Bosham Hoe Pipeline West Sussex

Archaeological Watching Brief Report

oxfordarchaeology

October 2007

ATKINS

Client: Atkins Heritage

OA Job No: 3829
NGR: SU8101402330

Archaeological Watching Brief Report

Client Name: Atkins Heritage

Client Ref No: na

Document Title: Bosham Hoe Pipeline, West Sussex

Document Type: Watching Brief

Issue Number: 1

National Grid Reference: SU 8101402330
Planning Reference:

OA Job Number: 3829
Site Code: BOSHOE07
Invoice Code: BOSHOEWB
Receiving Museum: Chichester District Museum
Museum Accession No: Awaiting confirmation

Prepared by: Daniel Miller
Position: Geoarchaeologist
Date: 22 October 2007

Checked by: Elizabeth Stafford
Position: Head of Geoarchaeological Services
Date: 2nd November 2007

Approved by: Elizabeth Stafford Signed…….
Position: Head of Geoarchaeological Services
Date: 2nd November 2007

Document File Location Z:\Geoarchaeological Services\GEOARCH REPORTS\SUSSEX\Bosham Hoe\BOSHOE07_WBReport_V1.doc
Graphics File Location \\Servergo\invoice codes a thru h\B_invoice codes\BOSHOEWB
Illustrated by Sarah Lucas

Oxford Archaeology

Janus House
Osney Mead
Oxford OX2 0ES
t: (0044) 01865 263800 e: info@oxfordarch.co.uk
f: (0044) 01865 793496 w: www.oxfordarch.co.uk

Oxford Archaeological Unit Limited is a Registered Charity No: 285627

Bosham Hoe Pipeline, West Sussex

ARCHAEOLOGICAL WATCHING BRIEF REPORT

CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

In October 2007 Oxford Archaeology was commissioned by Atkins Heritage to carry out a Watching Brief along the route of a proposed pipeline at Bosham Hoe, West Sussex. The Watching Brief comprised the monitoring of seven geotechnical boreholes. The sedimentary sequence revealed within the boreholes comprised relatively thin minerogenic deposits of silty loam, sandy silts and gravels of probable Pleistocene age directly overlying Tertiary bedrock. Apart from modern disturbance, no direct evidence for anthropogenic activity was identified within the sediments.

1 INTRODUCTION

1.1 General

1.1.1 In October 2007 Oxford Archaeology (OA) was commissioned by Atkins Heritage, on behalf of Clancy DOCWRA, to carry out a Watching Brief along the route of a proposed new pipeline at Bosham Hoe, West Sussex.

1.1.2 The Watching Brief was requested by John Mills, Archaeological Officer for West Sussex County Council, due to the potential for buried prehistoric land surfaces along the route. The primary objective of the investigation was to characterise the subsurface sedimentary sequence and produce a geoarchaeological profile of the area.

1.1.3 OA produced a Written Scheme of Investigation (WSI) for the work following a brief provided by Atkins Heritage. This report presents the results of the investigation. The site and borehole locations are presented in figures 1 and 2, and geoarchaeological profiles in figures 3 and 4. Detailed sediment logs for each borehole are included in Appendix 1.

1.2 Site location and topography

1.2.1 The site is located in Bosham Hoe, West Sussex (NGR SU 812018, Fig. 1). The area is predominately rural, surrounded by the Bosham Channel to the west and Chichester Channel to the east. It surrounds a small inlet called Furzefield Creek and contains a number of small woods to the south and east. To the north and north-west the land is mostly agricultural.

1.2.2 The inland area is relatively flat, with a very slight southward slope, and slightly steeper slope within *c*100m of the current shoreline. Exceptions to this are two relic channels, creeks or bays, observed on the north side of Furzefield Channel as topographic lows with well-defined edges, leading down toward slight embayments on the present shoreline. Where observed along the line of the Smugglers Lane the features are approximately 1.5-2.0m lower than surrounding ground level and

approximately 50m wide at the top of slope. BHT 1 is at the eastern base-of-slope of one of these features.

1.3 Geoarchaeological and environmental background

1.3.1 Detailed descriptions of the environmental and geological history of the Chichester Harbour area are available in several reports (eg Bates 2005, Mills *et al* 2007a, 2007b), and summarised in the following section.

1.3.2 Regionally the area around Chichester Harbour lies within the Hampshire Basin. Previously mapped bedrock geology consists of Cretaceous Chalk to the far north, with Lambeth Formation clays and sands immediately to the north of the study area. London Clay underlies Bosham Hoe and the study area itself. These Tertiary formations are of considerable age (over 50 million years), and represent a variety of marine and coastal environments.

1.3.3 The Tertiary and older formations define the basement topography, upon which younger sediments have formed. The age of these 'superficial' deposits falls within periods of archaeological interest, particularly those younger than *c* 500,000 years, which coincide with hominid and human presence in Northern Europe. During this period several Ice Ages have come and gone, with accompanying changes in environment, sea level, and surface morphology.

Pleistocene

1.3.4 Periods before the end of the last Ice Age (*c* 11, 000 years ago) are collectively termed the Pleistocene, associated with middle and late Palaeolithic archaeological remains. The palaeogeography of the study area changed considerably through this period.

1.3.5 Several main deposit types are of relevance (summarised from Bates, 2005):

- Marine sands and gravels associated with temperate phase sea level high points, and cappings of fine sediment associated with falling sea levels. Features include relic beaches and islands.
- Coarse, poorly sorted flint gravels and silts associated with cold phases, low sea levels, and high-energy ancient river courses. Features include large erosive channels, and blankets of fine wind blown sediment.
- Lower energy, temperate stage mineral and organic sediments preserved in abandoned or buried river channels, and other sediment traps. Features may include, lake beds, fluvial sequences, peat deposits, wetlands and terrestrial soils.

1.3.6 Location and identification of geomorphic features such as relic beaches, channels and other landforms, are key to determining Palaeolithic archaeological potential. Contextualising specific archaeological sites also requires a broad knowledge of

specific local geological histories. Continued acquisition of new data adds to this body of knowledge.

