneis								1
	Cocconeis sp.							1	1
	Cosmioneis pusilla						6		
	Cymbella sp.	1			1				
	Diploneis didyma	1	6	13	34	11	1		1
	Diploneis interrupta		94	88	5	1			1
	Diploneis ovalis	7	1						
	Diploneis parma		3	1			3		1
	Diploneis sp. 1						4		
	Epithemia adnata	1							1
	Epithemia turgida	11			2	19			8
	Eunotia monodon	5							
	Gomphonema gracile	2							
	Gyrosigma acuminata							1	1
	Gyrosigma wansbeskii						2	8	8
	Hantzschia amphioxys	7							
	Mastogloia exigua							4	
	Navicula digitoradiata				1		2	8	5
	Navicula oblonga				1				
	Navicula peregrina	17	7	19	2	10	15	31	7
	Navicula viridula						12		
	Navicula sp. 1						4	5	
	Nitzschia bilobata					1	3	1	7
	Nitzschia commutata	15							
	Nitzschia navicularis	14	20	15	71	54	2	3	5
	Nitzschia punctata	2	8	17	13	2	3	1	1
	Nitzschia sigma			1	1	3	13	16	35
	Nitzschia sigmoidea	9					1		
	Petroneis marina			2					
	Pinnularia viridis	35				1			
	Rhophalodia sp.						1	2	
	Scoliopleura tumida		5		3				1
	Staureoneis sp.					1	10	3	4
	Surirella gemma							5	
	Surirella ovalis				1				
	Surirella ovata						7	6	8
	Surirella striatula						1	1	1
	Synedra ulna							3	3
	Tryblionella acuminata							8	5
	Tryblionella gracilis						1	2	
Abundance		mod	high	high	high	high	high	high	high
Diversity		high	mod	mod	mod	mod	high	high	high
Suitable for further analysis?		y	y	y	y	y	y	y	y

Table 3: Summary of diatoms encountered in BH01 Bower Farm, Bridgwater

		Elevation (m OD)							
		BH01							
		peat	cl-silt	org silt	peat	cl-silt	org silt	peat	peat
		3.73-3.72	2.18-2.17	2.15-2.14	2.13-2.12	2.09-2.08	1.88-1.87	1.83-1.82	0.98-0.97
Trees	*Alnus*		3	4		2	1		
	Betula		1			1			
	Fraxinus								
	Pinus		1	1					1
	Quercus	2	2				1		
	Tilia					1			
	Ulmus								
Shrubs	*Corylus-Myrica* type	1	3	7	1	3	2	1	1
	Ericaceae undiff.		2	1					
	Hedera helix								
	Salix								
Herbs	Poaceae	12	8	13		12	23	1	2
	Poaceae >32mic								
	Cyperaceae		2	2	2	8			
	Apiaceae (Umbelliferae) undif.		1						
	Artemisia								
	Asteraceae						3		
	Brassicaceae						1		
	Filipendula								
	Lactuceae								
	Caryophyllaceae								
	Chenopodiaceae	21	78	68	5	83	76	1	19
	Cirsium								
	Plantago sp.	1	2	2					
	Polygonum sp.								
	Ranunculus								
	Rubiaceae	1		1					
	Rumex			1					
	Urrica								
Spores	*Polypodium*	1	2		4	2	2	1	
	Pteridium	1	10	12		2			
	Pteropsida (monolete) undif.	13	43	71	300+	27	47	134	51
	Sphagnum		1						
Aquatics	*Hydrocotyle*								
	Menyanthes								
	Myriophyllum								
	Nymphaea								
	Potemogeton								
	Sparganium	1		1					
	Typha latifolia								
Charcoal		xxxxx	xx	xx	xxxxx	xx	xx	xx	x
Pre Quaternary pollen and spores									
Identifiable NPPs		x	x	x		x	x	x	x
Abundance		low	high	high	low	high	high	low	low
Diversity		low	mod	mod	low	mod	mod	low	low
Suitable for further analysis?		n	y	y	n	y	y	n	n

Table 4: Summary of pollen encountered in BH01 Bower Farm, Bridgwater

7.2.4 Discussion

Contrasting results have been achieved in relation to the application of pollen and diatom assessments to the stratigraphic sequences encountered at Bower Farm. Diatoms were found to be well preserved and present in relative abundance and diversity in the majority of samples. Interestingly, despite the clear variations in stratigraphy present (with peat deposits interbedded within alluvium), the diatoms did not indicate substantial palaeoenvironmental variation through height through the sequence. It may have been assumed that the peat units would have derived in freshwater contexts whereas, in light of proximity to the coastal zone, the alluvium was derived through coastal processes. Instead, the overriding signal from the diatoms is that estuarine influence prevailed for the duration of deposition, with a suite of marine, marine-brackish and brackish diatoms, from both the planktonic and benthic realm, being encountered in the majority of samples, including the peat deposits. There are diatoms associated with lower salinity and/or freshwater settings also present, and these are most often encountered in the samples derived from the peat units. In addition, there appears a greater freshwater signal in the uppermost peat unit when compared to the others encountered with depth. So, this could infer an overall reduction in marine influence towards the top of the sequence. However, all the peat samples also contain marine, marine-brackish and brackish diatoms in sufficient abundance to indicate that deposition must have been taking place within the littoral zone as these peat units formed. As such, instead of these peat units developing above the influence of the tides, they are likely to have formed below highest astronomical tide (HAT). It is possible perhaps that the peat units have therefore formed as a result of the infilling of abandoned channels or topographic depressions within the coastal zone, such as abandoned tidal creeks, for example.

The evidence from the pollen is somewhat more limited due to variations in abundance and diversity, but overall the pollen signal seems to reinforce these preliminary observations. The minerogenic units are dominated by goosefoot, which is a salt tolerant plant and often well associated with the coastal contexts. The remaining assemblages associated with the minerogenic units are typified by wild grasses, hazel and occasional grains of trees including alder, birch, oak and pine, all of which are likely in-wash from the surrounding drier ground. The peat units contained very poor pollen assemblages and as such there is subsequently little that can be said with regards the likely vegetation associated with these units. Whilst the pollen record of the organic units is restricted, goosefoot is once again encountered (and is often the most common grain, albeit in very restricted assemblages in the units), and hence this further reinforces the preliminary diatoms analyses to suggest sedimentation remained within the coastal zone during the development of the stratigraphic sequence under assessment. However, the abundance of fern spores, the presence (often in abundance) of charcoal, and the presence of *Glomus*-type fungal spores in the peat units and the interbedded minerogenics, perhaps sheds more light into the development of these organic beds than the pollen assemblages. Ferns are often associated with drier ground settings and were often noted as showing signs of corrosion. Their relative abundance within the organic units, in conjunction with charcoal (increasing in abundance with height), alludes to a source of material from inland contexts, away from the coastal zone. The fact that corroded fern spores and charcoal are present together could also be an indicator of possible episodes of burning on the drier ground, subsequently in washed and becoming incorporated into what have been suggested as abandoned channels or creeks within the intertidal zone (see above). The presence of the fungal spore *Glomus*-type perhaps reinforces this they are seen as possible indicators of the redeposition/reworking of sediment (e g Kołaczek *et al* 2012).

Recommendations for further analysis

All interpretations provided within this report are provisional and based on an 'assessment of potential' of pollen and diatom samples within the Bower Farm borehole sequence. As such, interpretations are based on limited microfossil counts and hence musty be treated with caution. It must therefore be stressed that, if the sequence is deemed to be of value in terms of understanding the geoarchaeological and/or palaeoenvironmental context of the study site, full analysis would be required to ensure such interpretations are reliable and accurate.

The presence of diatoms in relative abundance and diversity throughout all samples, spread across both organic and minerogenic units, suggests the Bower Farm sequence has high potential in terms of further work. The overall dominance of marine and brackish diatoms, supported by lower but nonetheless influential numbers of species associated with lower salinity contexts, suggests sedimentation likely was taking place within the coastal zone for the duration of deposition. There are variations in marine-freshwater influence with height through the sequence, particularly evident with the larger freshwater signal in the uppermost peat unit. If further analyses were undertaken, the presence of marine and brackish taxa within the assemblages would enable the reconstruction of approximate depositional positions within the tidal frame at the time of sedimentation. This would be achieved using the classification scheme of Vos and de Wolf (1993). This semi-quantitative approach enables assemblages to be associated with specific palaeo-shoreline elevations such as deposition within tidal channel, mud flat, salt marsh below/at/above mean high waters etc. This technique utilises those diatom species that are often present, but in much lower abundances (1-5%TDV). Such taxa can often dictate the reconstructed palaeo-elevations that are applied to a diatom assemblage, but due to their relative abundance, don't always appear to be statistically significant during assessment level studies. This approach would assist in understanding the changing depositional conditions that prevailed at the Bower Farm site, and place these changing landscape conditions into context in relation to the role of relative sea-level change during the Holocene.

In contrast, the restricted presence of pollen within the organic units indicates any further work is not recommended. In addition, whilst pollen was encountered in abundance within the minerogenic units, its diversity was low and the overall dominance of goosefoot would suggest little more can be extracted from these samples if taken to further analysis. As such, no recommendations are made for further pollen studies at the Bower Farm site.

7.3 Plant macrofossils assessment by Elizabeth Pearson

7.3.1 Processing and analysis

A single sub-sample, taken from Borehole 1, was initially processed by the wash-over technique as follows, in order to test the suitability for extracting material for radiocarbon dating. The sub-sample was broken up in a bowl of water to separate the light organic remains from the mineral fraction and heavier residue. The water, with the light organic faction, was decanted onto a 300µm sieve and the residue washed through a 1mm sieve. The remainder of the bulk sample was retained for further analysis.

The residue was scanned by eye and the abundance of each category of environmental remains estimated. The wet flot was scanned using a low power MEIJI stereo light microscope and plant remains identified using modern reference collections maintained by Worcestershire Archaeology, and a seed identification manual (Cappers *et al* 2012). Nomenclature for the plant remains follows Stace (2010).

