Fletching Mill
Fletching
Sussex

Geological Assessment Report

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Geological Assessment Report

FLETCHING MILL
FLETCHING,
SUSSEX

Geoarchaeological Assessment Report

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SUMMARY

In October 2008, Oxford Archaeology (OA) carried out an auger survey at Fletching Mill, near Fletching, East Sussex. The investigation was commissioned by Nexus Heritage on behalf of Royal Haskoning for the Environmental Agency in advance of planned re-meandering work at the site. The survey aimed to investigate a potential medieval moated manor sequence and recover samples for palaeo-environmental assessment.

Sixteen auger holes were undertaken within two ditch sequences that surround a well preserved flat rectangular earthwork interpreted as a potential medieval moated manor. The ditches extended to a maximum depth of 1.76m below the platform. Bedrock was encountered at the base of the ditches at a depth of 1.27m. A sequence of waterlogged fluvial clays overlying bedrock was identified indicative of low-energy waterlain deposits. The sedimentary and environmental evidence indicated deep flowing conditions existed within the ditches. This evidence suggested that the ditches must have at some point been connected to the River Ouse. These deposits were overlain by 0.60m of organic rich clayey silts and sands, which formed within a damp ditch environment. Evidence of structural material intermittently dispersed within the southern ditch sequence between these two deposits, may suggests the proximity of a medieval/post medieval brick built structure. Overlying the ditch sequence was a thin topsoil and leaf litter.

The ditch sequences are consistent in terms of their form, dimensions and sedimentation with other moated sites within the area. The ditch sequences indicate a high degree of consistency within the ditch fills which imply that they were once connected and formed part of a moated rectangular enclosure. The ditches must have been connected to the river via the leats that can be seen extending to the north of the site. Other possible features that could produce a similar sedimentary sequence include various fishponds, watering and garden features and these should also be considered.

The alluvial deposits have remained waterlogged and should be considered of palaeo-environmental interest. The sequence was found to have good potential for the preservation of waterlogged plant remains, insects, pollen and diatoms. Organic material is also present and would be suitable for radio carbon dating. A programme of dating for the lower sequence has been recommended in order to confirm the dating of these earthworks.

It is expected that any proposed work in this area may have a potential impact on this site. This sequence will be vulnerable to direct and indirect impactions that may be involved in any remodelling work within or near to the earthworks.

Acknowledgements

Oxford Archaeology would like to thank Gerry Wait and Kate Page-Smith of Nexus Heritage Ltd.

The fieldwork and report was undertaken by Laura Strafford and Carl Champness of OA's Geoarchaeological Services Department. The project was managed by Elizabeth Stafford.

FLETCHING MILL, EAST SUSSEX

Geoarchaeological Assessment Report

NGR TR 422 229

1 INTRODUCTION

1.1 Location and scope of work

1.1.1 Oxford Archaeology (OA) has been commissioned by Nexus Heritage on behalf of the Royal Haskoning Ltd to undertake an auger survey at Fletching Mill, near Fletching in East Sussex (NGR: TQ 422 229). The investigation is required prior to proposed re-meandering work at the site. The primary aim of the survey is to establish the variability in a potential medieval moated manor ditch sequence and provide samples suitable for palaeoenvironmental assessment.

1.1.2 It is likely that any re-meandering work may have some impact on archaeological remains that underlie the site and that these impacts will need to be addressed before any such work is carried out. Accordingly Royal Haskoning Ltd has appointed Nexus Heritage to act on their behalf in relation to ensuring that archaeological and historical remains are appropriately considered during the process of development.

1.1.3 This report sets out the results of the auger survey and details the geoarchaeological dataset that OA have generated in order to assess the geoarchaeological and palaeoenvironmental potential of the ditch sequences.

1.2 Location, topography and geology

1.2.1 The site is an area of grassland situated on the western bank of the River Ouse. The remains consist of a flat rectangular area, which is surrounded on three sides by ditches. These ditches are heavily vegetated with bushes and trees, and contain remnant ponds. The site is considered to be a possible medieval moated manor house although this is still to be confirmed.

1.2.2 The site is level, approximately 15.7m OD, but contains a number of subtle internal earthworks. At its widest point the site is approximately 60m east to west by 100m north to south.

1.2.3 The site is situated on alluvial deposits of the River Ouse. The solid geology is mapped as Upper Tunbridge Wells Sands Formation, which consists of sandstone, siltstone and Mudstone from the Valanginian. This is overlain by 1st River Terrace and Head gravel deposits that outcrop towards the west (BGS sheet 303).

1.3 Archaeological and historical background

1.3.1 A Desk-based assessment (DBA) specific to the proposal area has been undertaken by Nexus Heritage (Nexus 2008). This details comprehensively previous archaeological work and assesses the site's potential through the archaeological data and historic map regressions. The archaeological and historical background is not reproduced in any great detail here. However, the main key points are briefly outlined here for the purposes of this report.

1.3.2 The area has produced a number of archaeological artefacts ranging from the Palaeolithic through to the present day. Palaeolithic and Neolithic artefacts in particular are abundant. Evidence from the Bronze Age through to the Saxon period is less significant.

1.3.3 There is considerable evidence from the medieval period. The earthworks present on the site are comparable with those of a medieval moated homestead, and ESHER has recorded these earthworks as a moat (ESHER No: MES3160, TQ342 230). Medieval pottery, dating from the mid 13th to mid 14th century has also been discovered to the south of the site (ESHER No: MES3155; TQ 424 229). Post medieval evidence on the site is also rich, with the establishment of a corn mill, converted from an earlier iron forge c.1700 (ESHER No: MES3126; TQ 423 230) and Mill Farm House.

1.3.4 This area was transformed significantly between 1790 and 1812 due to the Upper Ouse Navigation Act, when a number of canals and associated features were introduced. All that remains of this now are a lock, weir and two sluices situated to the south of the site.

2 AIMS AND OBJECTIVES

2.1.1 The overall aim of the auger survey was to describe the ditch sediment sequences, discuss the environments of deposition and to retrieve samples suitable for palaeoenvironmental assessment.

2.1.2 Specifically the monitoring was intended to:

- Characterise the sequence of sediments and patterns of accumulation across the site, including the depth and lateral extent of major stratigraphic units.
- Identify the environments of deposition within the moat and highlight any archaeological deposits which could help to inform about activity within the possible manor.

- Identify the location and extent of any waterlogged organic deposits and to retrieve suitable samples from these deposits in order to assess the potential for the preservation of palaeoenvironmental remains and material for scientific dating.

- Consider how any waterlogged deposits which were found could be affected by proposed hydrological changes.