Holocene

1.3.7 The current temperate phase, beginning approximately 11, 000 years ago, after the last Ice Age, is known as the Holocene. Beginning with rapid warming and followed by rising sea levels, the environment and landscape of hunter-gatherer societies radically changed in the early Holocene. Extensive woodlands were eventually established, and the British mainland separated from continental Europe by flooding of the English Channel.

1.3.8 Holocene sediments continued to accumulate in rivers and estuaries, and older land surfaces were buried. Complex sequences formed in which high resolution environmental and archaeological information is often preserved.

1.3.9 Deposit types of relevance include;

- Estuarine sediments that can be correlated or dated, and used to derive archeologically relevant environmental or palaeogeographic information.
- Old land-surfaces and geomorphic features buried in coastal situations by estuarine sediments, beach deposits, wind blown sediment. Inland, similar features may be buried beneath slope deposits, wind blown sediment, flood deposits, or organic accumulations such as peat and soil.
- Outcrops of older material that may have formed islands or other focal points, which are now obscured by younger sediment build-up.
- Rich organic deposits, such as buried peat, organic and/or calcareous muds, from which detailed environmental evidence can be obtained.
- Various datable materials that allow correlation over wide areas of long-term geomorphological history with archaeological sites.

1.4 Archaeological and historical background

1.4.1 The archaeological potential of the site area, outlined in the specification provided by Atkins Heritage, is summarised in the following section.

Prehistoric (500,000BC – 43AD)

1.4.2 The Prehistoric period is represented in the area by a number of sites and findspots. The earliest remains include a Palaeolithic flint handaxe, a Mesolithic flint axe and a part polished Neolithic flint axe, all found north of Hook Farm. There are six known Neolithic sites containing worked flint, all of which are located on the east, west and south coastal fringes of Bosham, overlooking the Bosham and Chichester Channels.

A further possible prehistoric burnt mound site is recorded west of Old Park Wood, again on the coast. This was found to contain a large quantity of fire-cracked flints.

1.4.3 Further isolated findspots recorded include a Neolithic worked flint and a retouched flint blade on the western coast along the Chichester Channel. Neolithic flint implements and a broadly dated prehistoric black volcanic rock axe were found on the western coast along Bosham Channel. A flint scraper and two flakes were also found to the east and inland of these finds and were similarly dated broadly to the prehistoric period.

1.4.4 There is high potential therefore to encounter prehistoric activity across a broad date range in areas near the coast of Bosham Hoe. Marine transgression through the Holocene has buried much of these former prehistoric land surfaces within the area.

Roman (43AD – 450AD)

1.4.5 Only two isolated findspots of Roman pottery represents Roman activity in this area. These were both found amongst earlier prehistoric remains on the eastern coast overlooking Chichester Channel. While these limited finds demonstrate a distinct lack of evidence from this period, it must be considered that the site of Fishbourne Palace lies only a short distance to the north-east of Bosham and therefore there must be potential for further Roman activity in the area to exist.

Medieval (450AD – 1539AD)

1.4.6 The only evidence of the Medieval period at Bosham Hoe is a park at Blackhouse Copse) owned by the former Earl Marshall in the 13th century and a single findspot containing pottery sherds, found immediately south-east of Hook Farm. Given these two sites, the potential for encountering further remains from the Medieval period is likely to be low.

Post-Medieval (1540AD – 1900AD)

1.4.7 Apart from listed buildings in the area, the only evidence of Post-Medieval activity is from a well and brick kiln; likely forming part of a larger brick works noted on the OS map of 1813, which are located inside the wood covering part of the natural jetty at Bosham Hoe. Given the limited number of remains found to date, there is a low potential for Post-Medieval archaeology to be encountered.

.

1.5 Previous work

1.5.1 A number of borehole and stratigraphic studies have been carried out in the Chichester Harbour area discussed in detail by Bates (2005) and Francis (2007). The Bosham Channel and Chichester Channel surrounding Bosham Hoe have also been investigated (Bates, 2005), but there is little data for the inland areas of Bosham Hoe. Consequently, the results of this investigation provide a useful set of new baseline

sedimentary data. No archaeological investigations had been undertaken in this area to date.

2 AIMS

2.1.1 The main aims of the borehole monitoring as outlined within the WSI are summarised below. This also includes a consideration of the wider regional research objectives to which this investigation may contribute as outlined within the Chichester Harbour Archaeological Framework (2004)

2.1.2 The main aims of the assessment will be to:

- Describe and interpret the sediment sequence from the borehole samples and take palaeoenvironmental samples where deemed appropriate
- Identify significant variations in the deposit sequence indicative of localised features such as topographic highs or palaeochannels
- Identify the location and extent of any waterlogged organic deposits and address the potential and likely location for the preservation of archaeological and palaeoenvironmental remains
- Clarify the relationships between alluvial/fluvial sediment sequences and other deposit types, including periods of 'soil' development, peat growth and archaeological deposits
- Identify any archaeological remains (if present) or deposits that the development may remove or impact during the construction of the scheme
- Assess the archaeological significance of the sequences and whether further work should be recommended.

2.1.3 Regional research objectives:

- Attempting to understand coastal change through time, building on the previous work.
- Investigating relative sea level change within sequences that will help to provide broad period maps showing major channels, islands, promontories and coasts for different major periods.
- Continue to map and date sand and gravel deposits and develop understanding of Pleistocene deposits.

3 METHODOLOGY

3.1.1 The locations of the boreholes were determined by the requirements of the geotechnical investigation (Fig. 2). The boreholes were drilled by a specialist subcontractor using a Terrier percussion rig producing a continuous sequence of cores 1m in length, mostly without any significant loss of material. The maximum depth drilled was between 5 and 4 metres. The first *c* 1m of each sample location was hand dug.