Borehole	Core	Spit/Sub-sample	Feature type	Depth bgl	Height mOD	Period	Sampe volume (L)	Volume processed (L)	Residue assessed	Flot assessed	C14 Date
1	2	92 - 100cm	Layer	1.92 – 2.00m	3.74 – 3.66m	Iron Age	0.5	0	No	No	760 – 410 cal BC & 810 – 770 cal BC
1	4	90 - 100cm	Layer	3.90 – 4.00m	1.76 – 1.66m		0.5	0.5	Yes	Yes	
1	4	82 - 90cm	Layer	3.82 - 3.90m	1.84 – 1.76m	Neolithic	0.5	0	No	No	2580 – 2460 cal BC & 3370 - 3100
1	5	63 - 76cm	Layer	4.63 - 4.67m	1.03 – 0.90m		0.5	0	No	No	
4	6	62 – 68m	Layer	5.62 – 5.68m	0.17 – 0.23m	Late Mesolithic	0.5	0	No	No	4440 - 4330 & 4540 - 4370 cal BC

Table 5: List of bulk samples taken

7.3.2 Discard and retention policy

Remaining soil sample and residues (post scanning) will be discarded after a period of three months following submission of this report unless there is a specific request to retain them.

7.3.3 Waterlogged plant macrofossils

The results are summarised in Table 6.

As no identifiable remains were recorded, remaining sub-samples were left unprocessed so that the sediment could be preserved and sent for radiocarbon dating. As this was a peaty layer, potential for recovering information useful for interpreting the site was thought to be very limited (in comparison to analysis of pollen and diatom remains), hence further processing was not carried out on the other sub-samples.

Context	***Sample***	***Spit/Sub-sample***	***Preservation type***	***Species detail***	***Category remains***	***Quantity/diversity***	***Comment***
1	4	90 - 100cm	wa	unidentified stem fragments, unidentified moss fragments, unidentified wood fragments, unidentified herbaceous fragments	misc	++/low	humified wood fragments

Table 6: Plant remains from bulk samples

Key:

preservation	**quantity**
wa = waterlogged	+ = 1 - 10
	++ = 11- 50

7.3.4 Recommendations

No further recommendations are made for analysis of plant remains for the purpose of interpreting the site, although further sediment samples may need to be submitted for radiocarbon dating should further analysis be undertaken.

8 Radiocarbon dating

A total of six radiocarbon determinations have been achieved from organic sediments from boreholes that make up Transect 1. As preservation of plant macrofossil remains was poor, it was necessary to submit two sediment samples at each level dated for radiocarbon dating of humic acid and humin fractions. Results indicate a late Mesolithic date at the base, a Neolithic date at the middle and early Iron Age at the top of the sequence (Fig 4).

Samples were dated at SUERC (University of Glasgow) by AMS.

The results are conventional radiocarbon ages (Stuiver and Polach 1977) and are listed in Table 6. The calibrated date ranges for the samples have been calculated using the maximum intercept method (Stuiver and Reimer 1986) and are quoted with end points rounded outwards to ten years. The probability distributions of the calibrated dates, calculated using the probability method (Stuiver and Reimer 1993) are shown in Graphs 6 and 7 in Appendix 2. They have been calculated using OxCal v4.2 (Bronk Ramsey 2009) and the current internationally-agreed atmospheric calibration dataset for the northern hemisphere, IntCal13 (Reimer *et al* 2013).

Laboratory code	Context number	Material	δ13C (‰)	Conventional Age	OxCal calibrated age (95.4% probability or 2 sigma)
SUERC-108044	BH4/C6/62-68cm	Sediment: humic acid	-26.8 ‰	5513 ±21	4440 - 4330 cal BC
SUERC-108048	BH4/C6/62-68cm	Sediment : humin	-26.6 ‰	5642 ±23	4540 - 4370 cal BC
SUERC-108049	BH1/C4/82-90cm	Sediment: humic acid	-28.5 ‰	3996 ±25	2580 - 2460 cal BC
SUERC-108050	BH1/C4/82-90cm	Sediment: humin	-28.9 ‰	4523 ±23	3370 - 3100 cal BC
SUERC-108051	BH1/C2/92-100cm	Sediment: humic acid	-28.0 ‰	2459 ±24	760 - 410 cal BC
SUERC-108052	BH1/C2/92-100cm	Sediment: humin	-27.8 ‰	2597 ±24	810 - 770 cal BC

Table 6: Radiocarbon dating results

9 Conclusions

The drilling of sixteen geoarchaeological boreholes across the proposed development site has confirmed the broadly tripartite sequence of the Somerset Levels Formation and demonstrated the preservation of organic-rich sediments at several levels within the alluvial sequence. Although the 6m deep boreholes appear to have only sampled the Upper and Middle Somerset Level Formation deposits. The radiocarbon dating of humic acid and humin from peat layers within Borehole 1 and Borehole 4 returned a late Mesolithic date towards the base of the core. This is thought to be near to the start of the Middle Somerset Level Formation although the exact transition between the Lower and Middle Somerset Level Formation deposits was not observed in the cores.

A middle to late Neolithic date was returned from deposits in the centre of the Middle Somerset Levels Formation. While the top of the Middle Somerset Level Formation was dated to the early Iron Age. This was overlain by up to 2m of brown silty clays, of the Upper Somerset Levels Formation.

The presence of laminated silty clay between 1.30 and 1.60 b.g.l indicates that there was a period of slightly higher tidal action during this deposition. This could result from a change in spatial distribution of active tidal channels, rather than a wholesale change in estuarine conditions. This episode potentially dates to between the early and late Neolithic, based on radiocarbon dating (Fig 4). Lenses of peat throughout the profile indicate short-term phases of higher silt content during low-energy deposition, interspersed with episodes of higher erosion.

Whilst macrofossil and pollen survival was low, with no potential for further work, the diatoms were present in relative abundance and diversity throughout all samples. These were recovered across both organic and minerogenic units and suggests the Bower Farm sequence has high potential in terms of further work.

The overall dominance of marine and brackish diatoms, supported by lower, but nonetheless influential numbers of species associated with lower salinity contexts, suggests sedimentation is likely to have taken place within the coastal zone for the duration of deposition. This supports the Holocene coastline model summarised by Brunning (2013), that suggests that this part of the Parrett Valley was under sea and or saltmarsh until the Roman period. Peat lenses throughout the sequence indicates sporadic episodes of low-energy peat build-up, most likely under brackish conditions. If further analyses were undertaken, the presence of marine and brackish taxa within the assemblages would enable the reconstruction of approximate depositional positions within the tidal frame at the time of sedimentation.

The radiocarbon dating of humic acid and humin from deposits within Borehole 1 and Borehole 4 spanned the late Mesolithic to the early Iron Age. The date of these Middle Somerset Levels Formation deposits is broadly comparable with other dated sequences regionally although the timing of early Holocene peat development is variable. Around the mouth of the Parrett, the Middle Somerset Levels Formation peat formation is dated at its base to c.3900 cal. BC (Coles and Dobson in Bell *et al* 2015) at Stolford on the coast and to 4840 – 4520 cal. BC at Langport, c. 14km further upstream of Bower Farm (Wilkinson 2006 in Bell *et al* 2015). The lower date at Bower Farm (4440 – 4330 & 4540 - 4370 cal. BC) is comparable to both. Although it was not possible to confirm the onset of peat formation as the transition from the Lower to Middle Somerset Level Formation was not observed in the Bower Farm boreholes. Similar dates for early peat formation are also known at Porlock Bay (c.4500 and c.3540 cal. BC; Jennings *et al* 1998 in Bell *et al* 2015) and at Minehead (around 5000 cal. BC, then later at c.4800 – 4500 cal. BC; Jones *et al* 2005 in Bell *et al* 2015).

At Bower Farm, a later band of peat deposition in the middle of the sequence is dated to 2580 – 2460 & 3370 - 3100 cal. BC lies within the Middle Somerset Levels Formation. The upper peat layer at Bower Farm dated to 760 – 410 & 810 - 770 cal. BC, which suggests that the transition to the Upper Somerset Levels Formation must have occurred after this date. The change to the silt depositing environments of the Upper Somerset Levels Formation has been dated to 1130-840 cal. BC at Langport, c. 14km upstream in the Parrett Valley (Wilkinson 2006). Although more comparable dates for this change have been recorded at Godney Moor in the Brue valley where this transition is dated to between c. 840–450 cal. BC (Brunning 2013).

The diatom assemblage shows the most potential for further analysis, which with further radiocarbon dating would enable the reconstruction of approximate depositional positions within the tidal frame at the time of sedimentation. Unfortunately, however any further diatom analysis would be undertaken in isolation as the other proxy environmental remains do not warrant further analysis.

Although no cultural archaeological remains were recorded during the borehole survey, such environments also have the potential to preserve remains at depth within the sedimentary sequence. This must also be considered if future development is proposed at the site is that may disturb or truncate these deposits.

10 Project personnel

The fieldwork was led by Graham Arnold, PCIfA, and Jamie Wilkins ACIfA.

The project was managed by Tom Rogers, MCIfA and Andrew Mann MCIfA. The report was produced and collated by Graham Arnold. Andy Howard (Landscape Management and Research) provided the geoarchaeological analysis. Dr Tom Hill (PERCS) provided a report on the pollen and diatom assessment. Illustrations were completed by Graham Arnold and Abbie Horton.

Specialist contributions and individual sections of the report are attributed to the relevant authors throughout the text.

