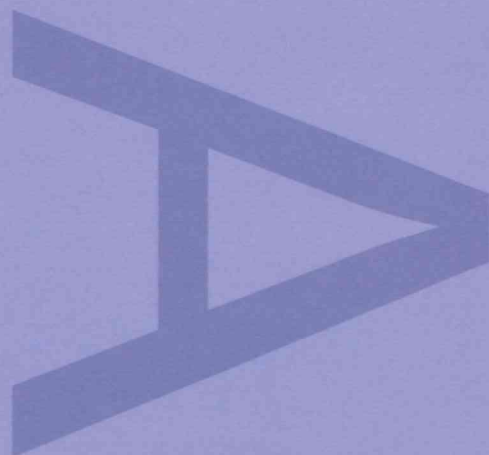
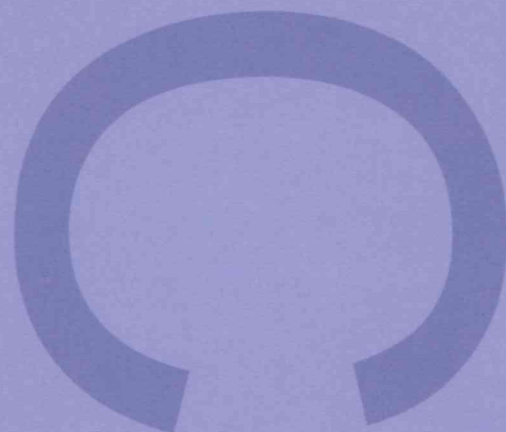
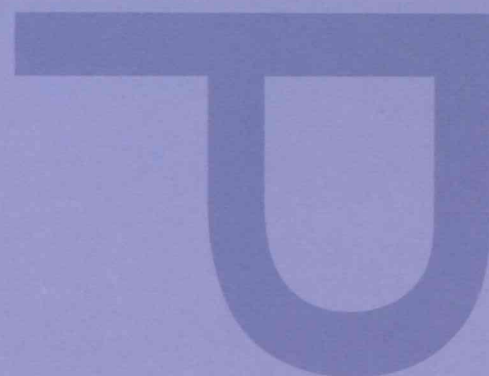


ST PAUL'S ACADEMY (ABBAY WOOD  
SCHOOL)

LONDON BOROUGH OF GREENWICH

EVALUATION



AUGUST 2005

AWS 05

PRE-CONSTRUCT ARCHAEOLOGY

## DOCUMENT VERIFICATION

# ST PAUL'S ACADEMY EVALUATION

### Quality Control

Pre-Construct Archaeology Limited			
	Name & Title	Signature	Date
Text Prepared by:	Chris Mayo		August 2005
Graphics Prepared by:	Adrian Nash		August 2005
Graphics Checked by:	Jon Butler		August 2005
Project Manager Sign-off:	Tim Bradley		August 2005

Revision No.	Date	Checked	Approved

Pre-Construct Archaeology Ltd  
Unit 54  
Brockley Cross Business Centre  
96 Endwell Road  
London  
SE4 2PD

**An Archaeological Evaluation at St. Paul's Academy (Abbey Wood School), Eynsham Drive, Abbey Wood, London Borough of Greenwich**

**Central National Grid Reference: TQ 4630 7915**

**Site Code: AWS 05**

**Written and Researched by Chris Mayo**

**Pre-Construct Archaeology Ltd.  
August 2005**

**Project Manager: Tim Bradley**

**Commissioning Client: Rydon Construction Ltd**

**Contractor:**

**Pre-Construct Archaeology Limited  
Unit 54  
Brockley Cross Business Centre  
96 Endwell Road  
Brockley  
London SE4 2PD**

**Tel: 0207 732 3925  
Fax: 0207 732 7896  
E-mail: [tbradley@pre-construct.com](mailto:tbradley@pre-construct.com)  
Website [www.pre-construct.com](http://www.pre-construct.com)**

**Pre-Construct Archaeology Ltd.  
August 2005**

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## **1 ABSTRACT**

- 1.1 An archaeological evaluation was conducted by Pre-Construct Archaeology Ltd. at St Paul's Academy (Abbey Wood School) (henceforth the Site) (Figure 1), at Abbey Wood, London Borough of Greenwich, to assess the nature of surviving archaeological and environmental remains across the site. The work was commissioned by Rydon Construction Ltd.
- 1.2 The investigation was undertaken between the 20<sup>th</sup> and 28<sup>th</sup> June 2005. It comprised five trenches to assess potential peat deposits on Site, with one of these designed to cut completely through the peat.
- 1.3 The natural sequence of the Site, comprising fluvial deposits, peat and alluvial clay, was seen. The peat was seen to be sporadic, with concentrated thicknesses surviving in the northwest of the Site. The lack of peat in the other areas may suggest the presence of an underlying prehistoric tributary of the Thames. The peat was sampled for environmental analysis. In one trench a 19th century boundary ditch was found, attesting to the post-medieval use of the area for agriculture or pasture.