3.1.2 The drilling of each borehole was monitored by a qualified geoarchaeologist. All retrieved cores were logged onsite on to standard OA summary proforma sheets which included information on sample number, core number, elevation and location with reference to Ordnance Datum and the National Grid, together with detailed sediment descriptions. The sediments were described according to Jones *et al* 1999 *The Description and Analysis of Quaternary Stratigraphic Field Sections, Technical Guide No 7, Quaternary Research Association*. This included information on depth, texture, composition, colour, clast orientation, structure (bedding, ped characteristics etc) and contacts between deposits. Note was also made of any visible ecofactual, or artefactual inclusions e.g. pottery, daub or charcoal fragments. Samples for further description and/or palaeoenvironmental remains were retrieved opportunistically.

3.1.3 The lithological data from the boreholes were inputted in geological modelling software (RockWorks 2006) to allow generation of stratigraphic cross-sections. Detailed logs are included in Appendix 1.

4 RESULTS

4.1.1 No anthropogenic material was observed (except for recently disturbed soils containing brick and concrete fragments), nor were any rich organic or fossiliferous deposits encountered (e.g. peats, carbonate silts). The sequences within the boreholes comprised largely pre-Holocene deposits (sandy gravel, pale mottled clay, pale sands, and stiff dark grey clays) expect for current surface soils and sub-soil. A significant proportion of which appear to be related to Tertiary deposits (i.e. bedrock), although a coarse-grained laterally extensive gravel unit overlain by a fine-grained, possibly loessic, silt may be of mid or late Pleistocene age.

4.1.2 The surface elevation of the majority of the boreholes was similar, apart for BHT 1 and BHT 10, which were c.1-2m lower. A lithological summary of each borehole is presented in Table 1.

Table 1: Summary of borehole data

Borehole	Max. Depth	Surface Elevation	Main Lithologies 0m 1m 2m 3m 4m 5m
BHT1	4.0m	3.24	Silt loam—gravel ---pale heavily mottled clay-----→----→----]

Borehole	Max. Depth	Surface Elevation	Main Lithologies 0m 1m 2m 3m 4m 5m
BHT2	5.0m	5.66	Silt loam ------–gravel ----clays and sands --------→-----→-----→-----→----]
BHT3	4.5m	5.63	Silt loam—gravel—clays and sands--------→-----→-----→-----→----]
BHT6	5.0m	5.74	Silt loam- -gravel—clays and sands-----→----→----→--darker grey sandy clay-]
BHT7	4.2m	4.40	Silt loam--gravel – light mottled clay----------darker grey clay------]
BHT9	5.0m	4.50	Silt loam—gravel—light mottled clays---------darker grey clay----------]
BHT10	4.7m	2.17	Clay loam ---- pale heavily mottled clay--------→-------→-------→-------]

Pre-Quaternary (Bedrock)

4.1.3 Pale grey, soft, plastic, sand free clay with abundant strong red mottling consistent with the Reading Beds (Lambeth Group) were identified in boreholes in the northern part of the study area (BHT 1, 3 and 10), the surface of which ranged from 1.35-1.75m OD. In BHT 1 it is capped by gravel (see below). In BHT10 (adjacent to active tidal marsh) it is overlain by relatively thin sediments of recent age, and appears to be undergoing active erosion by the creek margins.

4.1.4 Deposits consistent with London Clay were present in three boreholes (BHT 6, 7 and 9) in the southern part of the study area at the surface of which ranged from 0.25-1.25m OD at depths of c. 4.00-4.50m BGL, with some graded and weathered material overlying. These deposits have stiff textures, with micro-laminated horizons, combined with dark brown grey to blue grey hues, and silty clay to fine sandy silt compositions. Neo-formed, clear, flaky crystals (likely gypsum), in one instance c.1cm long, are present, especially in the base of BHT9. Crystal formations of this type suggest significant age, and are commonly found in London Clay. In BHT 9, the deposit grades upward to slightly paler, stiff clay with extensive mottling, suggestive of the weathered upper surface of the Tertiary bedrock. In BHT 7 and BHT 6 weathered zones were thinner, perhaps as a result of truncation, or perhaps due to less exposure (the top of the weathered zone in BHT 9 is *c* 1m higher (up to 3.20mBGL) than comparable zones in BHT7 and BHT6.

4.1.5 Overlying these deposits at approximately 5.00m and 2.00m BGL in BHT 2, 3 and 6 was a complex sequence of firm, bedded sand and clay deposits averaging 2-3m in thickness. Each bed measured 10cm or thicker but contained no obvious internal structures. Additionally discrete deposits of weathered clay, moderately to extensively mottled dull orange, pale grey, and occasionally yellow were present towards the top of the unit in BH 6 and 9. This unit had a crumb like ped structure (rather than platy) and was generally clast free. The dull orange mottles suggest reduction-oxidation of intermittently wet/dry cycles. The other mottles may be associated with pedogenic processes, mediated and initiated by fauna and flora. It is probable these deposits represent transition facies associated with the underlying bedrock, although local later reworking of this deposits cannot be ruled out. They are unlikely to represent the cold stage lacustrine deposits identified elsewhere in the region by Bates, particularly because they lack well defined fine laminate structures (M. Bates pers. comm.).

Pleistocene Gravel

4.1.6 A distinct unit of sandy gravel directly overlying these deposits can be clearly identified in all boreholes except BHT 10 (where comparable material may be worked into the current clay loam surface). It consisted of sub-angular to sub-rounded matrix supported, poorly sorted flint gravel, with clasts occasionally up to 20cm. There was no clear bedding or orientation, and no apparent lateral variation in clast size or morphology. Surfaces were often highly patinated, and broken faces, though less patinated, appeared quite worn. The matrix was usually medium sand with gritty inclusions. This varied, however, as the gravel is variably reworked into the overlying loamy silts and topsoil, and in places into the underlying clays. Occasionally clasts decrease towards the base of the unit.

4.1.7 The character of this unit suggests high-energy deposition. Gravel and sand deposits found inland around Chichester Harbour have been identified as raised beach deposits during periods of high sea-level (Bates 2005, Francis 2007). However, the character of the gravel deposits at Bosham Hoe is more consistent with cold stage fluvial deposition, possibly representing an ancient course of the River Lavant (M. Bates pers. comm.).