3 METHODOLOGY

3.1 Auger Survey

3.1.1 Sixteen auger locations were taken along the length of the two ditches, as evenly spaced as the thick vegetation would allow. Where it was possible, one transect also extended across the ditch in order to to establish a profile across the potential moat.

3.1.2 The augering was undertaken using a standard hand operated soil auger with a screw head. Each location was augered to bedrock, or until an impenetrable obstruction was encountered. The sediment recovered at each location was recorded on a summary performa sheet and significant layers identified and described using standard geological terminology such as colour, texture, compaction and inclusions, following Jones *et al.* 1999.

3.1.3 A stratified sequence of palaeoenvironmental samples was taken at various points throughout the ditch sequence and each given a unique sample number in accordance with OA sampling guidelines (OA 2005). The location of each sample was surveyed in using tapes and a dumpy level.

3.2 Palaeoenvironmental assessment

3.2.1 The samples were processed for the assessment of a suite of palaeoenvironmental indicators including waterlogged and/or charred plant remains and insects. Each sample was hand floated in a bucket onto a 250µm mesh, with the flot and residue (the material which does not float) each bagged separately and kept in water to prevent any waterlogged remains from drying out. The flot was scanned under a low powered binoculour microscope at approximately x15 magnification. Nomenclature for the plant remains follows Stace (1997).

3.2.2 A series of small sub-samples (approx. 25g) from each palaeoenvironmental sample was taken to determine pH levels in the sequence using a combination electrode. This used a 1:1 ratio of soil and water mixture.

3.3 Scope of fieldwork

3.3.1 The auger survey was undertaken over two days in order to obtain sufficient coverage of the ditch sequences, to enable the correlation of deposits and to identify any spatial variations within the ditch sequences.

3.4 Finds

3.4.1 Fragments of brick were retrieved from AH 7, AH 8, AH 11 and AH 12, from deposits that have been interpreted as archaeological dumps. Closer examination revealed them to be poorly preserved medieval or post-medieval brick fragments, some of which had been fired to high temperatures. The surfaces of the brick were poorly preserved and not particularly diagnostic.

4 RESULTS: GENERAL

4.1 Deposits and ground conditions

4.1.1 The fieldwork was undertaken in dry overcast conditions, within boggy grassland, in ditches covered in vegetation consisting of trees, shrubs and overgrown grass. The ditches, although wet underfoot, were generally dry, but have the potential to fill up with water in wet weather. The distribution of auger holes was significantly restricted by dense vegetation. However the auger holes were spaced out as evenly as possible.

4.2 Deposit Model

4.2.1 Based on the result of the auger survey a stratigraphic sequence for the site has been developed to aid the assessment of the archaeological and palaeoenvironmental potential. The following sequence has been proposed:

4.2.2 Sediment sequence:

- Bedrock
- Waterlogged clayey silts
- Archaeological deposits
- Upper ditch fill deposits
- Topsoil/leaf litter

4.3 Pre-Holocene Deposits and basement stratigraphy

4.3.1 **Bedrock:** The sandy bedrock was recovered within the majority of auger holes as a reddish brown sand deposit with occasional angular to sub-angular stone inclusions. The bedrock was encountered on average depth of 1.20m, ranging between +12.75m OD and +13.0m OD.

4.4 Ditch sediment sequence

4.4.1 **Waterlogged silty clay:** Alluvial deposits were encountered in all auger holes apart from AH8 and AH12, where penetration of the auger was disrupted at approximately +13.65m and +13.80m OD due to an obstruction, and AH15 and AH16 which were situated at the edges of the ditch itself. When encountered, the clays were between 0.60m and 1.20m in depth (+12.80m OD and +13.80m OD). The alluvial deposits consisted of structureless silty clay with rare coarse inclusions, ranging from light grey to a dark grey. Organic matter was present and targeted for sampling. Within the southern ditch, towards the base of these deposits it gradually became more gravely with increasing moderately sorted sub-angular to sub-rounded stones.

These deposits represent waterlain clays that accumulated within reduced anerobic conditions. The presence of sub-rounded stones within the deposit suggests that they have been carried along the bed of the ditch with the flow of water. Considering the close proximity of the ditch to the River Ouse, the presence of sub-rounded stones in the clays suggests that at this stage the ditches were connected to the river.

4.4.2 **Archaeological Deposits:** Two thin layers of whitish clay material, with frequent inclusions of brick, were identified within the southern ditch. The deposits were between +13.45m OD and +13.80m OD. This unit was confined to the southern ditches (AH7, AH8, AH11, AH12) overlying the waterlogged clayey silts and underlying the upper ditch fills. The brick inclusions varied in size and were all fragmented, and have been identified as being medieval/post medieval in date.

4.4.3 These deposits are thought to represent dumps of structural material within the ditch and probably indicate the former presence of a brick built structure nearby.

4.4.4 **Upper ditch fill deposits:** A sequence of ditch fill deposits was identified below the thin topsoil throughout the site, from +13.20m OD to +14.03m OD. These deposits ranged from silty clays to clayey silts and contained decayed organic matter, occasional to frequent modern rootlets and signs of oxidation.

The decayed organic matter suggests a damp ditch environment, indicating waterlogging during the wetter months of the year. Signs of oxidation imply occasional drying out, however this was not sufficiently prolonged to affect the anaerobic conditions within the ditch fills. These periods of drying out suggest that the ditches were cut off from the river during this period, as is the case at the present day.

4.4.5 **Modern topsoil/ Leaf Litter:** Much of the ground was covered in decaying vegetation and leaf litter. The soil below this on the southern section of the site was a light brown friable clay silt, with occasional to frequent modern rootlets and signs of oxidation. To the west (AH4, AH5) was fine sand with frequent modern roots. These deposits ranged from +13.90m OD to +14.20m OD.

4.5 Palaeoenvironmental assessment

4.5.1 Two ditch sequences were sampled for waterlogged and charred plant remains and pH determinations. Five deposits were sampled in sequence from AH2 and six from a combination of AH6, AH7 and AH10. The plant remains assessment and pH lab reports can be found within the appendices of this report.

4.5.2 Environmental evidence from the ditches implies that they were connected and that similar waterlain deposits accumulated under slow-flowing conditions. Only waterlogged plant remains typical of waterways, riverbanks and damp to wet meadows/ grassland were recovered which suggests that waste (e.g. agricultural, settlement, industrial, etc…) was not deposited into this feature. All of the samples contained taxa typical of damp to wet environments, which is likely to indicate that these remains are specific to the moat and immediate surrounding environment. From the samples it is clear that the ditches supported plants that prefer deep, slow-flowing water and silty/muddy substrates such as duckweed (*Lemna* spp.), water plantain (*Alisma plantago-aquatica* L.) or water starwort (*Callitriche* spp.).