## **2 INTRODUCTION**

- 2.1 An archaeological evaluation was undertaken by Pre-Construct Archaeology Ltd. at St Paul's Academy (Abbey Wood School), Abbey Wood, London Borough of Greenwich (Figure 1). The Site is currently a playing field attached to Abbey Wood School, but is intended as part of a new development for St Paul's Academy. Pre-Construct Archaeology was commissioned by Rydon Construction Ltd. The site is centred at National Grid Reference TQ 4630 7915.
- 2.2 A desk-based assessment of the Site by Pre-Construct Archaeology (Leary 2004) has shown the palaeo-environmental and prehistoric potential of the Site. Environmental archaeologists from Archaeoscape visited the Site to take samples of the peat for analysis.
- 2.4 The Site is bounded by residential buildings, a primary school and Combwell Crescent to the south, Church Manorway to the west, by Finchale Road to the north and by Penmon Road and Eynsham Drive to the east.
- 2.5 The evaluation was conducted between the 20<sup>th</sup> and 28<sup>th</sup> June 2005. A Method Statement (Bradley 2005) was completed prior to the work.
- 2.6 The evaluation was monitored by Mark Stevenson of the Greater London Archaeological Advisory Service (GLAAS). The project manager for Pre-Construct Archaeology Ltd. was Tim Bradley, and the work was supervised by Chris Mayo.
- 2.7 The completed archive, comprising written, drawn and photographic records and artefacts will eventually be deposited at the London Archaeological Archive and Research Centre (LAARC) under the site code AWS 05.