Sandy silt and silt loam

4.1.8 Apart for borehole BHT 10, the solum and near surface deposits consisted of sandy silts and silt loam. Only occasional small flint clasts were present, except where ploughed, or otherwise disturbed. The lower contact with the underlying gravels was commonly graded becoming sandier down profile with and increase in the size and frequency of gravel. The sandy silt/silt loam was clearly pedogenically active, both currently at the surface, but also with well developed fine crumb ped structure at greater depth. This unit appeared to be locally disturbed at depth as indicated by the presence of brick and concrete fragments in BHT 2.

4.1.9 Other than material derived from modern disturbance and ploughing no material of anthropogenic origin or significance was observed in this unit. The lithology is indicative of a loessic (wind blown) origin, and the BGS Geological Drift maps indicate that Brickearth is present in a wide swath across the study area. The deposit is moderately thin (less than 1m) across the Bosham Hoe area, and appears to have been well incorporated into active soil formation since deposition. This unit was probably deposited in a periglacial environment at the end of the last cold stage.

5 DISCUSSION

5.1.1 The monitoring of the ground investigation has been productive in characterising the gross morphology of the sub surface stratigraphy. It is likely that only the sandy gravel and overlying sandy silt loam units generally within the first 2m BGL are of archaeological relevance, that is deriving from periods within the last *c* 500,00 years.

5.1.2 Although no evidence of human activity was identified during these investigations, archaeological material may be present elsewhere around Bosham Hoe. Any artefactual material identified within the coarse grained fluvial gravels is however likely to have been substantially reworked, Artefactual material found in the finer grained overlying silts may have suffered minimal lateral transport although the upper parts of this unit in particular have undergone significant post-depositional, pedogenic, transformation. There is the potential for later prehistoric or historic archaeological features to be cut into the upper parts of the silts, although some plough truncation is to be expected. There is also the potential for other deposits of geoarchaeological or environmental relevance, for example fossiliferous channel fills, beach deposits or peat, missed by the widely spaced borehole distribution, although specifically along the route of the pipeline investigations the upper sequences appeared relatively consistent.

5.1.3 Superficial clayier facies associated with the upper part of the profile in BHT 10 may indicate recent alluviation in this peripheral area associated with a tidal inlet. Overall, however Holocene alluvial deposits appear to absent across the majority of the area investigated.

5.1.4 The sequences recorded during this investigation have relevance for better defining the geological and environmental history of wider landscapes in which archaeological sites may exist. The gravel unit has relevance to ongoing investigation of cold stage fluvial environments in the area, though it is not of high environmental potential in its own right.

5.1.5 There remains some uncertainty as to the origin and age of the 'stacked' sandy sediments in BHT 2, 3, 6 and 7. These are most probably associated with the underlying bedrock sequence although localized later reworking may have occurred. The deepest deposits of weathered London Clay and Reading Beds have no direct geoarchaeological significance. However, as major underlying strata, their form and position has continuing importance for understanding overlying deposit morphology and composition.

5.1.6 A limited number of grab samples were obtained from the boreholes, these are only of limited value as reference material, and no further work is proposed for them. They should, however, be made available to researchers with interests in the area. Additional material could also be retained from any samples not used in off-site analysis by the borehole contractors.

6 ACKNOWLEDGEMENTS

OA would like to acknowledge Dr Martin Bates (University of Lampeter) for his comments on the strata and site interpretation.

7 REFERENCES

Atkins Heritage	2007	Bosham Hoe, West Sussex: Brief for geoarchaeological monitoring
Bates, M.R.	2005	HA5 Paleoenvironment of the AONB: Desk Based Assessment of Borehole and Core information. Unpublished report, Chichester Harbour Conservancy
Francis, A.	2004	Chichester Harbour Area of Outstanding Natural Beauty: An archaeological research framework. Unpublished report, Museum of London Archaeology Service
Francis, A.	2007	Uncovering the Past: Archaeological discoveries in Chichester Harbour AONB. Unpublished report, museum of London Archaeology Service
Mills, W. Corcoran, J. Bates, M. Wittaker, J. Allen, P. Cameron, N. Roberts, K. & Pipe, A.	2007a	Chichester Harbour AONB, Coring and Palaeoenvironmental analysis – intertidal: Stage 4 Report, Volume I: data. Unpublished report, Museum of London Archaeology Service
Mills, W. Corcoran, J. & Bates, M.	2007b	Chichester Harbour AONB, Coring and Palaeoenvironmental analysis – intertidal: Stage 4 Report, Volume I: data. Unpublished report, Museum of London Archaeology Service
Oxford Archaeology	2007	Bosham Hoe, Sussex, Geoarchaeological borehole monitoring, Written Scheme of Investigation for Atkins Heritage