4.5.3 The plant macrofossils and insect remains recovered from the assessed auger hole samples all have good potential to characterize the water conditions and/or surrounding environment of the potential moat. The recovery of taxa typical of meadows/grassland suggests that the area surrounding the moat was grassy, with areas of bramble (*Rubus* section Rubus) or nettle (*Urtica dioica* L.) developing; all of which is typical of areas of neglect or waste ground. Plant macrofossils typical of banks along rivers/ lakes such as alder (*Alnus glutinosa* (L.) Gaertn.), sedge (*Carex* spp.) and rush (*Juncus* spp.) suggest that the area immediately around the moat could get quite damp or muddy. The presence of alder in all auger holes is particularly informative as alder typically occurs in damp to wet environments in and around water courses/ bodies (Stace 1997, 126).

4.5.4 Samples sent for pH determination showed the sediments to range from moderately acidic (minimum pH, 5.3) to neutral (maximum pH, 6.9), with the majority of the samples being slightly acidic (i.e. pH range, 5.6–6.5). Sediments that are both acidic and anaerobic have good potential for the preservation of pollen and diatoms, but are less conducive to the preservation of snails and ostrocods.

5 DISCUSSION AND INTERPRETATION

5.1 Reliability of field investigation

5.1.1 Whilst the coverage of the site was limited in certain areas due to dense vegetation, a reasonable interpretation of the range and preservation of surviving archaeological deposits and palaeoenvironmental material can be presented.

5.2 Overall interpretation

5.2.1 The investigation has successfully identified the main types and depths of deposits within the ditch sequences. It has allowed the correlated of deposits along and between ditch sequences into stratigraphic units, which has been used to develop a

basic understanding of the changing environmental and sedimentary sequence of the site.

5.2.2 The survey provides evidence that the two of the ditches present on the site were once connected together to form part of a rectilinear moat. This network of ditches must have been connected to the river, in order to explain the presence of well sorted pebbles within the lower ditch fills. Evidence of two archaeological dumps with the southern ditch indicates activity at the site. The inclusions of medieval/post medieval brick imply that the material was deliberately dumped there, and is perhaps material related to a possible structure within the enclosure itself, potentially placed there when the building and moat ceased to function. These deposits were overlain by organic deposits that accumulated within a damp ditch environment. The ditches appear to have been cut off from the main flow of the river and sedimentation rates would have been significantly reduced as a result. The accumulation of 0.60m of damp ditch deposits indicates an extended period of deposition following the abandonment of the site. This environment appears to have continued to present day.

5.2.3 The evidence from the sediment and environmental samples indicate that the ditch sequence is consistent with other moat sites in the area. By definition moated sites consist of one or more ditches between 3-6m wide, which in most cases were intended to be water-filled, surrounding an area occupied by buildings or other structures. The earth created by digging the moat was often used to create the platform on which buildings were constructed. Rectangular enclosures are common but circular or trapezoidal ones are also known. Sometimes there is more than one enclosure, and the moat is often accompanied by one or more fishponds. Thus, except where water was obtained by seepage or where the moat lay in an existing stream bed, most sites had inlet and outlet leats or channels to carry water into and away from the moat. Many of these have subsequently been modified and are often reduced to modern ditches.

5.2.4 The features at Fletching Mill are consistent in terms of dimension, form and sedimentation with other moated sites. There is also a deep topographic surface depression that potentially represents a fishpond at the site, and a nearby corn mill to the south, which are often found in conjunction with medieval manor houses.

5.2.5 Although the evidence from the sediments and samples from the ditch support the interpretation of a moated manor, it is important to consider other possibilities. There are other features which could produce a sediment sequence similar to a moat, and amongst the simplest of these features are fishponds. They range in date from the medieval period to the present century and can range in form from simple rectangular depressions to complex arrangements of conjoined ponds, usually known as fish stews. Many are known as moats and are even described as such on maps.

5.2.6 Other features commonly confused with true moated sites, are stock-watering ponds. These often take the form of an L shape in plan and are usually set in the corners of fields. They may be of any date, subsequent to the formation of the fields, though

most are 17th century or later. Other ponds of various dates can and have been mistaken for moated sites, especially when they have been altered or mutilated at a later period. Abandoned mill ponds, especially those of long rectangular or L-shaped form, are often called moats, while disused sheep dips and even duck-decoy ponds have caused similar difficulties. Almost as common, but not studied in any way in the same detail, are the countless examples of abandoned gardens which can date from the 16th to the present century. Many, particularly those of the 16th and 17th centuries, when rectangular arrangements of ponds were an intimate part of the ideal layout, are recorded as moats.

5.2.7 The assessment has revealed a waterlogged sequence of fluvial and damp ditch deposits with good potential for palaeoenvironmental remains. The pH determinations of this sequence indicate neutral to moderately acidic conditions conducive with pollen, insects and diatom preservation. The assessment has identified organic material suitable for radiocarbon dating throughout the sequence. Reconstruction of rural environments around moats is relatively scarce, but has been carried out elsewhere in England (e.g. the medieval moats at Cowick – Greig 1986; Hayfield and Greig 1989 and at Shapwick – Smith and Campbell 2007). Full analysis of the palaeoenvironmental sequence at the Fletching Mill moat may provide another much needed glimpse into the rural landscape of medieval England.

5.2.8 The ditches represent a significant archaeological resource that could be vulnerable to both primary impacts, through the digging of drainage channels and resurfacing work, and secondary impacts, in terms of lowering the water table or changes in either pH or oxygenation. The integrity of the site and its sequence should be maintained, and any proposed work should take steps to avoid any disturbance to this sequence.

6 SUMMARY CONCLUSIONS

6.1 Summary

6.1.1 Based on the results of the auger survey and palaeoenvironmental assessment the following conclusions can be drawn:

- In terms of the dimensions, form and sediments the investigated ditch sequences are consistent with other moated manor sites in the area.
- The sequence of ditch fills that form parts of the rectangular enclosure are consistent and indicate a sequence of low-energy waterlain deposits accumulating within deep slow-flowing water. These ditches appear to have been connected to the river Ouse by a leat to the north of the site.
- The abandonment of the site may be represented by the structural dumps that were recorded within the southern ditch sequence. The remains of medieval/post medieval bricks may indicate the presence of a brick built

structure nearby. Shortly after the accumulation of the archaeological dumps the environment changed, the sequence appears to have cut off from the main river and a damp ditch environment similar to that of present day started to develop.