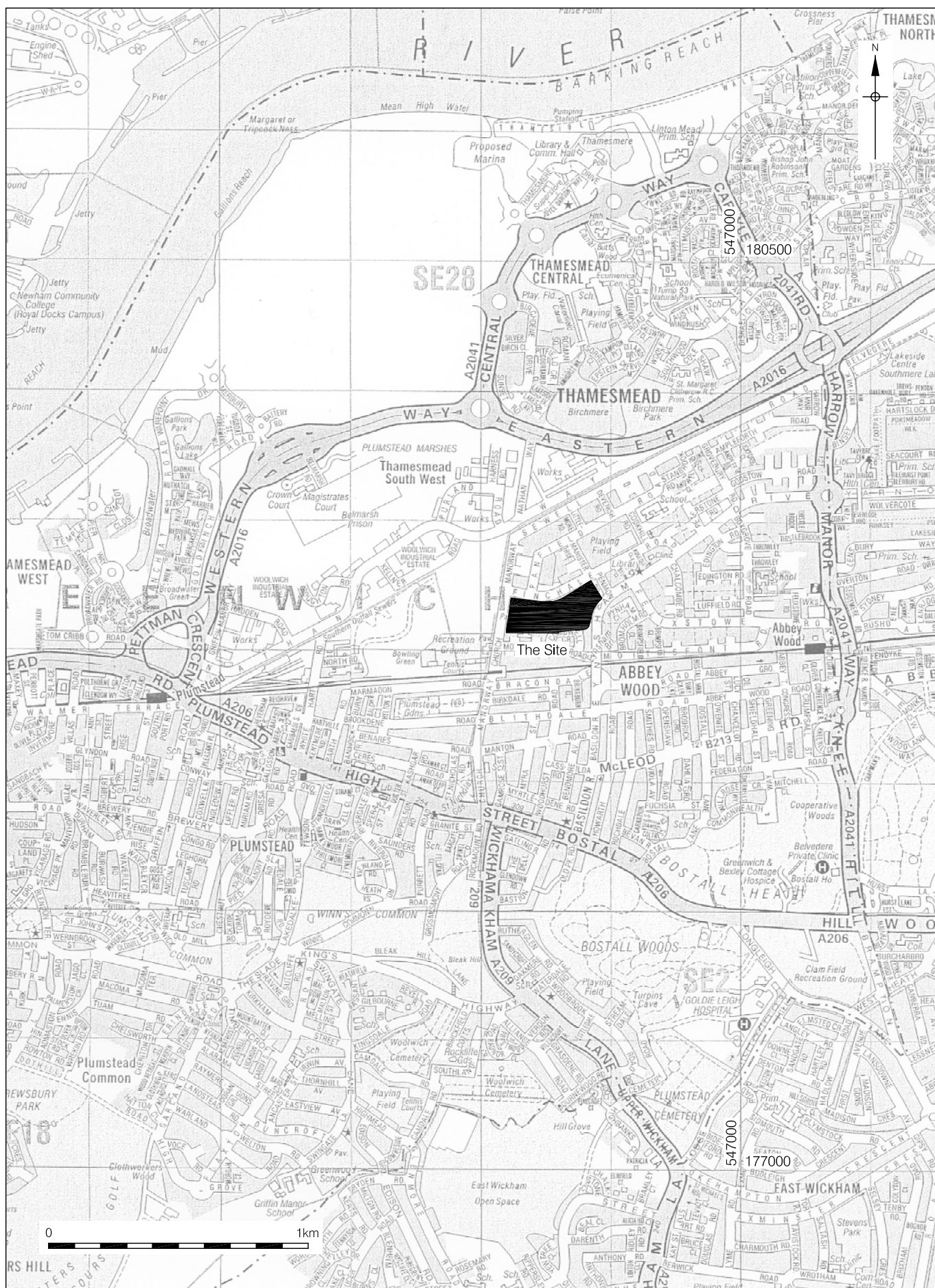


Figure 1  
Site Location  
1:20,000



Figure 2  
Detailed Site Location  
1:2000



### 3 PLANNING BACKGROUND

- 3.1 The design for the investigation fulfils the requirements set out by the Development Plan Framework of the London Borough of Greenwich Unitary Development Plan (UDP), published in 1994 (see below):

#### ARCHAEOLOGY

##### POLICY D27A

AT IDENTIFIED SITES OF KNOWN ARCHAEOLOGICAL REMAINS OF NATIONAL IMPORTANCE, INCLUDING SCHEDULED MONUMENTS, THERE WILL BE A PRESUMPTION IN FAVOUR OF THE PHYSICAL PRESERVATION OF THE REMAINS *IN SITU* AND TO ALLOW FOR PUBLIC ACCESS AND DISPLAY. FOR REMAINS *IN SITU*, BUT WHERE THIS IS NOT FEASIBLE, THE REMAINS SHOULD BE EITHER EXCAVATED AND REMOVED FROM THE SITE, OR EXCAVATED AND RECORDED BEFORE DESTRUCTION. APPROPRIATE CONDITIONS / LEGAL AGREEMENTS MAY BE USED TO ENSURE THIS IS SATISFIED.

##### POLICY D27B

THE COUNCIL WILL EXPECT APPLICANTS TO PROPERLY ASSESS AND PLAN FOR THE IMPACT OF PROPOSED DEVELOPMENTS ON ARCHAEOLOGICAL REMAINS WHERE THEY FALL WITHIN AREAS OF ARCHAEOLOGICAL POTENTIAL AS DEFINED ON THE CONSTRAINTS MAP 10. IN CERTAIN INSTANCES PRELIMINARY ARCHAEOLOGICAL SITE INVESTIGATIONS MAY BE REQUIRED BEFORE PROPOSALS ARE CONSIDERED. THE COUNCIL WILL SEEK TO SECURE THE CO-OPERATION OF DEVELOPERS IN THE EXCAVATION, RECORDING AND PUBLICATION OF ARCHAEOLOGICAL FINDS BEFORE DEVELOPMENT TAKES PLACE BY USE OF PLANNING CONDITIONS / LEGAL AGREEMENTS AS APPROPRIATE.

- 3.2 The London Borough of Greenwich produced its UDP First Deposit Draft in February 2002. The plan contains the following policies, which provide a framework for the consideration of development proposals affecting archaeological and cultural heritage features.