APPENDIX 1 BOREHOLE LOGS

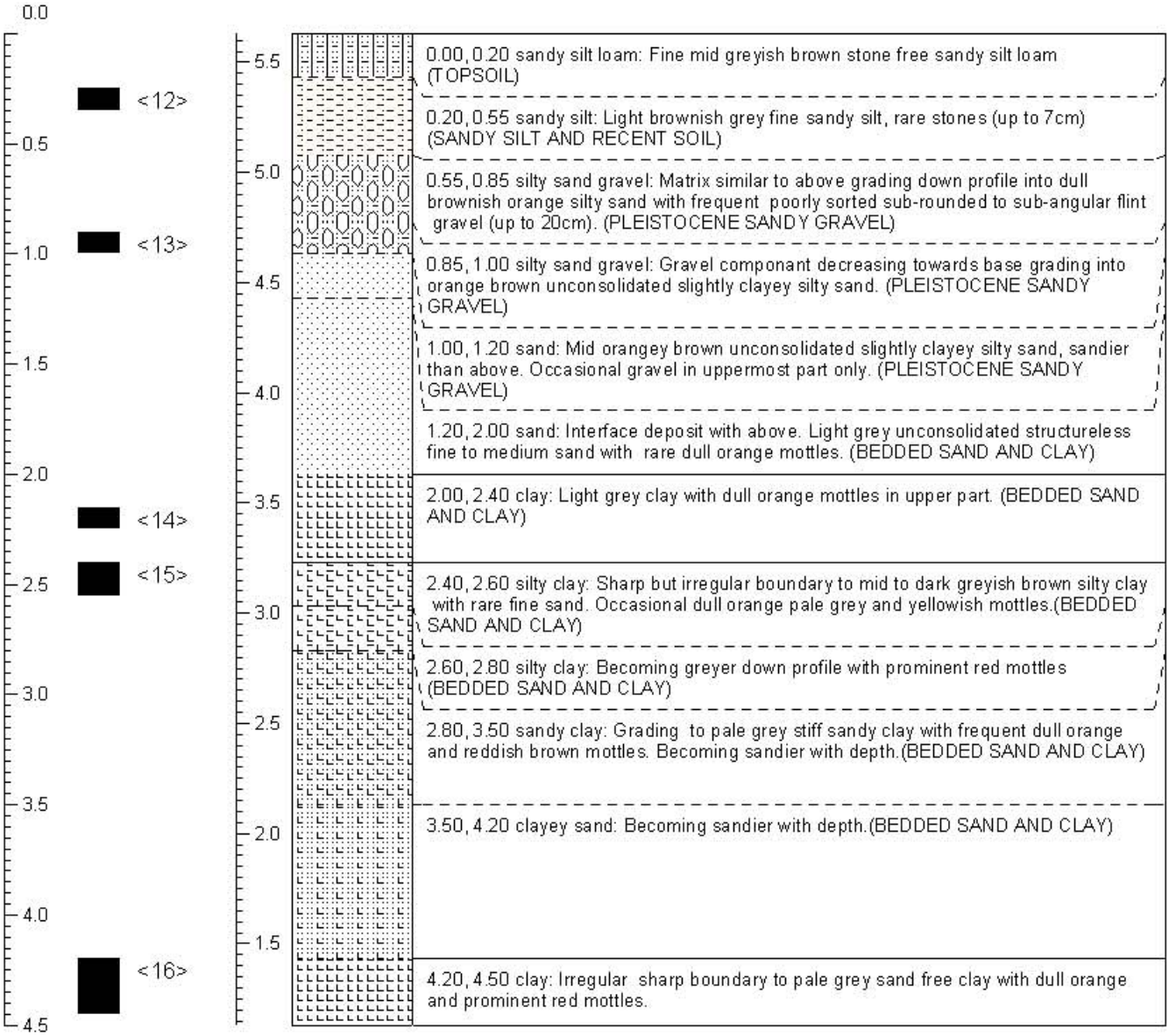
BOREHOLE No BHT1	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 17/10/07	CLIENT Atkins Heritage
GL (m AOD) 3.24	NGR 480704 102120	

Depth	Samples	Level	Lithology	Description
0.0		3.0		0.00, 0.10 silty loam: Thin mid brown silty loam, some fine sand with rare stones (TOPSOIL)
0.5		2.5		0.10, 0.20 clayey silt: Mid greyish brown clayey silt, slightly loamy with some fine sand. Occasional stones and small brick fragments (e.g. 2-3cm). (SANDY SILTS AND RECENT SOIL)
1.0		2.0		0.20, 0.60 silty clay gravel: Mid greyish orange/brown silty clay with some fine sand. Frequent sub-rounded to sub-angular poorly sorted flint gravel (up to 10 cm). Rare small (<1cm) brick fragments. (PLEISTOCENE SANDY GRAVEL)
1.5		1.5		0.60, 1.00 clayey gravel: Light brownish grey clay, frequent brownish orange Fe mottling concentrated around subvertical root channels Common supported poorly sorted sub-rounded to sub-angular gravel (up to 15cm). (PLEISTOCENE SANDY GRAVEL)
2.0		1.0		1.00, 1.50 Sediment loss from core
2.5		0.5		1.50, 4.00 clay: Very firm light yellowish grey slightly silty clay. Frequent dull orange and pinkish red mottles. Occassionally weakly bedded. Fine decaying 'rootlets' to 3.00+ meters. (BEDROCK: READING FORMATION)
3.0	<17>	0.0		
3.5		-0.5		
4.0				

BOREHOLE No BHT2	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 17/10/07	CLIENT Atkins Heritage
GL (m AOD) 5.66	NGR 481061 102029	

Depth	Samples	Level	Lithology	Description
0.0		5.5		0.00, 0.30 silty loam: Mid to dark greyish brown silt loam with some fine sand, rare stones. (TOPSOIL)
0.5		5.0		0.30, 1.10 silty loam: Mid greyish orange brown silt loam with some fine sand, with common stones including brick and concrete fragments (up to 15cm) (DISTURBED GROUND)
1.0		4.5		1.10, 1.80 silty sand gravel: Loose slightly silty mid orangey brown fine to medium sand with frequent sub-rounded to sub-angular poorly sorted flint gravel (up to 10cm) (PLEISTOCENE SANDY GRAVEL).
1.5	<9>	4.0		1.80, 2.00 sandy clay: Stiff slightly sandy light grey clay with occasional dull orange mottles (BEDDED SANDS AND CLAYS)
2.0		3.5		2.00, 2.75 sand: Light grey unconsolidated well sorted fine to medium sand. (BEDDED SANDS AND CLAYS)
2.5		3.0		2.75, 3.00 clay: Stiff slightly sandy light grey clay with occasional dull orange mottles (BEDDED SANDS AND CLAYS)
3.0		2.5		3.00, 3.50 sand: Light grey unconsolidated well sorted fine to medium sand. (BEDDED SANDS AND CLAYS)
3.5	<18>	2.0		3.50, 4.00 silty clay: Light grey grading to mid brownish grey slightly silty clay with occasional dull orange mottles and black Mn flecking. (BEDDED SANDS AND CLAYS)
4.0		1.5		4.00, 4.50 sand: Light grey, soft, fine to medium well sorted unconsolidated sand. Clast of brownish grey clay at c.4.20m possibly deriving from below. (BEDDED SANDS AND CLAYS)
4.5	<11> <10>	1.0		4.50, 4.95 silty clay: Mid to dark greyish brown silty clay (some fine sand) with occasional very dull orange mottles and common black Mn specks. Grades to grey below 4.70m. (BEDDED SANDS AND CLAYS)
5.0				4.95, 5.00 sand: Light grey unconsolidated fine to medium sand (BEDDED SANDS AND CLAYS)