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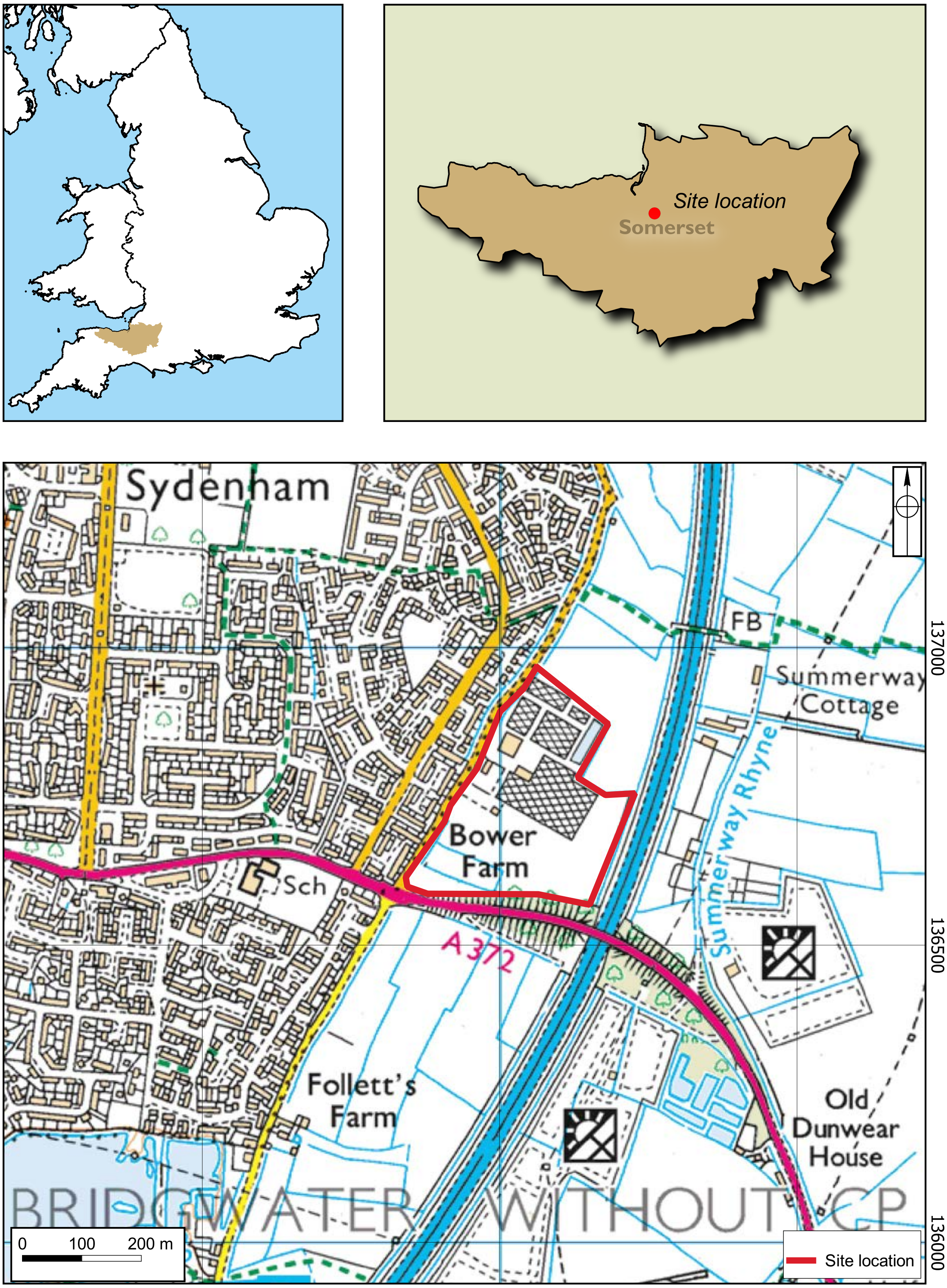
Figures