#### ARCHAEOLOGY

##### POLICY D29A

AT IDENTIFIED SITES OF KNOWN ARCHAEOLOGICAL REMAINS OF NATIONAL IMPORTANCE, INCLUDING SCHEDULES MONUMENTS, THERE WILL BE A PRESUMPTION IN FAVOUR OF THE PHYSICAL PRESERVATION OF THE REMAINS *IN SITU* AND TO ALLOW FOR PUBLIC ACCESS AND DISPLAY. FOR SITES OF LESSER IMPORTANCE THE COUNCIL WILL SEEK TO PRESERVE THE REMAINS *IN SITU*, BUT WHERE THIS IS NOT FEASIBLE THE REMAINS SHOULD BE EITHER INVESTIGATED, EXCAVATED AND REMOVED FROM SITE, OR INVESTIGATED, EXCAVATED AND RECORDED BEFORE DESTRUCTION. APPROPRIATE CONDITIONS / LEGAL AGREEMENTS MAY BE USED TO ENSURE THAT THIS IS SATISFIED.

##### POLICY D29B

THE COUNCIL WILL EXPECT APPLICANTS TO PROPERLY ASSESS AND PLAN FOR THE IMPACT OF PROPOSED DEVELOPMENTS ON ARCHAEOLOGICAL REMAINS WHERE THEY FALL WITHIN 'AREAS OF ARCHAEOLOGICAL POTENTIAL' AS DEFINED ON THE CONSTRAINTS MAP 10. IN CERTAIN INSTANCES PRELIMINARY ARCHAEOLOGICAL SITE INVESTIGATIONS MAY BE REQUIRED BEFORE PROPOSALS ARE CONSIDERED. THE COUNCIL WILL SEEK TO ENSURE THE CO-OPERATION OF DEVELOPERS IN THE EXCAVATION, RECORDING AND PUBLICATION OF ARCHAEOLOGICAL FINDS BEFORE DEVELOPMENT TAKES PLACE BY USE OF PLANNING CONDITIONS / LEGAL AGREEMENTS AS APPROPRIATE.

## **4 GEOLOGY AND TOPOGRAPHY**

### **4.1 GEOLOGY**

- 4.1.1 The underlying geology of the Site is alluvial deposits with localised areas of peat, overlying river terrace gravels<sup>1</sup>.

### **4.2 TOPOGRAPHY**

- 4.2.1 The Site is located just under 2km to the south of the River Thames. It is on low-lying level ground which was originally within the floodplain of the river.

## **5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND**

- 5.1 The archaeological and historical background of the Site has been detailed in a desk-based assessment (Leary 2004). This information is summarised below.

### **5.2 PREHISTORIC**

- 5.2.1 Only a few artefacts of prehistoric date have been recovered from the immediate area of the Site, in keeping with the marshland nature of the Site in those times. These marsh deposits, particularly the peat, may have been exploited and as such there is a chance of archaeological remains being present within the alluvial clay and peat deposits as have been excavated on the north bank of the River Thames (Meddens 1996). The peat deposits particularly can, under analysis, reveal valuable palaeo-environmental information.

### **5.3 ROMAN**

- 5.3.1 There may have been a Roman settlement in existence along Plumstead High Street; closer to the Site pottery fragments have been recovered. This suggests that the marshland was being exploited in the Roman period.

### **5.4 ANGLO-SAXON / EARLY MEDIEVAL**

- 5.4.1 In Saxon and medieval times the Site is likely to have lain within the extensive estates of Lesnes Abbey as open ground. Little evidence for these periods has been found in the area of the Site.

### **5.5 POST-MEDIEVAL**

- 5.5.1 In post-medieval times the marshland around the Site was reclaimed and utilised for fields, reflected in a Tithe map of 1842 that shows nothing more substantial than field boundaries. Indeed this situation remained until the construction of Abbey Wood School in the 1960s.

---

<sup>1</sup> From British Geological Survey, 1:50 000 Series, England and Wales Sheet 271: Dartford (1998)