BOREHOLE No BHT3	SITE NAME Bosham Hoe Pipieline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 17/10/07	CLIENT Atkins Heritage
GL (m AOD) 5.63	NGR 481365 102029	



BOREHOLE No BHT6	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 16/10/07	CLIENT Atkins Heritage
GL (m AOD) 5.74	NGR 481829 101565	

Depth	Samples	Level	Lithology	Description
0.0		5.5		0.00, 0.15 sandy silt loam: Thin mid brown sandy silt loam occasional stones. (TOPSOIL)
0.5				0.15, 0.45 sandy silt: Mid greyish brown sandy silt, loose/friable, occasional stones increasing to common down profile (SANDY SILT AND RECENT SOIL)
	<7>	5.0		0.45, 0.80 silty sand gravel: Dull orangey brown becoming bright orangey brown, unconsolidated silty sand with frequent poorly sorted sub-rounded to sub-angular flint gravel (up to 15cm). (PLEISTOCENE SANDY GRAVEL)
1.0				0.80, 1.00 silty sand gravel: Gradual decrease in frequency of gravel down profile. (PLEISTOCENE SANDY GRAVEL)
		4.5		1.00, 1.30 sandy clay: Irregular sharp boundary to light grey stiff slightly sandy clay with some dull orange mottles.(PLEISTOCENE SANDY GRAVEL)
1.5				1.30, 1.50 sand: Irregular sharp boundary to light yellowish unconsolidated well sorted fine sand.(PLEISTOCENE SANDY GRAVEL)
	<8>	4.0		1.50, 1.90 sandy gravel: Irregular boundary to bright orangey brown slightly stiff sand with frequent rounded to sub-angular poorly sorted flint gravel (up to 10cm). (PLEISTOCENE SANDY GRAVEL)
2.0				1.90, 3.00 silty clay: Irregular boundary to light brownish grey clay with occasional pale grey and dull orange mottles.(BEDDED SAND AND CLAY)
		3.5		
2.5				
		3.0		
3.0				3.00, 3.30 silty clay: Slightly darker grey, slightly sandy silty clay, rare mottles.(BEDDED SAND AND CLAY)
		2.5		
3.5				3.30, 4.00 sandy clay: Diffuse boundary to mid grey (slightly bluish) clay no mottles.(BEDDED SAND AND CLAY)
		2.0		
4.0				4.00, 4.50 clayey sand: Similar colour to above but increasingly sandy with depth. Graded interface between above and below.(BEDDED SAND AND CLAY)
		1.5		
4.5				4.50, 5.00 silty sand: Diffuse boundary to mid grey (slightly bluish) compact silty sand. Very fine weak platy bedding structures
		1.0		
5.0				

BOREHOLE No BHT7	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 16/10/07	CLIENT Atkins Heritage
GL (m AOD) 4.40	NGR 481542 101326	

Depth	Samples	Level	Lithology	Description
0.0		4.0		0.00, 0.15 sandy silt loam: Thin sandy silt loam (some clay) occasional small stones. (TOPSOIL)
0.5		3.5		0.15, 0.40 sandy silt: Light to mid yellowish brown sandy silt (loamy) faint orange Fe mottles in root channels. (SANDY SILT AND RECENT SOIL)
1.0		3.0		0.40, 0.70 sandy silt gravel: Matrix as above a little more orange and becoming sandier with depth. Frequent poorly sorted rounded to sub-angular flint gravel (up to 10cm).(PLEISTOCENE SANDY GRAVEL)
1.5		2.5		0.70, 1.00 silty clay: Becoming less gravelly grading to stiff silty clay (PLEISTOCENE SANDY GRAVEL)
2.0		2.0		1.00, 3.00 silty clay: Homogenous, clean, light brownish grey clay. Occassional faint dull orange and pale grey mottles. (LIGHTLY MOTTLED CLAY)
2.5		1.5		
3.0		1.0		3.00, 3.50 silty clay: Light grey clay, rare mottles.(LIGHTLY MOTTLED CLAY)
3.5		0.5		3.50, 4.00 silty clay: Greyish brown clay (INTERFACE ZONE)
4.0				4.00, 4.20 clay: Gradual boundary to firm clean mid grey clay. Homogenous with very faint dull orange vein like mottles, Thin platy horizontal structures.(LONDON CLAY)

BOREHOLE No BHT9	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 16-17/10/07	CLIENT Atkins Heritage
GL (m AOD) 4.5	NGR 480957 101489	

Depth	Samples	Level	Lithology	Description
0.0		4.5		0.00, 0.15 silty loam: Mid to dark brown, crumbly, silty loam (slightly sandy) with occasional stones and rare chalk fragments. Abundant modern roots (SANDY SILT AND RECENT SOIL)
0.5		4.0		0.15, 0.30 clayey gravel: Gradual boundary to mixed pale grey (with orange mottles) silty clay and slightly sandy silt (loamy sub-soil). Occasional to common flinty gravel (poorly sorted sub-rounded to sub-angular up to 10cm) increasing with depth. Plough mixed prior to formation of current roadside verge?(SANDY SILT AND RECENT SOIL)
1.0		3.5		0.30, 0.60 clayey gravel: Clear boundary to mid brownish/orange grey clay with frequent matrix supported flinty gravel (rounded to sub-angular poorly sorted up to c.10cm).(PLEISTOCENE SANDY GRAVEL)
1.5	<1>	3.0		0.60, 1.30 clayey gravel: Grading to mid grey stiff clay with dull orange mottles (increasing down profile). Frequent poorly sorted sub-rounded to sub-angular gravel up to 15cm.(PLEISTOCENE SANDY GRAVEL)
2.0		2.5		1.30, 1.50 sandy clay gravel: Gravel as above but quite sharp change to slightly clayey mid orange (bright) sand matrix.(PLEISTOCENE SANDY GRAVEL)
2.5	<2>	2.0		1.50, 3.20 clay: Sharp boundary to light grey clay with frequent dull orange mottles. Weak/fine bedding structures, especially at c.2.50m (MOTTLED CLAY)
3.0		1.5		
3.5	<3>	1.0		3.20, 4.25 silty clay: Diffuse boundary to darker brownish grey clay (slightly silty with some fine sand). Common dull orange vein like and patchy mottles. Occasional weak finely bedded structures to 3.7m. Below matrix is mixed . (MOTTLED CLAY)
4.0	<4>	0.5		
	<5>			
4.5		0.0		4.25, 5.00 silty clay: Stiff dark grey clay with some silt and fine sand. Occasional gypsum crystals (up to 1.5cm) and common Mn flecks. Micro-laminated platy structure. (LONDON CLAY)
5.0		-0.5		