- Other possible features other than a medieval manor also need to be considered. Such features as fishponds, watering and garden features can also produce similar sedimentary sequences.

- The ditch deposits have remained waterlogged and are of palaeo-environmental interest. Full analysis of the palaeoenvironmental evidence at Fletching Mill moat would provide an insight into the rural landscape of medieval England.

6.2 Recommendations for further work

6.2.1 As part of a well defined strategy for the site, the following recommendations are proposed:

- Establish a chronological framework to the site using appropriate scientific dating techniques in order to confirm some of the interpretations made in this report. Radiocarbon dating would be particularly useful to date some of the palaeoenvironmental remains recovered in order to establish a date for the moat and central platform.

- Undertake an earthwork or geophysical survey of the site and surrounding area in order to gain a better understanding of potential structures and landscape features that could be potentially associated with this feature.

- Establish the potential impacts of any proposed work at the site and assess the direct and secondary impacts will have on the ditch sequences and features identified within this study.

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APPENDICES

APPENDIX 1 AUGER LOGS

	AH1	AH2	AH3	AH4	AH5	AH6	AH7	AH8
Topsoil	0.00 - 0.08	0.00 - 0.06	0.00 - 0.02	-	-	0.00 - 0.2	0.00 - 0.03	0.00 - 0.04
Damp ditch environment	0.08 - 0.5	0.06 - 0.38	0.02 - 0.3	0.00 - 0.63	0.00 - 0.75	0.2 - 0.55	0.03 - 0.5	0.04 - 0.48
Archaeological dump	-	-	-	-	-	-	0.5 - 0.7	0.48 - 0.5
Waterlain clays	0.5 - 1.27	0.38 - 1.25	0.3 - 1.15	0.63 - 1.25	0.75 - 1.08	0.55 - 1.17	0.7 - 1.25	-
Bedrock	from 1.27	from 1.25	from 1.15	from 1.25	from 1.08	from 1.17	from 1.25	-

	AH9	AH10	AH11	AH12	AH13	AH14	AH15	AH16
Topsoil	0.00 - 0.05	0.00 - 0.06	0.00 - 0.06	0.00 - 0.04	0.00 - 0.04	0.00 - 0.04	0.00 - 0.28	0.00 - 0.35
Damp ditch environment	0.05 - 0.6	0.06 - 0.6	0.06 - 0.25	0.04 - 0.25	0.04 - 0.25	0.04 - 0.4	0.28 - 0.4	
Archaeological dump	-	-	0.25 - 0.30	0.25 - 0.28	-	-	-	-
Waterlain clays	0.6 - 1.15	0.6 - 1.15	0.30 - 1.25	-	0.25 - 1.2	-	-	-
Bedrock	from 1.15	from 1.15	from 1.25	-	from 1.2	from 0.4	from 0.4	from 0.35

APPENDIX 2 WATERLOGGED PLANT AND INSECT ASSESSMENT

By Wendy Smith (Oxford Archaeology South, Janus House, Osney Mead, Oxford, OX2 0ES)

Introduction

The auger survey of a potential medieval moat at Fletching Mill, East Sussex (NGR TQ 422 299) was carried out to characterize palaeoenvironmental archive preserved in the sediments deposited within this archaeological feature. Eleven samples of sediment from auger holes 2 (samples 6-11), 6 (sample 4), 7 (samples 1-3) and 10 (sample 5) were submitted for analysis of waterlogged plant remains.

Assessment of waterlogged plant macrofossils from the Fletching Mill auger samples was carried out in order to establish:

- if plant macrofossils were present, well-preserved and of interpretable value
- if plant macrofossils provide information on water conditions
- if plant macrofossils provide information on the surrounding environment
- if plant macrofossils provide evidence for the disposal of waste into the moat

Method

Between 150 ml – 300 ml of sediment was processed by bucket flotation over a 0.25 mm geological sieve. Any sediment that did not float was retained in a 0.5 mm mesh. All of the flots were stored in water in the Oxford Archaeology cold store at approximately 8°C. Because the residues were quite clearly primarily small-sized (< 10cm) gravel, with occasional larger fragments of wood/ root, only the flots have been scanned for this assessment. Flots were scanned under a Leica EZ4D binocular microscope at a magnification of x12.5. Identifications were made without consulting modern comparatives and, therefore, should be seen as provisional. Full quantification was not attempted; instead, a notional semi-quantitative scale was used. Nomenclature and habitat information follows Stace (1997).

Results

Table 1 presents the results for waterlogged plant macrofossils and other forms of environmental remains (e.g. beetles, moss, wood, plant frass, etc…) noted in the eleven samples studied. All eleven samples have produced waterlogged plant macrofossils. In general preservation was very good, although sample 1 (borehole AH7 24-40 cm) did have remains that looked slightly rusty (possibly iron staining?), which is something the author has observed before in waterlogged deposits which have occasionally being subjected to periodic drying (e.g. drought, drainage, etc…). All of the samples had worm casts and modern seeds present and many also contained modern plant frass, which was still clearly green. As a result, all of these deposits may be affected by bioturbation (re-working of sediments by worm, insect or other animal action). Beetles (Coleoptera) were present in several of these

samples and were also well preserved. Water fleas (Daphnia) were recovered from all auger holes, but not all samples. Water fleas cannot be identified to species, or even genus, and are not particularly indicative of water conditions/ flow (*pers. comm*.. D. N. Smith). However, their presence does indicate periods when the moat contained water, although the water fleas obviously are deposited into sediments at the base of the water column.

All of the samples contained taxa typical of damp to wet environments, which is likely to indicate that these remains are specific to the moat and immediate surrounding environment. The moat quite clearly supported plants that prefer deep, slow-flowing water and silty substrates such as duckweed (*Lemna* spp.), water plantain (*Alisma plantago-aquatica* L.) or water starwort (*Callitriche* spp.). Remains of alder (*Alnus glutinosa* (L.) Gaertn.) were recovered from all auger holes. Alder is typically occurs in damp to wet environments in and around water courses/ bodies (Stace 1997, 126). Finally there are a range of taxa which are typical of meadow or grassland; such as the buttercups (*Ranunculus acris* L./ *repens* L./ *bulbosus* L.; *Ranunculus* subgenus *Ranunculus* and *Ranunculus ficaria* L. agg) and damp to wet environments; such as, meadowsweet (*Filipindula ulmaria* (L.) Maxim), rush (*Juncus* spp.) and sedge (*Carex* spp.).