## 6 ARCHAEOLOGICAL METHODOLOGY

- 6.1 Five trenches were designed in the Method Statement (Bradley 2005) to provide coverage of the potential peat deposits across the area of the school's playing field (Figure 2). Four of these (Trenches 1 to 4) were to be excavated only to the top of the peat to allow its' inspection, while the fifth (Trench 5) was to cut through the peat and allow environmental sampling to occur.
- 6.2 Trenches 1 to 4 were to be 20m long at their base, while Trench 5 was to be up to 10m<sup>2</sup> in order to be safely stepped and allow access through the peat.
- 6.3 This methodology was altered slightly during the course of the evaluation in light of two factors: the non-continuous nature of the peat across the site and the continual breaches of site security. Upon discussion between Mark Stevenson of GLAAS and Tim Bradley and Chris Mayo of Pre-Construct Archaeology, it was agreed that the peat could be reasonably evaluated by means of a series of machine-cut sondages along the length of the evaluation trenches (Figure 2). These could allow the inspection of the peat but also be opened and backfilled within a day, thereby reducing the risks on site.
- 6.4 All trenches were machine excavated with a tracked 360° mechanical excavator fitted with a flat-bladed ditching bucket, under the supervision of an archaeologist. The maximum dimensions and depths of the trenches are shown in Table 1. Once archaeologically sensitive deposits or features were encountered, machining was stopped to allow archaeologists to clean with hand tools as necessary and record the remains.

Trench Number	Max Dimensions (m)	Max Depth (m)	Max height (m OD)
1	11.7 x 3.8	3.34	0.88
2a	7.8 x 2.6	2.83	0.83
2b	3.3 x 2.2	1.34	0.76
3a	5.5 x 1.8	2.18	0.84
3b	3.8 x 2.6	1.71	0.82
4a	4.1 x 3.7	2.94	1.01
4b	4.7 x 2.5	3.12	0.91
5	6.6 x 6.1	3.01	0.82

**Table 1: Trench Dimensions**

- 6.5 A team from Archaeoscape were in attendance, on the 23rd and 24th June 2005, to take environmental samples from Trench 5. During the course of the evaluation it was also decided to drill through the peat in Trench 2 and take core samples for analysis.
- 6.6 All levels in this report were established from an OSBM on 188 Finchale Road with a value of 1.74m OD.

## **7 THE ARCHAEOLOGICAL SEQUENCE**

### **7.1 PHASE 1: NATURAL FLUVIAL DEPOSITS** (Figures 4, 5 and 6)

- 7.1.1 A number of fluvial deposits were found representing the earliest natural strata on the Site. In Trench 4 sub-rounded to rounded riverine terrace gravels [15] were recorded at an upper height of -2.01m OD, within a mid-brown and slightly sandy-silt matrix.
- 7.1.2 Another gravel layer [12] was found in Trench 5 at -2.06m OD. However this was different in the fact that the gravel was more angular and within a light blue-grey sand-silt matrix.
- 7.1.3 In Trench 1 fluvial deposits [6] and [7] were brownish silt-sand clay layers at -2.00m OD. They contained only very infrequent gravel.
- 7.1.4 The change in these fluvial deposits, recorded from south to north, suggests that an underlying river channel, a tributary of the Thames, may be present on the Site and could be aligned approximately southwest to northeast.

### **7.2 PHASE 2: NATURAL PEAT DEPOSITS** (Figures 4, 5 and 6)

- 7.2.1 Deposits of peat [3], [10], [18], [21] and [24] were found in Trenches 1, 2, 3 and 5. Their upper heights ranged from -0.63m OD ([18] in Trench 2) to -1.34m OD ([21] in Trench 3), representing a drop in height from east to west. The peat in Trenches 2, 3 and 5 was dark brown and with a high wood content. The thickness of the peat was recorded in Trench 2 (from the Archaeoscape drilling core) and Trench 5 (for environmental sampling), and was seen to be between 1.1m and 1.5m thick.
- 7.2.2 The peat deposit found in Trench 1 was at least 0.6m thick but banded out to the west, giving the impression of being lens-like as opposed to a distinct layer.
- 7.2.3 No peat was found to the south of the Site in Trench 4. This could be interpreted as further evidence of an underlying river channel, aligned approximately southwest to northeast.

### **7.3 PHASE 3: NATURAL ALLUVIAL DEPOSITS** (Figures 4, 5 and 6)

- 7.3.1 A thick deposit of stiff alluvial clay ([2], [9], [17], [20] and [23]) was recorded in all trenches at heights between 0.42m OD in Trench 3 and -0.20m OD in Trench 4. Its' thickness ranged from 0.86m in Trench 2 to 2.2m in Trench 1.