BOREHOLE No BHT10	SITE NAME Bosham Hoe Pipeline	Oxford Archaeology
	SITE CODE BOSHOE07	
	LOGGED BY Dan Miller DATE 16/10/07	CLIENT Atkins Heritage
GL (m AOD) 2.17	NGR 481038 101769	

Depth	Samples	Level	Lithology	Description
0.0		2.0		0.00, 0.15 clayey loam: Very dark brown/black clay loam with vegetation and thick root mat, common small to large stones brick fragments and other modern debris (RECENT SOIL)
0.5		1.5		0.15, 0.40 organic silty clay: Distinct boundary to mid brown grey clay with occasional brick and stone inclusions silty clay with angular weak peds. (RECENT SUB-SOIL)
1.0	<6>	1.0		0.40, 0.55 organic silty clay: Gradual boundary to darker grey more homogenous and compressed silty clay, occasional small to medium rounded to sub-angular poorly sorted flint gravel (INTERFACE ZONE)
1.5		0.5		0.55, 0.80 organic silty clay: Interface between above and below gradual transition with mixed materials
2.0		0.0		0.80, 4.75 clay: Pale grey (slightly brownish/yellowish) clay with extensive strong pinkish red to purple red mottles sometimes as small deep red concretions (especially at c.3.5-4.5m).
2.5		-0.5		
3.0		-1.0		
3.5		-1.5		
4.0		-2.0		
4.5		-2.5		

APPENDIX 2 SUMMARY OF SITE DETAILS

Site name: Bosham Hoe Pipeline
Site code: BOSHOE07
Grid reference: SU 8101402330
Type of evaluation: Geoarchaeological borehole monitoring
Date and duration of project: 16-17/10/2007
Area of site: N.a
Summary of results: In October 2007 Oxford Archaeology was commissioned by Atkins Heritage to carry out a Watching Brief along the route of a proposed pipeline at Bosham Hoe, West Sussex. The Watching Brief comprised the monitoring of seven geotechnical boreholes. The sedimentary sequence revealed within the boreholes comprised relatively thin minerogenic deposits of silty loam, sandy silts and gravels of probable Pleistocene age directly overlying Tertiary bedrock. Apart from modern disturbance, no direct evidence for anthropogenic activity was identified within the sediments.
Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Chichester District Museum in due course.