Discussion

The plant macrofossils and beetle remains recovered from the assessed auger hole samples all have good potential to characterize the water conditions and/or surrounding environment of the moat. Only waterlogged plant remains typical of waterways, riverbanks and damp to wet meadows/ grassland were recovered, which suggests that waste (e.g. agricultural, settlement, industrial, etc…) was not deposited into this feature. Most of the water plants recovered are typical of deep, slow-flowing water with silty/ muddy substrates. Plant macrofossils typical of banks along rivers/ lakes such as alder, sedge and rush suggest that the area immediately around the moat could get quite damp or muddy. The recovery of taxa typical of meadows/ grassland suggests that the area around the moat was grassy, with areas of bramble (*Rubus* section Rubus) or nettle (*Urtica dioica*) developing; all of which is typical of areas of neglected or waste ground.

Potential

Insect and plant remains are fairly abundant in these samples and would provide further detail of water conditions and surrounding environment should future sampling of this feature take place. In both cases (waterlogged plant macrofossils/ insect remains) larger sample volumes, through standard bulk sampling of at least 10L of sediment would be required. It is clear that there is little or no human input into this feature; rather the samples from the moat provide a picture of the moat and its immediate environment at the time of deposition.

Reconstruction of rural environments around moats is relatively scarce, but has been carried out elsewhere in England (e.g. the medieval moats at Cowick – Greig 1986; Hayfield and Greig 1989 and at Shapwick – Smith and Campbell 2007). Full analysis of the

palaeoenvironmental archive at the Fletching Mill moat would provide another much needed glimpse into the rural landscape of medieval England.

Recommendations

It is recommended that should any future development or clearing of the moat at Fletching Mill take place that bulk soil samples are collected in order to exploit the clearly well-preserved palaeoenvironmental archive contained within sediments currently infilling this feature. Full analysis of such deposits, accompanied by radiocarbon determinations, would provide a detailed chronological perspective of the environment in and around the moat at Fletching Mill in the medieval period.

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Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex

Sample Number	**<1>**	**<2>**	**<3>**	**<4>**	**<5>**		
Auger Hole	**AH7**	**AH7**	**AH7**	**AH6**	**AH10**		
Depth	**24-40 cm**	**50-60 cm**	**70-80 cm**	**105-110 cm**	**115-120**		
Volume Processed	**200 ml**	**150 ml**	**150 ml**	**150 ml**	**200 ml**		
Proportion of flot scanned	**75%**	**100%**	**100%**	**100%**	**25%**		
Waterlogged Plant Remains						**Habitat**	
Latin Binomial							**English Common Name**
Cereals							
Cereal/ POACEAE - culm node - ?modern	-	-	+	-	-	?Cu/ ?G	Cereal/ Large Grass
Cereal/ POACEAE - culm base - ?modern	-	-	-	-	-	?Cu/ ?G	
Weed/ Wild Plants							
Ranunculus acris L./ *repens* L./ *bulbosus* L.	+	+	-	-	+	M/ G	Meadow/ Creeping/ Bulbous Buttercup
Ranunculus subg. Ranunculus	+	+	-	-	-	?M/ ?G	Buttercup
Ranunculus ficaria L. agg.	+	-	+	-	-	M/ H/ W	Lesser Celandine
Urtica dioica L.	+	-	+	-	-	V, esp W, F, N	Common Nettle
Alnus glutinosa (L.) Gaertn. - seed	-	-	-	+	+	DW/ We	Alder
Alnus glutinosa (L.) Gaertn. - infrustructure	-	-	-	-	+	DW/ We	Alder
cf. *Alnus glutinosa* (L.) Gaertn. - cone frag.	+	-	-	-	-	DW/ We	Alder
Moehringia trinervia (L.) Clairv.	-	-	+	-	-	H/ W	Three-nerved Sandwort
Persicaria hydropiper (L.) Spach	+	-	-	-	-	D/ Swa/ We	Water-pepper
Persicaria spp.	-	+	-	-	-	-	Knotweed
Rumex sp.	-	-	-	+	-	-	Dock
Viola spp.	-	-	-	-	-	typical W	Violet
Filipindula ulmaria (L.) Maxim.	-	-	-	-	-	D/ We	Meadowsweet
Rubus section Rubus	-	+	+	-	-	V, esp WP	Blackberry/ Bramble
ROSACEAE - thorn	-	-	+	-	-	-	Rose Family
Chaerophyllum temulum L.	+	+	-	-	-	G/ H/ W	Rough Chervil
Solanum cf. *dulcamara* L.	-	-	-	-	-	V, esp. We, F, H, W	Possible Bittersweet

Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex continued...

Sample Number	**<1>**	**<2>**	**<3>**	**<4>**	**<5>**		
Auger Hole	**AH7**	**AH7**	**AH7**	**AH6**	**AH10**		
Depth	**24-40 cm**	**50-60 cm**	**70-80 cm**	**105-110 cm**	**n/a**		
Waterlogged Plant Remains						**Habitat**	
Latin Binomial							**English Common Name**
Lycopus europaeus L.	-	-	-	-	-	F, We	Gypsywort
LAMIACEAE - unidentified	-	-	-	-	-	-	Mint Family
Callitriche spp.	-	-	-	-	-	typ. DW	Water-starwort
Carduus spp./ *Cirsium* spp.	-	-	-	-	-	V	Thistle
Sagittaria spp./ *Alisma plantago-aquatica* L.	++	+	+	-	-	typ. DW/ We	Arrowhead/ Water plantain
Alisma plantago-aquatica L.	-	-	-	-	-	typ. DW/ We	Water plantain
Juncus spp. - seeds	+++	++	+	+	-	typ. D/We	Rush
Juncus sp. - complete fruit	-	-	-	++	-	typ. D/We	Rush
Lemna spp.	+	-	-	-	-	DW	Duckweed
Carex spp. - 2-sided	-	-	-	-	-	typ. D/We	Sedge
Carex spp. - 2-sided (tuburculated urticle)	-	-	-	-	-	typ. D/We	Sedge
Carex ssp. - 3-sided	+	+	-	-	+	typ. D/We	Sedge
POACEAE - small-sized caryopsis	+	+	-	-	-	-	Grass Family
POACEAE - medium-sized caryopsis	++	-	+	-	-	-	Grass Family
Sparganium sp.	+	-	-	-	-	typ. We/ DW	Bur-reed
PINACEAE type cone - unidentified	-	-	-	-	+		Pine Family (small cone)
leaf fragments	-	-	-	-	++		
Wood fragments - unidentified	++	+	+	+	++++		
Bud - Unidentified	-	+	-	-	+		
Bud-scar - Unidentified	-	+	-	-	+		
Thorn - unidentified	-	-	-	-	-		
Charred Plant Remains							
Charcoal fragments - unidentified	+	++	+	+	+		

Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex continued...