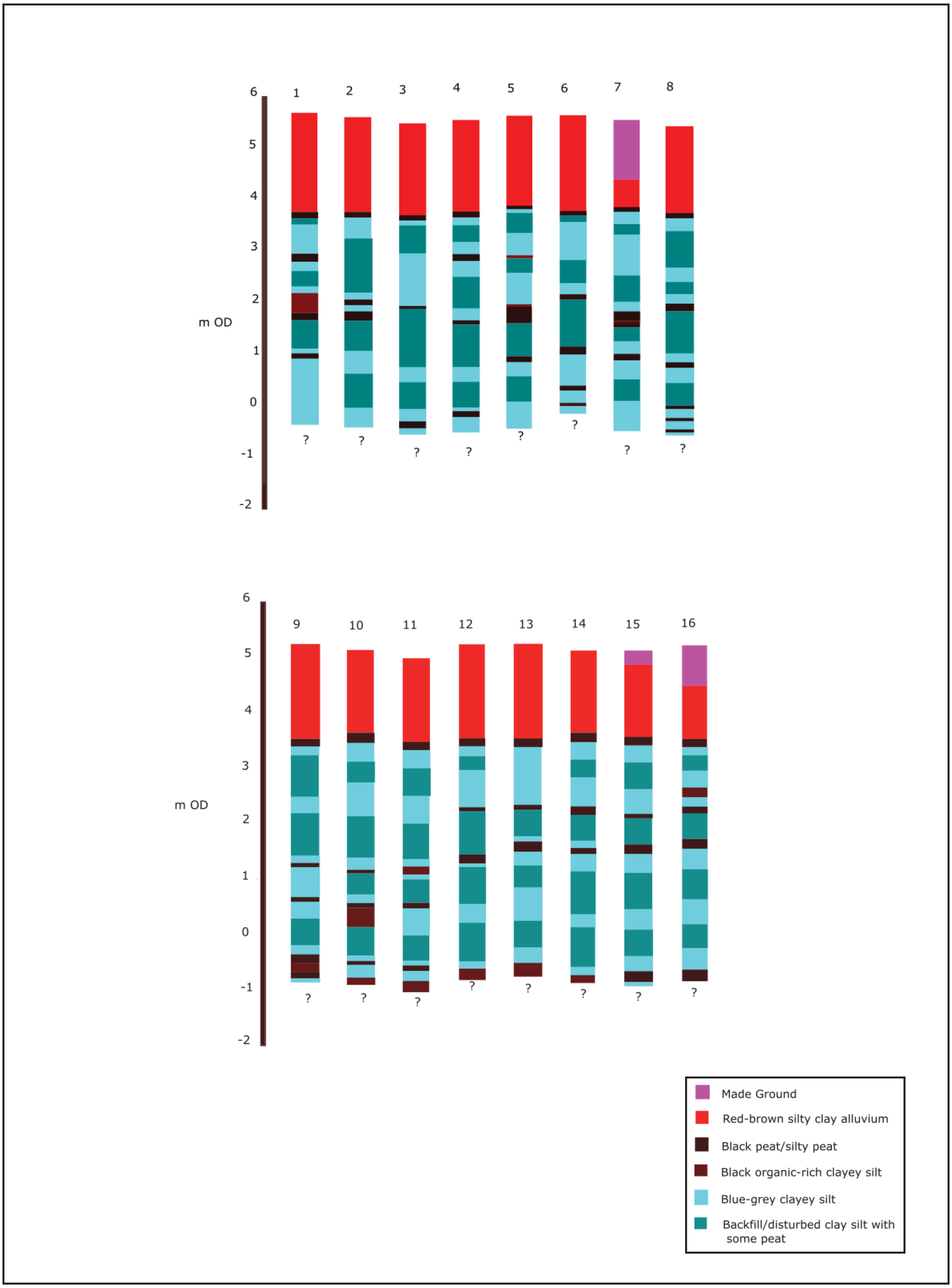


Location of the site *Figure 1*

332000

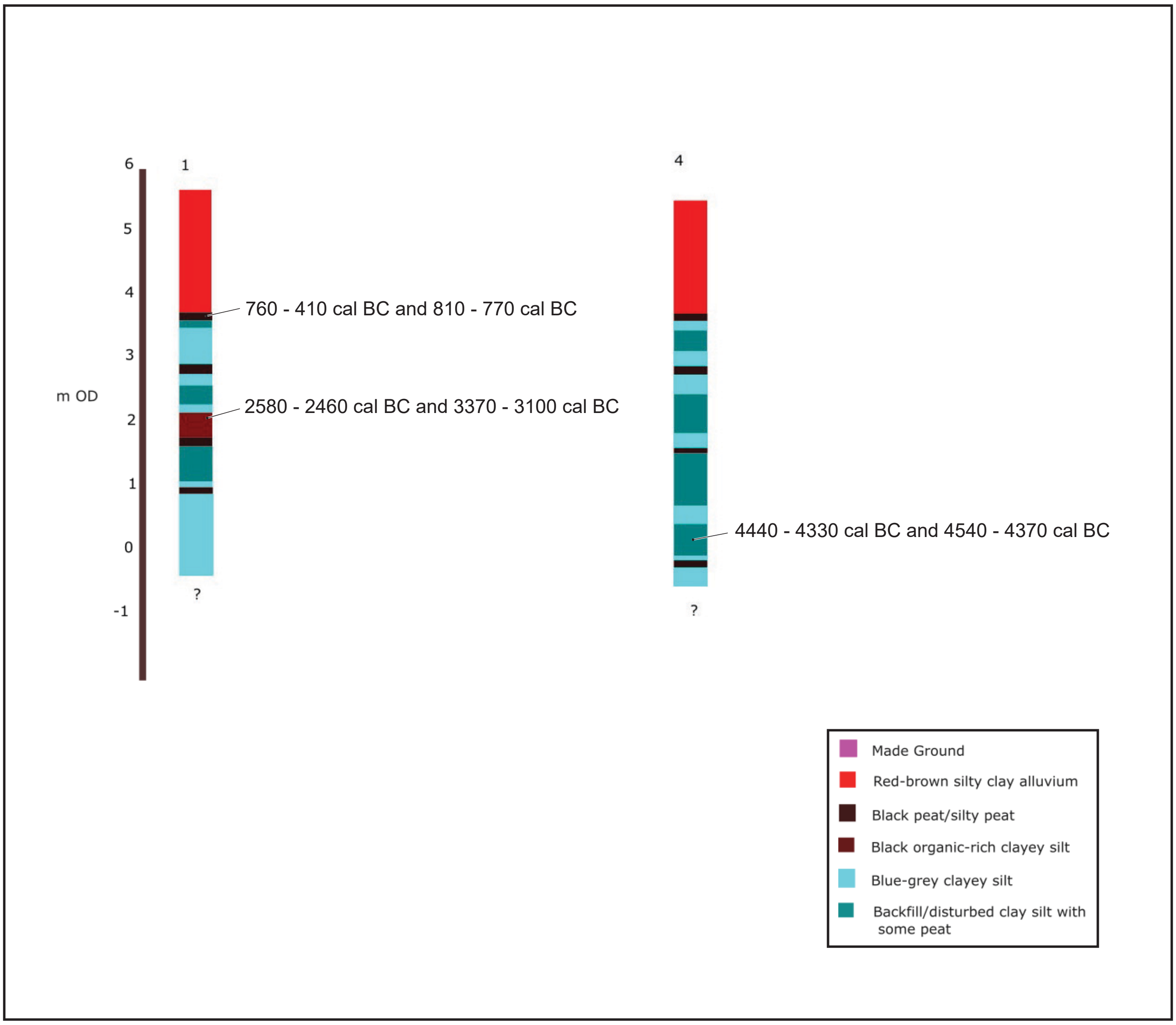
Location plan of borehole transect

Figure 2



Cross section of borehole transect line 1-16

Figure 3



C14 dating in boreholes 1 and 4 *Figure 4*

Plates

Plate 1: BH 2 on edge of field boundary, view southwest

Plate 2: Extant field boundary at south end of site, view west

Plate 3: Field looking southwest from the centre of the site, April 2022

Plate 4: BH 6 location during drilling, view southwest

Plate 5: View across site towards greenhouses from southwest corner of site, view northeast, April 2022

Plate 6: BH 8 location, view west, April 2022

Plate 7: View across site after greenhouse demolition, August 2022, view southwest

Plate 8: BH 10 location, view northwest

Plate 9: BH 16 location, view southeast

Plate 10: View across site after greenhouse demolition, view northeast towards balancing pond

Plate 11: Example of cores labelled and wrapped on site prior to transportation, 1m scale

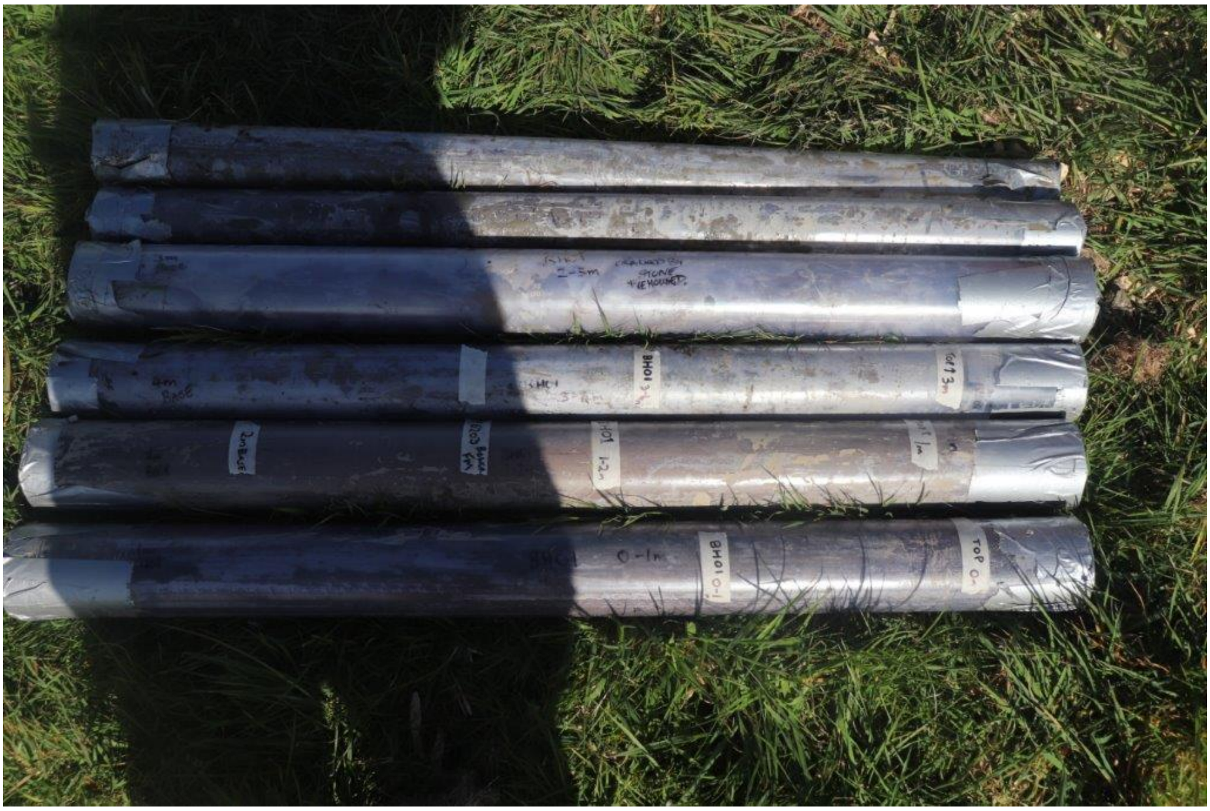


Plate 12: Example of borehole 1 cores labelled and wrapped on site prior to transportation

Appendix 1: Borehole Sediment Descriptions

Transect and Borehole	Depth (below ground level [bgl])	Description of Sediment [INTERPRETATON]
BH1	**Core 1 (0.00-1.00 m)**	
	0.00-0.20	Dark brown (7.5YR 3/2) silty clay, firm, with common, small modern rootlets, gradational base. Sparse shelly fragments and clast of small siltstone at base [TOPSOIL].
	0.20-0.90	Brown [7.5YR 4/3) silty clay. Significantly oxidised and gleyed (to dark greenish grey 5YY 4/1). Common manganese between 0.55 and 0.62m [ALLUVIUM].
	0.90-1.00	No Retention
	Core 2 (1.00-2.00 m)	
	1.00-1.92	Brown to reddish brown (2.5YR 5/3) to dark greenish grey silty clay, firm. Between 1.51 to 1.76, becomes laminated sandy silt (wavey bedding; at base of this laminated sandy silt, there is a clear, irregular contact). After 1.76, transitions to olive greyish green silty clay, clear, sharp and irregular basal contact [ALLUVIUM].
	1.93-2.00	Black to very dark grey (5YR 2.5/1 to 3/1) humified peat, laminated; no visible plant remains [PEAT].
	Core 3 (2.00-3.00 m)	
	2.00—2.16	Grey green silty clay with peat at base [BACKFILL].
	2.16-2.45	Olive greenish grey silty clay, firm, gleyed and oxidised, occasional specks of organic material, gradational base [ALLUVIUM].
	2.45-2.68	Blue grey clayey silt, homogenous. Irregular, clear (mixed) base [ALLUVIUM].
	2.68-2.86	Black humified peat mixed with wavey bands of laminated blue grey silt, 1 small, intact gastropod shell. Mixed base over 2-3cm [PEAT]
	2.86-3.00	Blue grey clayey silt, homogenous [ALLUVIUM]
	Core 4 (3.00-4.00 m)	
	3.00-3.36	[BACKFILL].
	3.36-3.46	Blue grey clayey silt, homogenous. Becomes more organic and mixed at base [ALLUVIUM].

	3.46-3.58	Black grey, peaty silt, very organic between 3.53 and 3.57. Clear irregular base [ORGANIC-RICH ALLUVIUM].
	3.58-3.85	Blue grey clayey silt, homogenous. Between 3.80 and 3.85, clayey silt is mixed with humified peat with some lamination [ALLUVIUM].
	3.85-4.00	Black, humified peat with visible macroscopic remains [PEAT].
	Core 5 (4.00-5.00 m)	
	4.00-4.50	No Retention.
	4.50-4.62	Blue grey silt, homogenous [ALLUVIUM].
	4.62-4.76	Black humified peat, sharp, planar base [PEAT].
	4.76-5.00	Blue grey silt, homogenous, sparse organic fragments and shell material [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.40	Blue silty clay [BACKFILL].
	5.40-5.88	Blue grey clayey silt, homogenous with notable mixed peaty zones (5.44-5.48 and 5.59-5.61). Clear base [ALLUVIUM].
	5.88-6.00	Blue grey silt [ALLUVIUM].
BH 2	**Core 1 (0.00-1.00 m)**	
	O.00-0.30	Dark brown silty clay, sticky to friable, common small modern rootlets and turf mat. Fragment of modern iron at 0.20m, specks of brick at 0.29m, gradational base [TOPSOIL].
	0.30-0.81	Brown [7.5YR 4/3) silty clay, firm. Significantly oxidised and gleyed (to dark greenish grey 5YY 4/1). Small modern rootlets between 0.60 to 0.75m [ALLUVIUM].
	0.81-1.00	No Retention
	Core 2 (1.00-2.00 m)	
	1.00-1.85	Brown to greenish grey silty clay, firm, oxidised and gleyed. Becomes sandy, laminated clayey silt between 1.30 and 1.52, strongly gleyed below 1.62. Irregular, clear base [ALLUVIUM].
	1.85-1.94	Black silty peat/peaty silt, well humified, some lamination. Clear sharp base [PEAT].
	1.94-2.00	Blue grey silty clay [ALLUVIUM].