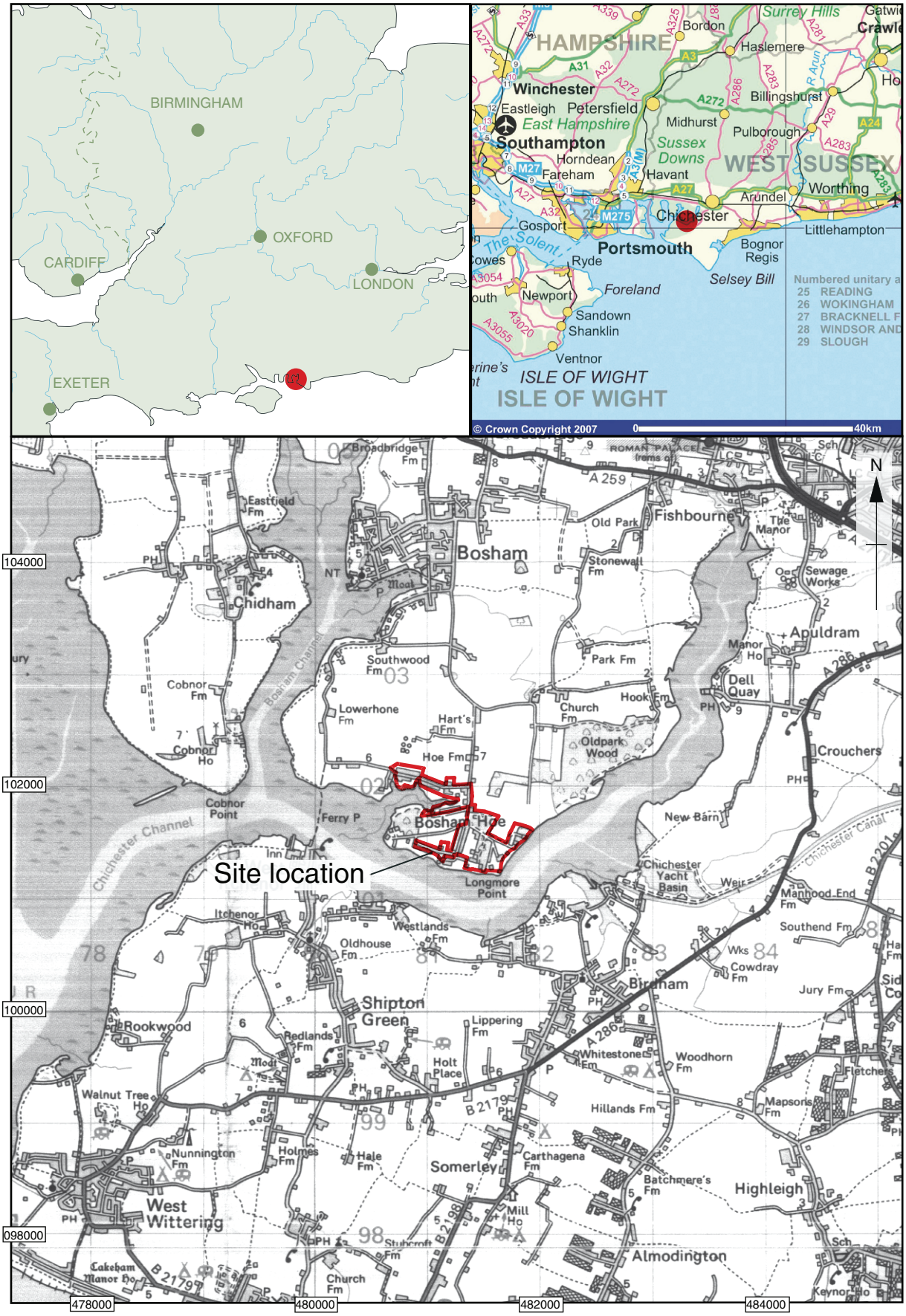


Figure 1: Site location

Servergo:/oaupubs1_A thru H*BOSHOE07*BOSHOEWB*Bosham Hoe Pipeline*SML *24.10.07

BOSHAM WWTW AND OUTFALL

ARABLE

GRASS

WOODLAND

BHT1

3 PROPERTIES FOR FUTURE CONNECTION

BHT2

5 PROPERTIES FOR FUTURE CONNECTION

BHT3

THE MEADOW (GRASS)

PROPOSED VACUUM AND TRANSFER PUMPING STATION

PROPOSED CONTRACTOR'S COMPOUND

ARABLE

BHT5

BHT4

WOODLAND

BHT6

BHT10

WOODLAND

ARABLE

ARABLE

5 PROPERTIES FOR FUTURE CONNECTION

ARABLE

BHT9

THE PADDOCK (GRASS)

WOODLAND

BHT8

LIGHTERS FIELD (GRASS)

BHT7

N

KEY

- Geoarchaeologically monitored boreholes
- Route of pipes
- Proposed vacuum sewer
- Proposed pumping main
- Proposed property connection
- Proposed property connection point
- Proposed valve chamber
- Limit of proposed service area
- Borehole by windows sampling with Terrier Rig
- Existing borehole
- 10m deep cable percussion borehole

0 100 m

1:2500

0 50 m

1:1250

Reproduced from Atkins plan

Which scale is right? The original said it was at 1:2500 but I suspect it is 1:1250

Figure 2: Borehole locations

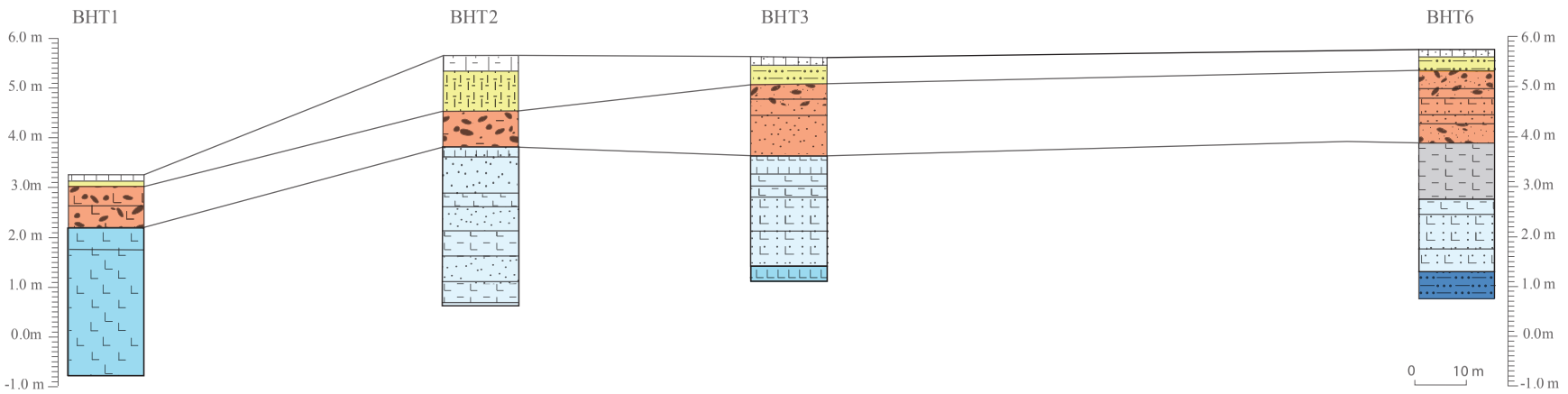


Figure 3: West-East profile, BHT 1, 2, 3 and 6

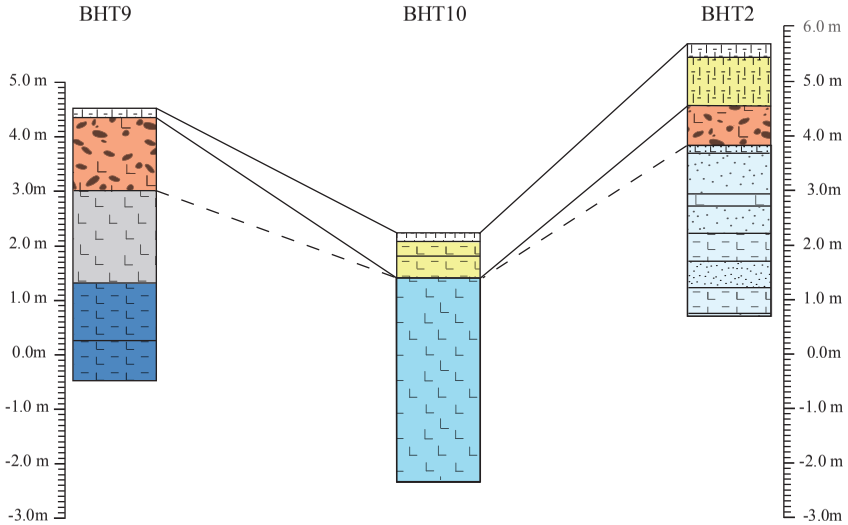


Figure 4: South - North profile, BHT 9, 10 and 2