Sample Number	**<1>**	**<2>**	**<3>**	**<4>**	**<5>**	
Auger Hole	**AH7**	**AH7**	**AH7**	**AH6**	**AH10**	
Depth	**24-40 cm**	**50-60 cm**	**70-80 cm**	**105-110 cm**	**n/a**	
Other Environmental Remains						
Coleoptera	+	+	-	-	+	Beetles
Daphnia	++	-	+	+	+	Waterfleas
Modern contaminants						
Modern root	+++	-	-	-	-	
Modern plant frass	++	-	+	-	-	

Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex continued…

Sample Number	**<6>**	**<7>**	**<8>**	**<9>**	**<10>**	**<11>**		
Auger Hole	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**		
Depth	**15-20 cm**	**38-42 cm**	**50-60 cm**	**75-80 cm**	**100-110 cm**	**115 - 120 cm**		
Volume Processed	**300 ml**	**250 ml**	**300 ml**	**200 ml**	**250 cm**	**300 ml**		
Proportion of flot scanned	**40%**	**50%**	**25%**	**25%**	**25%**	**20%**		
Waterlogged Plant Remains							**Habitat**	
Latin Binomial								**English Common Name**
Cereals								
Cereal/ POACEAE - culm node - ?modern	-	+					?Cu/ ?G	Cereal/ Large Grass
Cereal/ POACEAE - culm base - ?modern	-				+		?Cu/ ?G	
Weed/ Wild Plants								
Ranunculus acris L./ *repens* L./ *bulbosus* L.	-	-	-	-	-	-	M/ G	Meadow/ Creeping/ Bulbous Buttercup
Ranunculus subg. Ranunculus	-	-	-	-	-	-	?M/ ?G	Buttercup
Ranunculus ficaria L. agg.	-	-	-	-	-	-	M/ H/ W	Lesser Celandine
Urtica dioica L.	-	+	-	-	-	-	V, esp W, F, N	Common Nettle
Alnus glutinosa (L.) Gaertn. - seed	+	+	-	+	++	++	DW/ We	Alder
Alnus glutinosa (L.) Gaertn. - infrustructure	+	-	-	-	-	-	DW/ We	Alder
cf. *Alnus glutinosa* (L.) Gaertn. - cone frag.	-	-	-	+	-	-	DW/ We	Alder
Moehringia trinervia (L.) Clairv.	-	-	-	-	-	-	H/ W	Three-nerved Sandwort
Persicaria hydropiper (L.) Spach	-	-	-	-	-	-	D/ Swa/ We	Water-pepper
Persicaria spp.	-	-	-	-	-	-	-	Knotweed
Rumex sp.	-	-	-	-	-	-	-	Dock
Viola spp.	-	-	+	-	-	-	typical W	Violet
Filipindula ulmaria (L.) Maxim.	-	-	+	+	-	+	D/ We	Meadowsweet
Rubus section Rubus	++	++	+	+	-	+	V, esp WP	Blackberry/ Bramble
ROSACEAE - thorn	-	-	+	-	+	+	-	Rose Family
Chaerophyllum temulum L.	-	-	-	-	-	-	G/ H/ W	Rough Chervil
Solanum cf. *dulcamara* L.	-	-	-	-	+	-	V, esp. We, F, H, W	Possible Bittersweet

Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex continued…

Sample Number	**<6>**	**<7>**	**<8>**	**<9>**	**<10>**	**<11>**		
Auger Hole	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**		
Depth	**15-20 cm**	**38-42 cm**	**50-60 cm**	**75-80 cm**	**100-110 cm**	**115 - 120 cm**		
Waterlogged Plant Remains							**Habitat**	
Latin Binomial								**English Common Name**
Lycopus europaeus L.	-	-	-	-	+	-	F, We	Gypsywort
LAMIACEAE - unidentified	-	-	-	-	+	-	-	Mint Family
Callitriche spp.	-	-	+	++	+	+	typ. DW	Water-starwort
Carduus spp./ *Cirsium* spp.	-	-	+	-	-	+	V	Thistle
Sagittaria spp./ *Alisma plantago-aquatica* L.	+	+	-	-	-	+	typ. DW/ We	Arrowhead/ Water plantain
Alisma plantago-aquatica L.	-	-	+	++	++	++	typ. DW/ We	Water plantain
Juncus spp. - seeds	-	+	-	-	-	-	typ. D/We	Rush
Juncus sp. - complete fruit	-	-	-	-	-	-	typ. D/We	Rush
Lemna spp.	-	-	-	-	-	-	DW	Duckweed
Carex spp. - 2-sided	-	-	+	-	-	-	typ. D/We	Sedge
Carex spp. - 2-sided (tuburculated urticle)	+	-	-	-	-	-	typ. D/We	Sedge
Carex ssp. - 3-sided	-	-	-	+	+	+	typ. D/We	Sedge
POACEAE - small-sized caryopsis	-	-	-	-	-	-	-	Grass Family
POACEAE - medium-sized caryopsis	-	-	+	-	-	-	-	Grass Family
Sparganium sp.	-	-	-	-	-	-	typ. We/ DW	Bur-reed
PINACEAE type cone - unidentified	-	-	-	-	-	-		
leaf fragments	+	+	+	+	++	+		
Wood fragments - unidentified	+++	-	++	++	++	+		
Bud – Unidentified	-	+	+	+	+	+		
Bud-scar – Unidentified	-	-	-	-	+	+		
Thorn – unidentified	-	-	-	+	-	-		
Charred Plant Remains								
Charcoal fragments - unidentified								

Table 1: Assessment results for plant remains from auger samples at Fletching Mill, East Sussex continued…

Sample Number	**<6>**	**<7>**	**<8>**	**<9>**	**<10>**	**<11>**	
Auger Hole	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**	**AH2**	
Depth	**15-20 cm**	**38-42 cm**	**50-60 cm**	**75-80 cm**	**100-110 cm**	**115 - 120 cm**	
Other Environmental Remains							
Coleoptera	-	+	+	+	+	+	Beetles
Daphnia	-	-	-	-	+	-	Waterfleas
Modern contaminants							
Modern root	-	-	-	-	-	-	
Modern plant frass	-	-	-	+	+	+	

APPENDIX 3 LAB REPORT: PH DETERMINATIONS

By J. Crowther (Archaeological Services, University of Wales, Lampeter, Ceredigion, UK SA48 7ED)

Methodology

Determinations of pH (1:1 water) were made on 11 sediment samples from the moat using a combination electrode. The results are presented in Table 1.