	Core 3 (2.00-3.00 m)	
	2.00-2.05	Silty clay [BACKFILL].
	2.05-2.39	Blue grey clayey silt, homogenous [ALLUVIUM].
	2.39-3.00	No Retention.
	Core 4 (3.00-4.00 m)	
	3.00-3.16	No Retention.
	3.16-3.40	Blue grey silt, very mixed [BACKFILL].
	3.40-3.56	Blue very silt, organic between 3.53 to 3.56, clear irregular base [ALLUVIUM].
	3.56-3.64	Black, humified peat, clear sharp, irregular base [PEAT].
	3.64-3.78	Blue grey silt, homogenous, clear irregular base [ALLUVIUM].
	3.78-3.96	Black humified peat [PEAT].
	3.96-4.00	No retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.55	No Retention.
	4.55-5.00	Blue grey clayey silt. Notable thin (1cm) peaty silt band at 4.64m and clast of peat between 4.78 to 4.82 [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.33	No Retention.
	5.33-5.64	Blue grey silt, very mixed [BACKFILL?].
	5.64-6.00	Blue grey silt, notable black peat clast at 5.74-5.77, includes small woody fragments; peaty silt between 5.85 and 5.90 [ALLUVIUM].
BH 3	**Core 1 (0.00-1.00 m)**	
	0.00-0.20	Dark brown silty clay, firm to friable. Two small fragments of coal at 0.13m. Gradational base [TOPSOIL].
	0.20-0.89	Brown to greenish grey silty clay, firm, oxidised and gleyed, FIRM [ALLUVIUM].
	0.89-1.00	No Retention.

	Core 2 (1.00-2.00 m)	
	1.00-1.10	BACKFILL
	1.10-1.73	Brown to greenish grey silty clay, firm, and laminated sandy silt oxidised and gleyed. Sharp, wavy erosive base [ALLUVIUM].
	1.73-1.82	Reddish black humified peat, sharp, clear base [PEAT].
	1.82-2.00	Blue grey clayey silt [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.35	No Retention.
	2.35-2.50	Blue grey, sandy silty clay, mixed [BACKFILL].
	2.50-3.00	Blue grey clayey silt, homogenous [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.43	Blue grey silt, homogenous, sharp, clear base [ALLUVIUM].
	3.43-3.44	Black, humified peat [PEAT].
	3.44-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.66	Grey silt mixed with black humified peat, lacks integrity and structure, clear base [BACKFILL].
	4.66-5.00	Blue grey clayey silt with peat laminae at5.76 and 5.82 [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.65	Blue grey clayey silt mixed with black silty peat, some shelly and woody fragments, merging base [BACKFILL].
	5.65-5.79	Blue grey clayey silt with woody material at 5.73m, faint bedding structure, gradational base [ALLUVIUM].
	5.79-5.84	Black silty peat with visible woody fragments, sharp irregular base [PEAT].
	5.84-6.00	Blue grey clayey silt, laminated in upper 3cm, occasional small woody material [ALLUVIUM].
BH 4	**Core 1 (0.00-1.00 m)**	

	0.00-0.20	Strong brown silty clay, firm. Large fragment of brick at 0.18m. Gradational base [TOPSOIL].
	0.20-0.84	Brown to greenish grey silty clay, firm, and laminated sandy silt oxidised and gleyed [ALLUVIUM].
	0.84-1.00	No Retention.
	Core 2 (1.00-2.00 m)	
	1.00-1.73	Brown to greenish grey silty clay, firm; laminated sandy silty clay from 1.25-1.50, oxidised and gleyed, clear sharp base [ALLUVIUM].
	1.73-1.81	Black silty, humified peat, laminated. Clear sharp base [PEAT].
	1.81-2.00	Blue grey silty clay, homogenous [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.26	Peaty, silty clay, mixed [BACKFILL].
	2.26-2.55	Blue grey clayey silt, homogenous, clear irregular sharp base [ALLUVIUM].
	2.55-2.66	Greenish brown silty peat, laminated, with visible plant remains and abundant shell debris and woody material, Clear, irregular (erosive) base [PEAT].
	2.66-3.00	Blue grey clayey silt with reed fragments at 2.73 [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.58	Blue grey silty clay mixed with sandy peat [BACKFILL].
	3.58-3.82	Blue grey clayey silt, organic-rich after 3.70 clear but mixed base [ALLUVIUM].
	3.82-3.87	Black, humified peat [PEAT].
	3.87-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.71	Blue grey silty clay mixed with peat, disrupted structure [BACKFILL].
	4.71-5.00	Blue grey clayey silt with occasional small woody debris and notable laminated woody zone between 4.76 and 4.79 [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.53	Black peat mixed with blue grey clayey silt, disrupted structure [BACKFILL].

	5.53-5.62	Blue grey clayey silt with occasional peat laminae, gradational base [ALLUVIUM].
	5.62-5.68	Black peaty silt, laminated, gradational base [ORGANIC ALLUVIUM].
	5.68-6.00	Blue grey silt, notable peaty laminae to 5.74m [ALLUVIUM].
BH 5	**Core 1 (0.00-1.00 m)**	
	0.00-0.20	Dark brown silty clay, gradational base [Topsoil].
	0.20-0.90	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	0.90-1.00	No Retention
	Core 2 (1.00-2.00 m)	
	1.00-1.68	Brown to greenish grey silty clay, firm, oxidised and gleyed, laminated sandy silty clay between 1.20 and 1.50, very gleyed after 1.50 and peaty silt between 1.64 and 1.68, gradational base [ALLUVIUM].
	1.68-1.70	Black, humified silty peat, clear erosive base (PEAT)
	1.70-1.73	Blue grey clayey silt [ALLUVIUM].
	1.73-2.00	No retention.
	Core 3 (2.00-3.00 m)	
	2.00-2.25	Blue silt mixed with black peat [BACKFILL].
	2.25-2.80	Blue grey clayey silt, occasional small gastropod shells, Clear planar base [ALLUVIUM].
	2.80-2.86	Grey, peaty silt with common shelly material and occasional larger wooden fragments [ALLUVIUM].
	2.86-3.00	No Retention.
	Core 4 (3.00-4.00 m)	
	3.00-3.21	Blue grey clayey silt, some laminations. Gradational merging base [ALLUVIUM].
	3.21-3.35	Grey, shelly silt, gastropods both fragmented and intact, clear gradational base [ALLUVIUM].
	3.35-3.64	Blue grey clayey silt, gradational base [ALLUVIUM].
	3.64-3.70	Blackish blue peaty silt, gradational base [ALLUVIUM].

	3.70-3.96	Black, humified peat, silty between 3.74 and 3.78 [PEAT].
	3.96-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.47	Blue grey silt, mixed and unstructured [BACKFILL].
	4.47-4.60	Reddish black humified peat, mixed and unstructured [BACKFILL].
	4.60-4.71	Reddish black peat, laminated, firm, clear erosive base [PEAT].
	4.71-5.00	Blue grey silt, homogenous [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.15	Blue grey silty clay, unstructured [BACKFILL].
	5.15-5.24	Grey shelly peat, unstructured [BACKFILL].
	5.24-5.53	Blue grey silty clay mixed with peat, unstructured [BACKFILL].
	5.53-6.00	Blue grey clayey silt with band of silty peat between 5.87 and 5.90 [ALLUVIUM]
BH 6	**Core 1 (0.00-1.00 m)**	
	0.00-0.20	Dark brown silty clay, firm with straw roots, gradational base [TOPSOIL].
	0.20-0.85	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	0.85-1.00	No Retention
	Core 2 (1.00-2.00 m)	
	1.00-1.10	Brown to grey silty clay, unstructured [BACKFILL].
	1.10-1.88	Brown to greenish grey silty clay, firm, oxidised and gleyed, laminated sandy silty clay between 1.42 and 1.61, very gleyed after 1.61, Gradational peaty base over 3cm [ALLUVIUM].
	1.88-1.94	Black humified peat [PEAT].
	1.94-2.00	No Retention
	Core 3 (2.00-3.00 m)	
	2.00-2.06	Mixed peat and silty clay [BACKFILL].
	2.06-2.70	Blue grey clayey silt, homogenous [ALLUVIUM].

	2.70-3.00	No Retention
	Core 4 (3.00-4.00 m)	
	3.00-3.20	No Retention
	3.20-3.46	Blue grey clay, sharp irregular base [ALLUVIUM].
	3.46-3.52	Black humified peat [PEAT].
	3.52-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.40	Blue grey clay mixed with clast of peat between 4.27 and 4.30, unstructured (BACKFILL].
	4.40-4.53	Blue grey clay mixed with unstructured peat [BACKFILL].
	4.53-4.60	Black humified peat, unstructured [PEAT/BACKFILL?].
	4.60-5.00	Blue grey clay, firm, slightly peaty in lowest 2-3cm [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.22	Blue grey clayey silt, firm, clear erosive base. Some mixing with peat in the lowest 2cm [ALLUVIUM].
	5.22-5.36	Black humified peat, mixed with silt at the base over 3cm [PEAT].
	5.36-5.74	Blue grey clayey silt, occasional peat material, sharp, planer base [ALLUVIUM].
	5.74-5.76	Thin band of black peat, sharp, clear base [PEAT].
	5.76-6.00	Blue grey laminated silt with occasional peaty material [ALLUVIUM].
BH 7	**Core 1 (0.00-1.00 m)**	
	0.00-0.08	Brown silty clay, firm but friable with modern small rootlets. Small clast at base [TOPSOIL].
	0.08-0.30	Large, crushed limestone clasts [MADE GROUND].
	0.30-0.80	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	0.80-1.00	No Retention.
	Core 2 (1.00-2.00 m)	

	1.00-1.13	Large, crushed limestone clasts [MADE GROUND].
	1.13-1.68	Brown to greenish grey silty clay, firm, oxidised and gleyed, laminated and sandy between 1.30 to 1.45, strongly gleyed after 1.45. Gradational base with peat over 2-3cm [ALLUVIUM].
	1.68-1.74	Black, silty peat, laminated with visible small woody fragments. Sharp, irregular (erosive base) [PEAT].
	1.74-2.00	Blue grey clayey silt, firm, homogenous [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.17	Brown silty clay with fractured large limestone clasts [BACKFILL of MADE GROUND].
	2.17-3.00	Blue grey clayey silt, firm, homogenous with occasional plant material [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.20	Brown silty clay with fractured large limestone clasts [BACKFILL of MADE GROUND].
	3.20-3.50	Blue grey clayey silt, plastic and unstructured (BACKFILL].
	3.50-3.66	Blue grey clayey silt, firm, planar erosive base [ALLUVIUM].
	3.66-3.74	Black, humified peat, irregular clear base [PEAT].
	3.74-3.90	Interbedded unit of blue grey clay and black humified peat, mixed base over 2 cm [ORGANIC ALLUVIUM].
	3.90-4.00	Black humified peat [PEAT].
	Core 5 (4.00-5.00 m)	
	4.00-4.30	Blue grey clayey silt, plastic and unstructured [BACKFILL].
	4.30-4.46	Blue grey clayey silt, sharp, irregular base [ALLUVIUM].
	4.46-4.60	Grey black silty peat, merging lower contact [PEAT].
	4.60-5.00	Blue grey clayey silt, notable organic clast at 5.72 and organic laminae between 5.81 and 5.85 [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.50-5.50	Blue grey silty clay, unstructured and plastic [BACKFILL].
	5.50-5.85	Blue grey clayey silt, firm, occasional vegetation [ALLUVIUM].