Table 1: pH of sediment samples

Sample	Auger hole	Depth (cm)	pH (1:1, water)
1	AH7	24-40	5.3
2	AH7	50-60	6.0
3	AH7	70-80	6.4
4	AH6	105-110	5.8
5	AH10	115-120	6.9
6	AH2	15-20	5.5
7	AH2	38-42	5.5
8	AH2	50-60	5.7
9	AH2	75-80	6.0
10	AH2	100-110	5.8
11	AH2	115-120	5.7

Results

The results show the sediments to range from moderately acidic (minimum pH, 5.3) to neutral (maximum pH, 6.9), with the majority of the samples being slightly acidic (i.e. pH range, 5.6–6.5).

APPENDIX 4 SUMMARY OF SITE DETAILS

Site Name: Fletching Mill

Site code: FLEMIL 08

Grid Ref: TQ 422 229

Type of evaluation: Geoarchaeological assessment

Date and duration of project: 13th-14th October 2008

Summary of results: An auger survey of a potential medieval moated manor, revealed a sequence of waterlain deposits overlain by structural archaeological dumps and damp ditch deposits. These sequences revealed good palaeoenvironmental potential throughout the sequence. The assessment also indicated that the ditches sequences are consistent and may have previously joined together to form part of a rectangular moat. The moat is consistent in terms of its form, dimensions and sediment types with other examples of moat manors.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0E