	5.85-6.00	Blue grey clayey silt, firm, common peaty bands and small woody fragments [ALLUVIUM].
BH 8	**Core 1 (0.00-1.00 m)**	
	0.00-0.16	Dark brown silty clay, gradational base [TOPSOIL].
	0.16-0.82	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	0.82-1.00	No Retention.
	Core 2 (1.00-2.00 m)	
	1.00-1.75	Brown to greenish grey silty clay, firm, oxidised and gleyed, clear erosive, irregular base, sandy and laminated between 1.34 and 1.53, strongly gleyed below 1.53 [ALLUVIUM].
	1.75-1.80	Black humified peat, laminated, irregular, sharp (erosive) base) [PEAT].
	1.80-2.00	Blue grey clayey silt [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.40	No Retention.
	2.40-2.74	Brown silty clay, plastic and unstructured [BACKFILL].
	2.74-3.00	Blue grey clayey silt [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.22	Blue brown grey clayey silt, plastic and unstructured [BACKFILL].
	3.22-3.59	Blue grey clayey silt, firm, homogenous, clear base [ALLUVIUM].
	3.59-3.64	Black humified peat [PEAT].
	3.64-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.40	Blue grey clayey silt, plastic, unstructured, occasional peaty material [BACKFILL].
	4.40-4.63	Blue grey clayey silt, firm, homogenous, irregular sharp base [ALLUVIUM].
	4.63-4.70	Black humified peat, sharp, irregular (erosive) base [PEAT].
	4.70-5.00	Blue grey clayey silt, occasional peaty clasts [ALLUVIUM].

	Core 6 (5.00-6.00 m)	
	5.00-5.48	Blue grey clayey silt, plastic and unstructured [BACKFILL?].
	5.48-5.51	Black, humified peat clast, clear, erosional base [PEAT].
	5.51-5.72	Blue grey clayey silt with common small clasts of peat, gradational base [ALLUVIUM].
	5.72-5.76	Peaty silt, laminated, clear irregular base [ORGANIC ALLUVIUM].
	5.76-5.92	Blue grey clayey silt with common peaty laminations after 5.82, clear, wavey base [ALLUVIUM].
	5.92-5.97	Black humified peat, laminated, clear erosive base [PEAT].
	5.97-6.00	Blue grey clayey silt [ALLUVIUM].
BH 9	**Core 1 (0.00-1.00 m)**	
	0.00-0.05	No Retention
	0.05-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.20	Oxidised and gleyed silty clay [BACKFILL].
	1.20-1.70	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, irregular base [ALLUVIUM].
	1.70-1.80	Black, laminated, humified silty peat. Some visible macroscopic plant remains near base and specks of shell material. Notably more silty in upper and lower 2cm and base gradational [PEAT].
	1.80-2.00	Blue-grey clays silt. Notable plant remains fragments at 1.88 and 1.91m [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.60	No Retention.
	2.60-2.71	Mixed blue grey silt and peat [BACKFILL].
	2.71-3.00	Blue grey clayey silt, faintly laminated [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.35	No Retention.

	3.35-3.72	Mixed clayey silt [BACKFILL].
	3.72-3.84	Greenish grey clayey silt, clear, irregular base [ALLUVIUM].
	3.84-4.00	Black, humified peat, though occasional visible plant remains with laminated siltier band between 3.92 and 3.96m with intact gastropod shells [SILTY PEAT/PEAT].
	Core 5 (4.00-5.00 m)	
	4.00-4.13	No Retention.
	4.13-4.44	Grey blue clayey silt, some loss of integrity between 4.24 and 4.30 m. Clear, irregular base [ALLUVIUM].
	4.44-4.55	Black, humified peat. Sharp, irregular base [PEAT].
	4.55-4.82	Grey blue clayey silt, white specks indicative of degraded molluscs, faintly laminated [ALLUVIUM].
	4.82-5.00	No Retention.
	Core 6 (5.00-6.00 m)	
	5.00-5.05	No Retention.
	5.05-5.40	Mixed grey silt and black peaty material, no structure [BACKFILL].
	5.40-5.53	Grey blue clayey silt. Clear but irregular lower contact, occasional reed fragments [ALLUVIUM].
	5.53-5.62	Black, laminated, humified silty peat. Occasional plant remains. Clear, gradational base [PEAT].
	5.62-5.90	Blue grey clayey silt with thin peaty bands, notably around 5.70 to 5.72 and 5.84 to 5.90 m. Clear, but gradational base [ORGANIC ALLUVIUM].
	5.90-5.96	Black, laminated, humified silty peat, occasional visible plant remains, Sharp, irregular lower contact [SILTY PEAT/PEAT].
	5.96-6.00	Grey blue clayey silt [ALLUVIUM].
BH 10	**Core 1 (0.00-1.00 m)**	
	0.00-0.33	Stiff, desiccated red-brown clay broken up into large clasts. Clear, gradational base [ALLUVIUM].
	0.33-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	Core 2 (1.00-2.00 m)	

	1.00-1.10	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	1.10-1.53	Brown to greenish grey silty clay, firm, oxidised and gleyed. Notable sandy laminations between 1.15-1.30 m [ALLUVIUM].
	1.53-1.65	Black, faintly laminated, humified silty peat / peaty silt forming alternating bands. Clear, gradational base [PEAT/ORGANIC ALLUVIUM].
	1.65-2.00	Blue grey clayey silt, faintly laminated with specks of shell [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.30	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	2.30-2.38	Brown clay, sticky and mixed [BACKFILL].
	2.38-3.00	Blue grey clayey silt, faintly laminated with occasional intact gastropod shells [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.30	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	3.30-3.76	Blue grey clayey silt, lacks structure and mixed [BACKFILL?].
	3.76-3.91	Blue grey clayey silt. Sharp, irregular base [ALLUVIUM].
	3.91-3.96	Reddish black, humified peat, faintly laminated [PEAT].
	3.96-4.00	No Retention.
	Core 5 (4.00-5.00 m)	
	4.00-4.15	No Retention.
	4.15-4.40	Blue grey clayey silt. Mixed and lacks structure [BACKFILL].
	4.40-4.56	Blue grey clayey silt. Clear, irregular base [ALLUVIUM].
	4.56-4.62	Red black, humified peat, woody fragments. Merging base [PEAT].
	4.62-4.68	Blue grey silt, peat rich laminae, merging base [ORGANIC ALLUVIUM].
	4.68-5.00	Blue grey clayey silt, laminated in places. Notably organic between 5.86 and 5.90 m. [ORGANIC ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.38	No Retention.
	5.38-5.56	Blue grey clayey silt, mixed without structure [BACKFILL].

	5.56-5.67	Blue grey clay, Sharp irregular base [ALLUVIUM].
	5.67-5.69	Red black humified peat, Sharp, but irregular base [PEAT].
	5.69-5.91	Blue grey clayey silt. Occasional specks of degraded mollusc. Sharp, irregular base. [ALLUVIUM].
	5.91-6.00	Laminated bands of clayey silt and peat. Very peaty between 5.91 and 5.92 and 5.99-6.00 m [PEAT/ORGANIC ALLUVIUM].
BH 11	**Core 1 (0.00-1.00 m)**	
	0.00-0.30	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	0.30-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.60	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sandy laminations between 1.20 and 1.45 m. Sharp, irregular base [ALLUVIUM].
	1.60-1.67	Black, laminated and humified silty peat. Sharp but inclined erosive base [PEAT].
	1.67-2.00	Greenish, grey blue clayey silt [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.30	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	2.30-2.50	Blue grey clayey silt, mixed and unstructured [BACKFILL].
	2.50-3.00	Blue grey clayey silt. Occasional intact gastropod shells and red material around 2.87 m [ALLUVIUM].
	Core 4 (3.00-4.00 m)	
	3.00-3.30	No Retention.
	3.30-3.66	Blue grey clayey silt, mixed and unstructured [BACKFILL].
	3.66-3.77	Blue grey clayey silt. Occasional intact gastropods, faintly laminated, Sharp, planar base [ALLUVIUM].
	3.77-3.80	Laminated units of clayey silt and peat. Irregular sharp base [PEAT/ORGANIC ALLUVIUM].
	3.80-3.96	Red black humified peat, with occasional plant remains. Sharp, irregular base [PEAT].

	3.96-4.00	Blue grey clayey silt [ALLUVIUM].
	Core 5 (4.00-5.00 m)	
	4.00-4.15	No Retention.
	4.15-4.28	Greenish blue grey clayey silt. Mixed and lacks structure [BACKFILL].
	4.28-4.45	Black to blue grey, mixed clayey silt and peat unit. Lack of structure [BACKFILL].
	4.45-4.52	Black, humified peat, unconsolidated, sharp erosional base [PEAT].
	4.52-5.00	Blue grey clayey silt. Occasional specks of shell material. Laminated between 4.66 and 4.90 m. Laminae occasionally organic [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.23	No Retention
	5.23-5.45	Blue grey clayey silt, unstructured and mixed [BACKFILL].
	5.45-5.56	Blue grey clayey silt. Merging, irregular base [ALLUVIUM].
	5.56-5.60	Black humified peat, some visible plant remains. Sharp irregular base [PEAT].
	5.60-5.82	Bluish grey clayey silt with occasional plant remains. Gradational base [ALLUVIUM].
	5.82-6.00	Alternating bands of clayey silt and peaty silt/silty peat. Notably peaty between 5.82 and 5.88 and 5.98 and 6.00 m.
BH 12	**Core 1 (0.00-1.00 m)**	
	0.00-0.77	Stiff, desiccated red-brown clay broken up into large clasts. Modern glass shards at 0.35 m [BACKFILL].
	0.77-0.85	Brown to greenish grey silty clay, firm, oxidised and gleyed [ALLUVIUM].
	0.85-1.00	No Retention.
	Core 2 (1.00-2.00 m)	
	1.00-1.20	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	1.20-1.67	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	1.67-1.74	Black, laminated, humified silty peat. Sharp, irregular base [PEAT].

	1.74-2.00	Blue grey clay. Occasional organic laminae and plant remains [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.25	Red brown clay [BACKFILL].
	2.25-2.99	Blue grey clayey silt [ALLUVIUM].
	2.99-3.00	Black humified peat [PEAT].
	Core 4 (3.00-4.00 m)	
	3.00-3.40	No Retention.
	3.40-3.80	Blue grey clayey silt. Unstructured and mixed. Merging base [BACKFILL].
	3.80-3.97	Black, humified peat. Sharp, irregular base [PEAT].
	3.97-4.00	Blue grey clayey silt [ALLUVIUM].
	Core 5 (4.00-5.00 m)	
	4.00-4.55	No Retention.
	4.55-4.69	Mixed clayey silt and peat, lacks structure [BACKFILL].
	4.69-5.00	Blue grey clayey silt. Notable plant fragments at 4.80m [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.46	No Retention.
	5.46-5.70	Mixed clayey silt and peaty fragments, lacks structure [BACKFILL].
	5.70-5.84	Blue grey clayey silt. Gradational base [ALLUVIUM].
	5.84-6.00	Alternating bands of silty peat and peaty silt [ORGANIC ALLUVIUM].
BH 13	**Core 1 (0.00-1.00 m)**	
	0.00-0.77	Stiff, desiccated red-brown clay broken up into large clasts. Plastic coring shoe embedded at 0.53 m [BACKFILL].
	0.77-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.10	No Retention.

	1.10-1.40	Stiff, desiccated red-brown clay broken up into large clasts [BACKFILL].
	1.40-1.74	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, irregular base [ALLUVIUM]
	1.74-1.86	Black, laminated silty peat/peaty silt. Very peaty between 1.79 and 1.82 m. Gradational base [PEAT/ORGANIC ALLUVIUM].
	1.86-2.00	Blue grey clayey silt. Occasional fibrous plant remains [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.10	Red brown silty clay [BACKFILL].
	2.10-2.97	Blue grey clayey silt [ALLUVIUM].
	2.97-3.00	Black, humified peat [PEAT].
	Core 4 (3.00-4.00 m)	
	3.00-3.40	No Retention.
	3.40-3.50	Red brown silty clay [BACKFILL].
	3.50-3.58	Blue grey clayey silt. Sharp, irregular base (loaded?) [ALLUVIUM].
	3.58-3.77	Red brown woody, humified peat. Clear, irregular base [PEAT].
	3.77-4.00	Blue grey clayey silt [ALLUVUM].
	Core 5 (4.00-5.00 m)	
	4.00-4.40	Mixed blue grey clayey silt and red brown silty clay [BACKFILL].
	4.40-5.00	Grey blue clayey silt, sandy laminations between 4.40 and 4.60 m [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.17	No Retention.
	5.17-5.50	Grey blue clayey silt mixed with red brown silty clay [BACKFILL].
	5.50-5.78	Blue grey clayey silt, occasional intact gastropods. Merging base over 2cm [ALLUVIUM].
	5.78-6.00	Alternating bands of peaty clayey silt and silty peat. Notably peaty between 5.80-5.84, 5.88-5.89 and 5.98-6.00 m [ORGANIC ALLUVIUM/PEAT].

BH 14	**Core 1 (0.00-1.00 m)**	
	0.00-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.52	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	1.52-1.64	Black, laminated, humified silty peat. Gradational base over 2cm [PEAT].
	1.64-2.00	Blue grey clayey silt [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.38	No Retention.
	2.38-2.86	Blue grey clayey silt. Merging base over 1cm [ALLUVIUM].
	2.86-3.00	Black silty peat becoming fully humified peat after 2.96m [SILTY PEAT/PEAT].
	Core 4 (3.00-4.00 m)	
	3.00-3.28	No Retention.
	3.28-3.50	Blue grey clayey silt, mixed and unstructured [BACKFILL].
	3.50-3.56	Blue grey clayey silt. Sharp irregular base [ALLUVIUM].
	3.56-3.65	Black, humified silty peaty and peat. Gradational base over 2cm [SILTY PEAT/PEAT].
	3.65-4.00	Blue grey clayey silt [ALLUVIUM].
	Core 5 (4.00-5.00 m)	
	4.00-4.58	No Retention.
	4.58-4.72	Blue grey clayey silt mixed with red brown silty clay [BACKFILL].
	4.72-4.90	Blue grey clayey silt [ALLUVIUM].
	4.90-5.00	No Retention.
	Core 6 (5.00-6.00 m)	
	5.00-5.34	No Retention.
	5.34-5.78	Blue grey clayey silt, mixed and unstructured [BACKFILL].

	5.78-5.85	Blue grey clayey silt, Gradational base over 1cm [ALLUVIUM].
	5.85-6.00	Interbedded clayey silt and silty peat units. Notably peaty between 5.86-5.89 and 5.94-5.99 m (ORGANIC ALLUVIUM].
BH 15	**Core 1 (0.00-1.00 m)**	
	0.00-0.50	Desiccated red-brown clay broken into clasts [BACKFILL].
	0.50-0.75	Desiccated red-brown clay with crushed aggregate [MADE GROUND]
	0.75-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.15	Desiccated red-brown clay with crushed aggregate [BACKFILL].
	1.15-1.53	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	1.53-1.60	Black, humified silty peat. Gradational base [PEAT].
	1.60-2.00	Blue grey clayey silt. Notably organic between 1.67 to 1.71 m [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.15	No Retention.
	2.15-2.45	Blue grey clayey silt mixed with red brown silty clay, some crushed aggregate [BACKFILL].
	2.45-2.89	Blue grey clayey silt. Notably shelly between 2.52-2.53 and 2.59-264 m. Gradational base over 1cm [ALLUVIUM].
	2.89-3.00	Black, humified peat, faintly laminated [PEAT].
	Core 4 (3.00-4.00 m)	
	3.00-3.20	No Retention.
	3.20-3.50	Mixed blue grey clayey silt and red brown silty clay [BACKFILL].
	3.50-3.65	Black, humified peat. Sharp, irregular base [PEAT].
	3.65-4.00	Blue grey clayey silt [ALLUVIUM].
	Core 5 (4.00-5.00 m)	

	4.00-4.20	No Retention.
	4.20-4.66	Mixed clayey silt, unstructured, includes peaty material between 4.32 and 4.44 [BACKFILL ?].
	4.66-5.00	Blue grey clayey silt. Sandy laminations between 4.80-4.85 [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.50	Blue grey clayey silt mixed with red brown silty clay [BACKFILL].
	5.50-5.73	Blue grey clayey silt. Sharp planar base [ALLUVIUM].
	5.73-5.96	Black, laminated, humified silty peat/peat. Sharp, irregular base [SILTY PEAT/PEAT].
	5.96-6.00	Blue grey clayey silt [ALLUVIUM].
BH 16	**Core 1 (0.00-1.00 m)**	
	0.00-0.20	No Retention.
	0.20-0.69	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base. Glass at 0.48 and crushed aggregate at 0.70 m [ALLUVIUM MIXED WITH MADE GROUND].].
	0.69-1.00	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, planar base [ALLUVIUM].
	Core 2 (1.00-2.00 m)	
	1.00-1.69	Brown to greenish grey silty clay, firm, oxidised and gleyed. Sharp, irregular base [ALLUVIUM].
	1.69-1.80	Black, laminated, humified silty peat. Gradational base over 2cm [SILTY PEAT].
	1.80-2.00	Blue grey clayey silt with common organic fragments [ALLUVIUM].
	Core 3 (2.00-3.00 m)	
	2.00-2.16	No Retention.
	2.16-2.26	Mixed blue grey clayey silt and red brown silty clay [BACKFILL].
	2.26-2.56	Blue grey clayey silt, merging basal contact [ALLUVIUM].
	2.56-2.70	Greenish grey organic silt with common, intact gastropods. Merging base [ORGANIC ALLUVIUM].

	2.70-2.85	Blue grey clayey silt. Clear, irregular base [ALLUVIUM].
	2.85-3.00	Black, humified peat with woody material [PEAT].
	Core 4 (3.00-4.00 m)	
	3.00-3.39	No Retention.
	3.39-3.50	Mixed blue grey clayey silt and peat, unstructured [BACKFILL].
	3.50-3.61	Red black peat with woody remains. Clear, planar base [PEAT].
	3.61-4.00	Blue grey clayey silt, woody at 3.68 m [ALLUVIUM].
	Core 5 (4.00-5.00 m)	
	4.00-4.16	No Retention.
	4.16-4.60	Mixed blue grey clayey silt and pet, unstructured [BACKFILL].
	4.60-5.00	Blue grey clayey silt, sandy laminations between 4.68-4.73 m [ALLUVIUM].
	Core 6 (5.00-6.00 m)	
	5.00-5.37	No Retention.
	5.37-5.40	Mixed blue grey clayey silt and pet, unstructured [BACKFILL].
	5.40-5.85	Blue grey clayey silt, common plant material. Merging base over 1cm [ALLUVIUM].
	5.85-6.00	Black, laminated silty peat, notably peaty between 5.86-5.89 and 5.97-6.00 SLTY PEAT/PEAT].