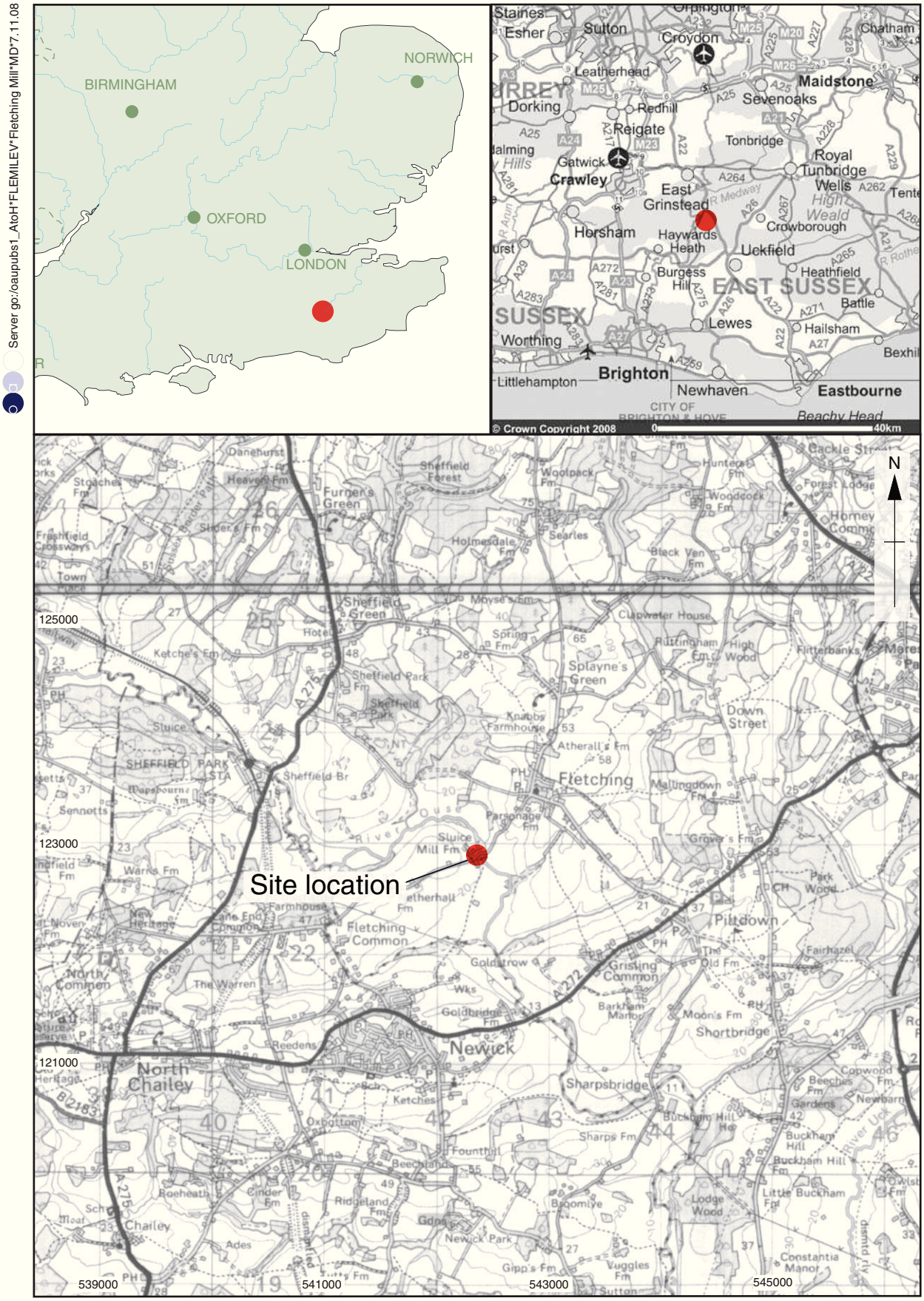

Figure 1: Site location

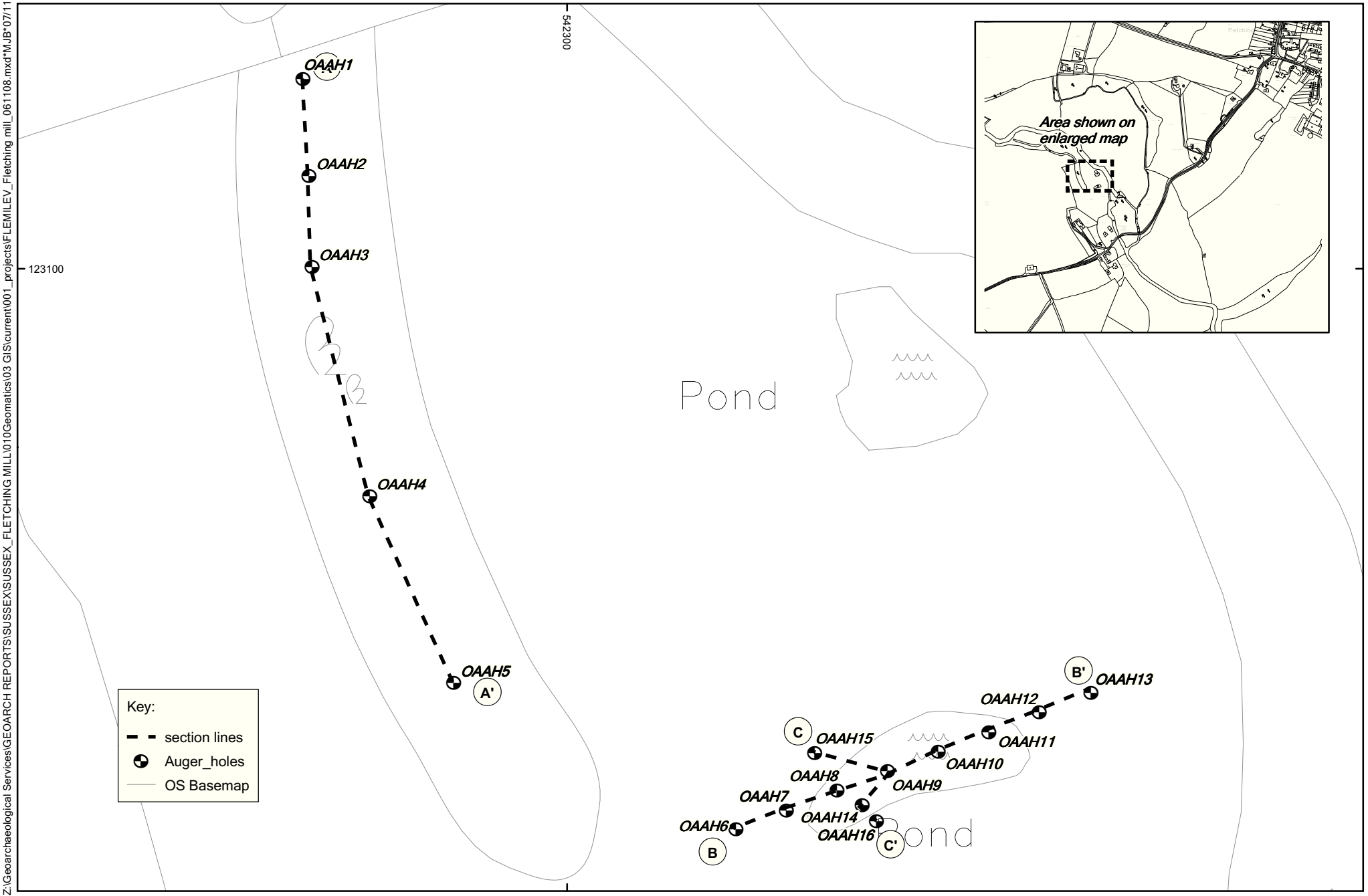

Figure 2 - Sample and cross-section locations

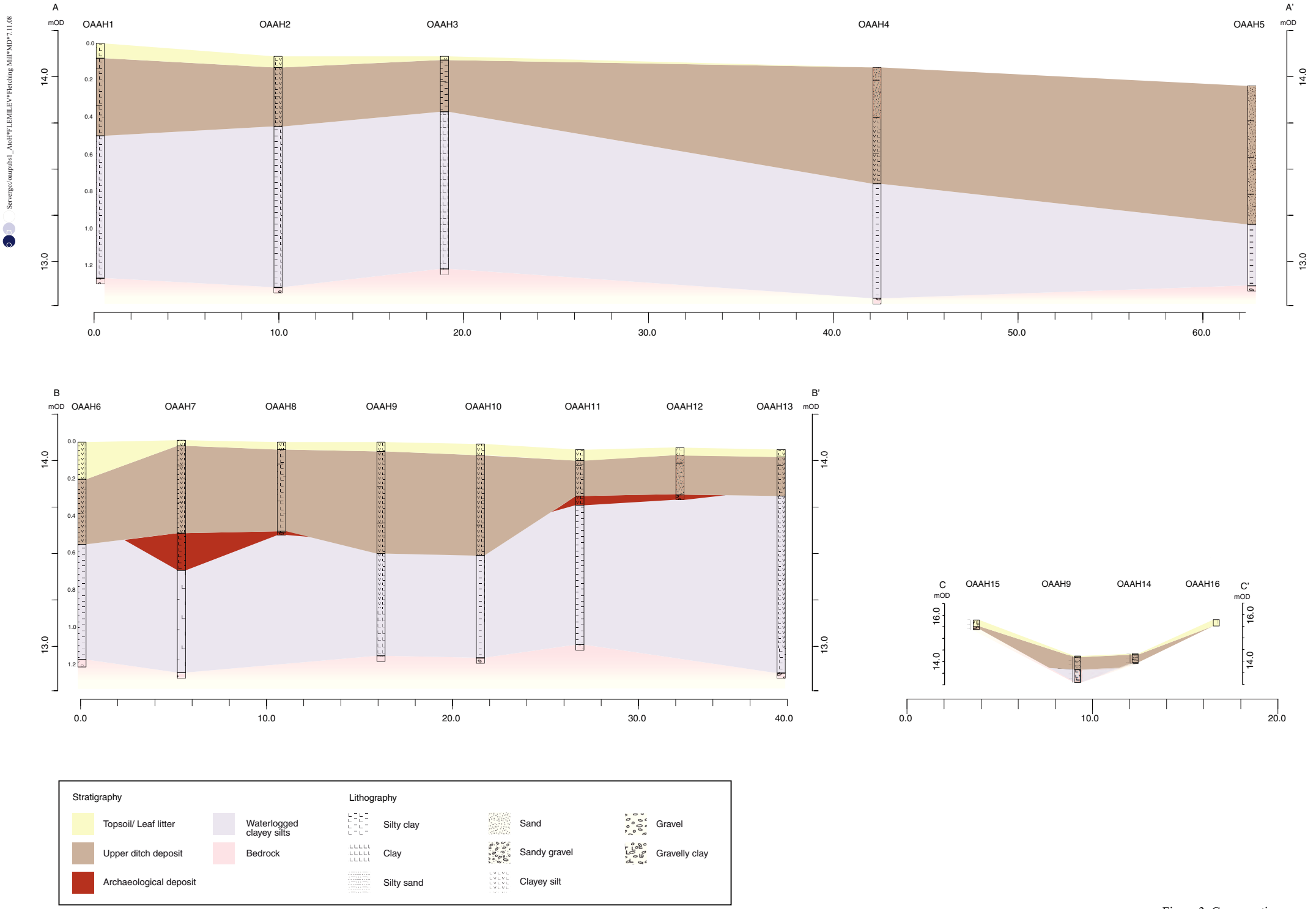

Figure 3: Cross-sections