Appendix 2: Digital Photographic Record of Cores

BH 1

BH 2


BOWER Fm, BH ② Core ①, 0-1m


BOWER Fm, BH ② Core ②, 1-2m


BOWER Fm, BH ② Core ③, 2-3m


BOWER Fm, BH ② Core ④, 3-4m


BOWER Fm, BH ② Core ⑤, 4-5m


BOWER Fm, BH ② Core ⑥, 5-6m

BH 3


Bower Fm, BH 3 Core 1, 0 – 1m


Bower Fm, BH 3 Core 2, 1–2m


Bower Fm, BH 3 Core 3, 2–3m


Bower Fm, BH 3 Core 4, 3–4m


Bower Fm, BH 3 Core 5, 4–5m


Bower Fm, BH 3 Core 6, 5-6m

BH 4


Bower fm, BH 4 Core 1, 0-1m


Bower fm, BH 4 Core 2, 1-2m

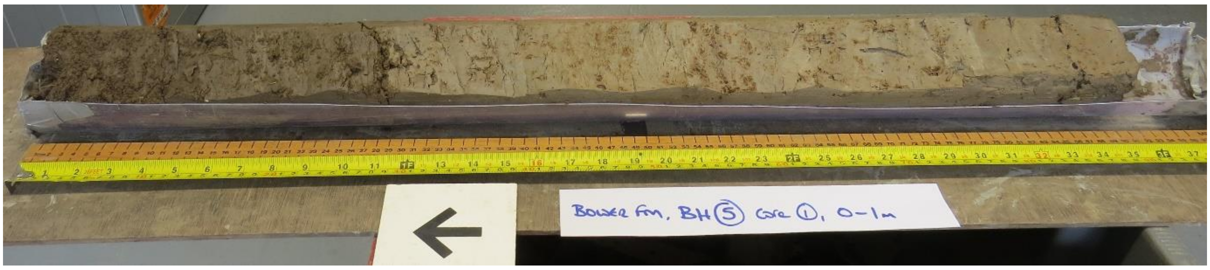

Bower fm, BH 4 Core 3, 2-3m


Bower Fm, BH 4 Core 4, 3-4m

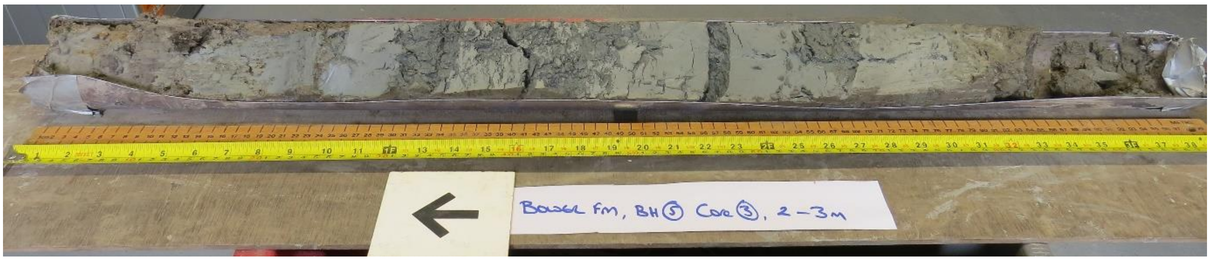

Bower fm, BH 4 Core 5, 4-5m

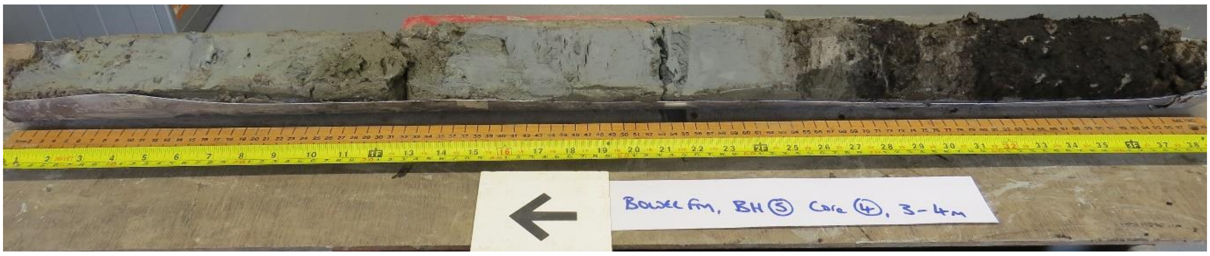

Bower fm, BH 4, Core 6, 5-6m

BH 5


Bowser fm, BH ⑤ Core ①, 0-1m


Bowser fm, BH ⑤ Core ②, 1-2m


Bowser fm, BH ⑤ Core ③, 2-3m


Bowser fm, BH ⑤ Core ④, 3-4m


Bowser fm, BH ⑤, Core ⑤, 4-5m


Bowser fm, BH ⑤, Core ⑥, 5-6m

BH 6


Bower Fm, BH 6 Core 1, 0-1m


Bower Fm, BH 6 Core 2, 1-2m


Bower Fm, BH 6 Core 3, 2-3m


Bower Fm, BH 6 Core 4, 3-4m


Bower Fm, BH 6 Core 5, 4-5m


Bower Fm, BH 6 Core 6, 5-6m

BH 7


Bower Fm, BH 7 Core 1, 0-1m


Bower Fm, BH 7 Core 2, 1-2m


Bower Fm, BH 7 Core 3, 2-3m


Bower Fm, BH 7 Core 4, 3-4m


Bower Fm, BH 7 Core 5, 4-5m


Bower Fm, BH 7 Core 6, 5-6m

BH 8


Bower Fm, BH 8 Core 1, 0-1m


Bower Fm, BH 8 Core 2, 1-2m


Bower Fm, BH 8 Core 3, 2-3m


Bower Fm, BH 8 Core 4, 3-4m


Bower Fm, BH 8 Core 5, 4-5m


Bower Fm, BH 8 Core 6, 5-6m

BH 9


Bower Farm - BH 9 - Core 1 (0-1m)


Bower Farm - BH 9 - Core 2 (1-2m)


Bower Farm - BH 9 - Core 3 (2-3m)


Bower Farm - BH 9 - Core 4 (3-4m)


Bower Farm - BH 9 - Core 5 (4-5m)


Bower Farm - BH 9 - Core 6 (5-6m)

BH 10


Bower Farm - BH 10, Core 1 (0-1m)


Bower Farm - BH 10, Core 2 (1-2m)


Bower Farm - BH 10, Core 3 (2-3m)


Bower Farm - BH 10, Core 4 (3-4m)


Bower Farm - BH 10, Core 5 (4-5m)


Bower Farm - BH 10, Core 6 (5-6m)

BH 11


Bower Farm - BH 11, Core 1 (0-1m)


Bower Farm - BH 11, Core 2 (1-2m)


Bower Farm - BH 11, Core 3 (2-3m)


Bower Farm - BH 11, Core 4 (3-4m)


Bower Farm - BH 11, Core 5 (4-5m)


Bower Farm - BH 11, Core 6 (5-6m)

BH 12


Bower Farm - BH 12, Core 1 (0-1m)


Bower Farm - BH 12, Core 2 (1-2m)


Bower Farm - BH 12, Core 3 (2-3m)


Bower Farm - BH 12, Core 4 (3-4m)


Bower Farm - BH 12, Core 5 (4-5m)


Bower Farm - BH 12, Core 6 (5-6m)

BH 13


Bower Farm - BH 13, Core 1 (0-1m)


Bower Farm - BH 13, Core 2 (1-2m)


Bower Farm - BH 13, Core 3 (2-3m)


Bower Farm - BH 13, Core 4 (3-4m)


Bower Farm - BH 13, Core 5 (4-5m)


Bower Farm - BH 13, Core 6 (5-6m)

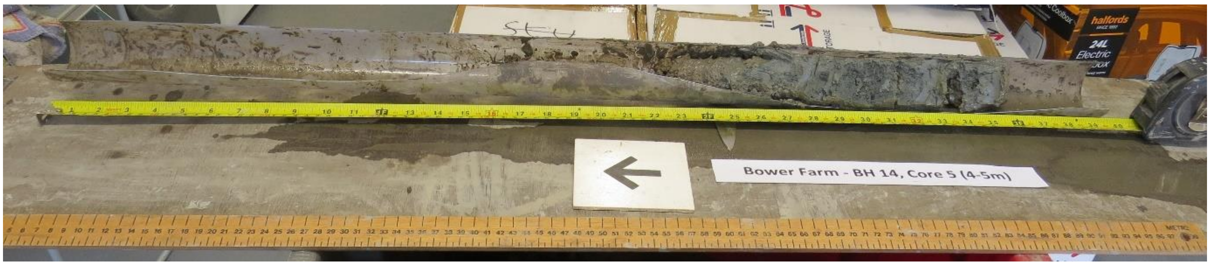
BH 14


Bower Farm - BH 14, Core 1 (0-1m)


Bower Farm - BH 14, Core 2 (1-2m)


Bower Farm - BH 14, Core 3 (2-3m)


Bower Farm - BH 14, Core 4 (3-4m)


Bower Farm - BH 14, Core 5 (4-5m)


Bower Farm - BH 14, Core 6 (5-6m)

BH 15


Bower Farm - BH 15, Core 1 (0-1m)


Bower Farm - BH 15, Core 2 (1-2m)


Bower Farm - BH 15, Core 4 (3-4m)


Bower Farm - BH 15, Core 3 (2-3m)


Bower Farm - BH 15, Core 6 (5-6m)


Bower Farm - BH 15, Core 5 (4-5m)

BH16


Bower Farm - BH 16, Core 1 (0-1m)


Bower Farm - BH 16, Core 2 (1-2m)


Bower Farm - BH 16, Core 3 (2-3m)


Bower Farm - BH 16, Core 4 (3-4m)


Bower Farm - BH 16, Core 5 (4-5m)


Bower Farm - BH 16, Core 5 (4-5m)