### **7.4 PHASE 4: 19<sup>TH</sup> CENTURY ACTIVITY** (Figures 3, 4, 5 and 6)

- 7.4.1 Cut into the alluvial clay in Trench 1 was an approximately east-west aligned ditch [5]. Observed for at least 12.5m, and with a width of 1.7m and depth of 0.3m, the feature was dug from 0.04m OD. Sherds of 19<sup>th</sup>/early 20<sup>th</sup> century pottery were recovered from fill [4]. The ditch was a drainage and boundary feature associated with the use of the Site for agriculture or pasture in the 19<sup>th</sup> century.
- 7.4.2 Sealing the ditch, and recorded in all trenches, were deposits of subsoil or ploughsoil, further evidence of the agricultural or pastoral use of the Site. The deposits [1], [8], [13], [16], [19] and [22] ranged in height between 0.68m OD in Trench 3 and 0.30m OD in Trench 4. Layers of topsoil and turf in turned sealed the subsoils. The varying thicknesses of these upper layers suggests that some terracing may have occurred on the Site, most likely when the playing field was formed in the 1960s.

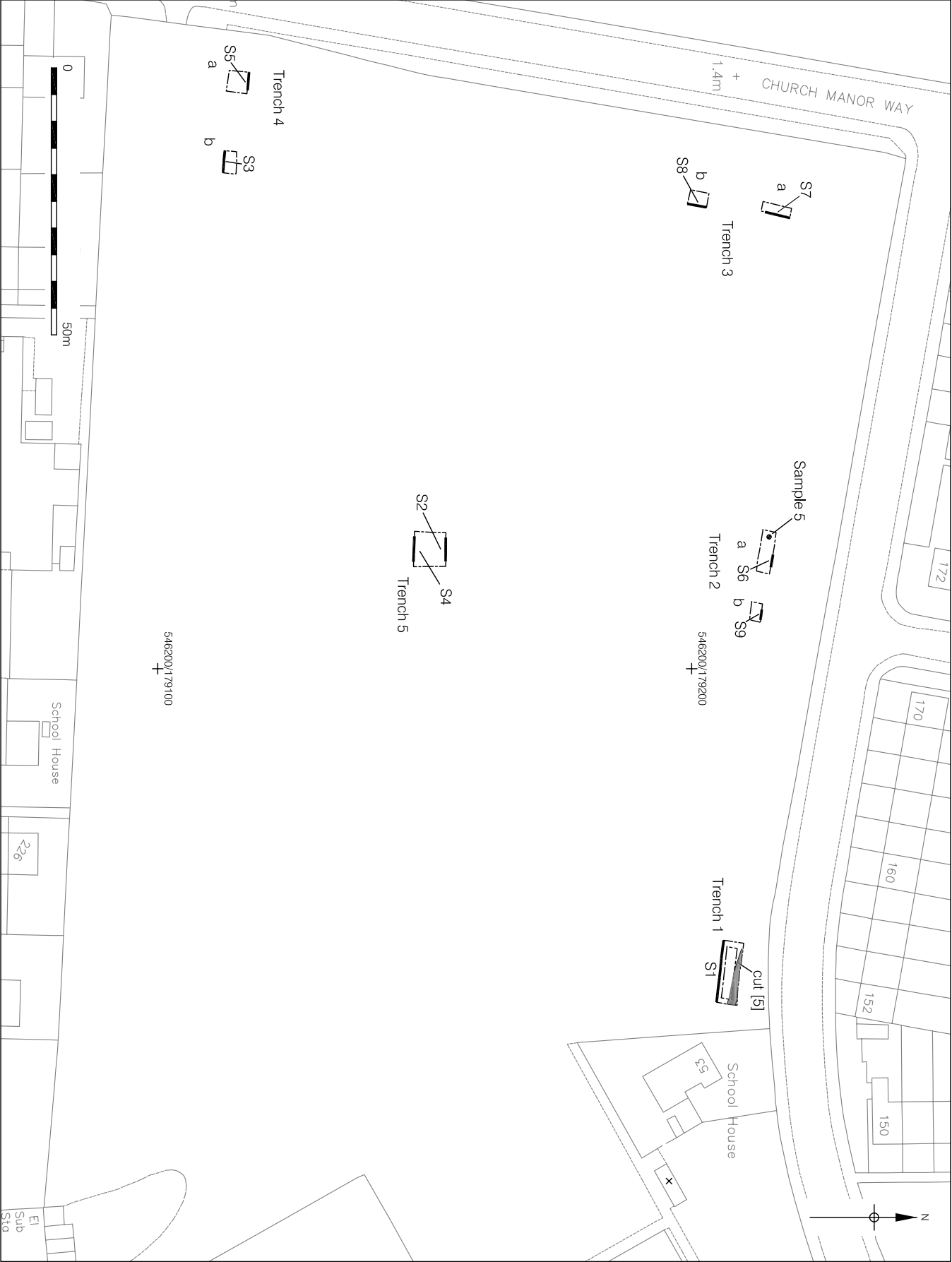


Figure 3  
Trench Location  
1:1000

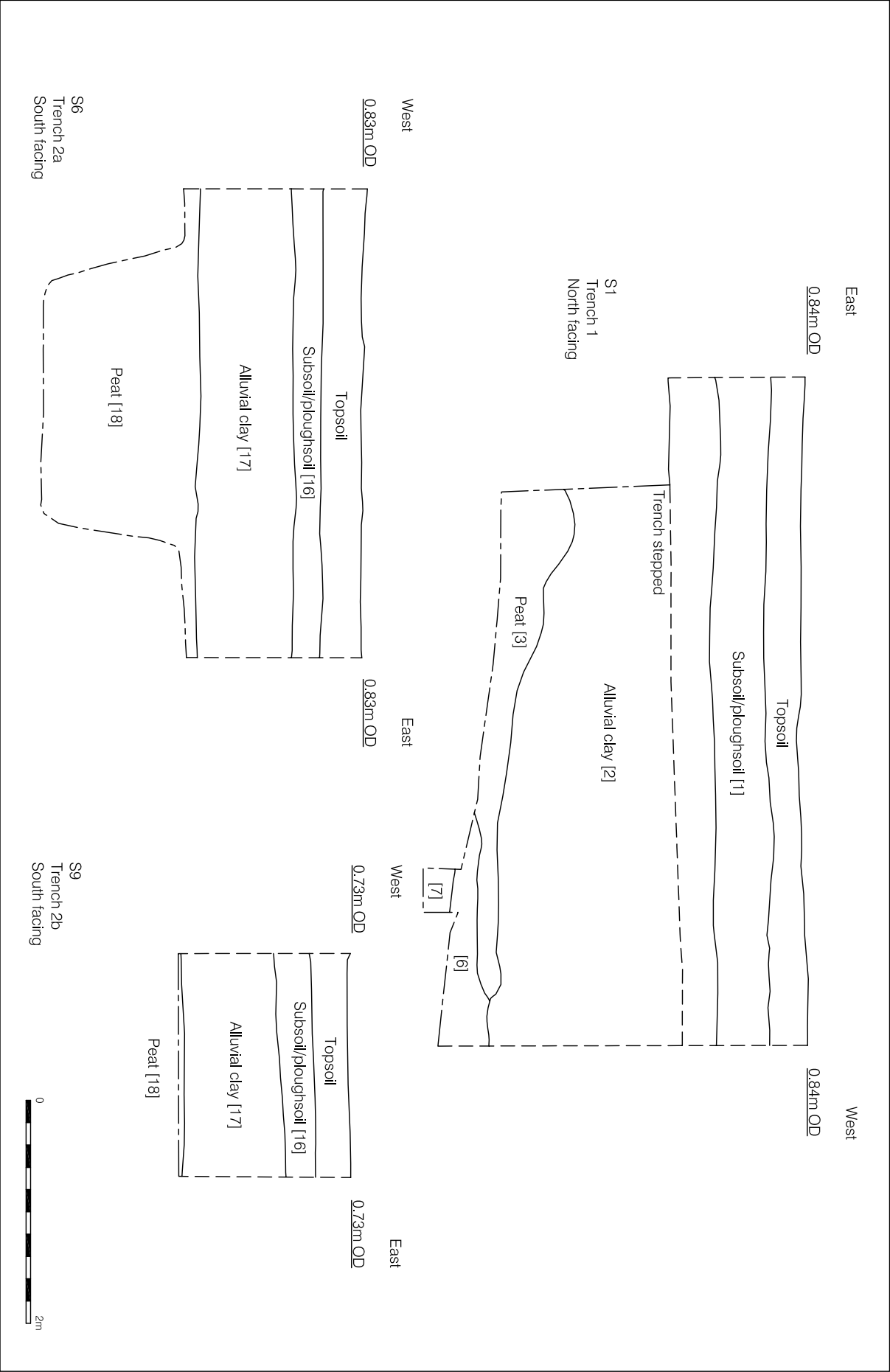


Figure 4  
Sections 1, 2a and 2b  
1:50

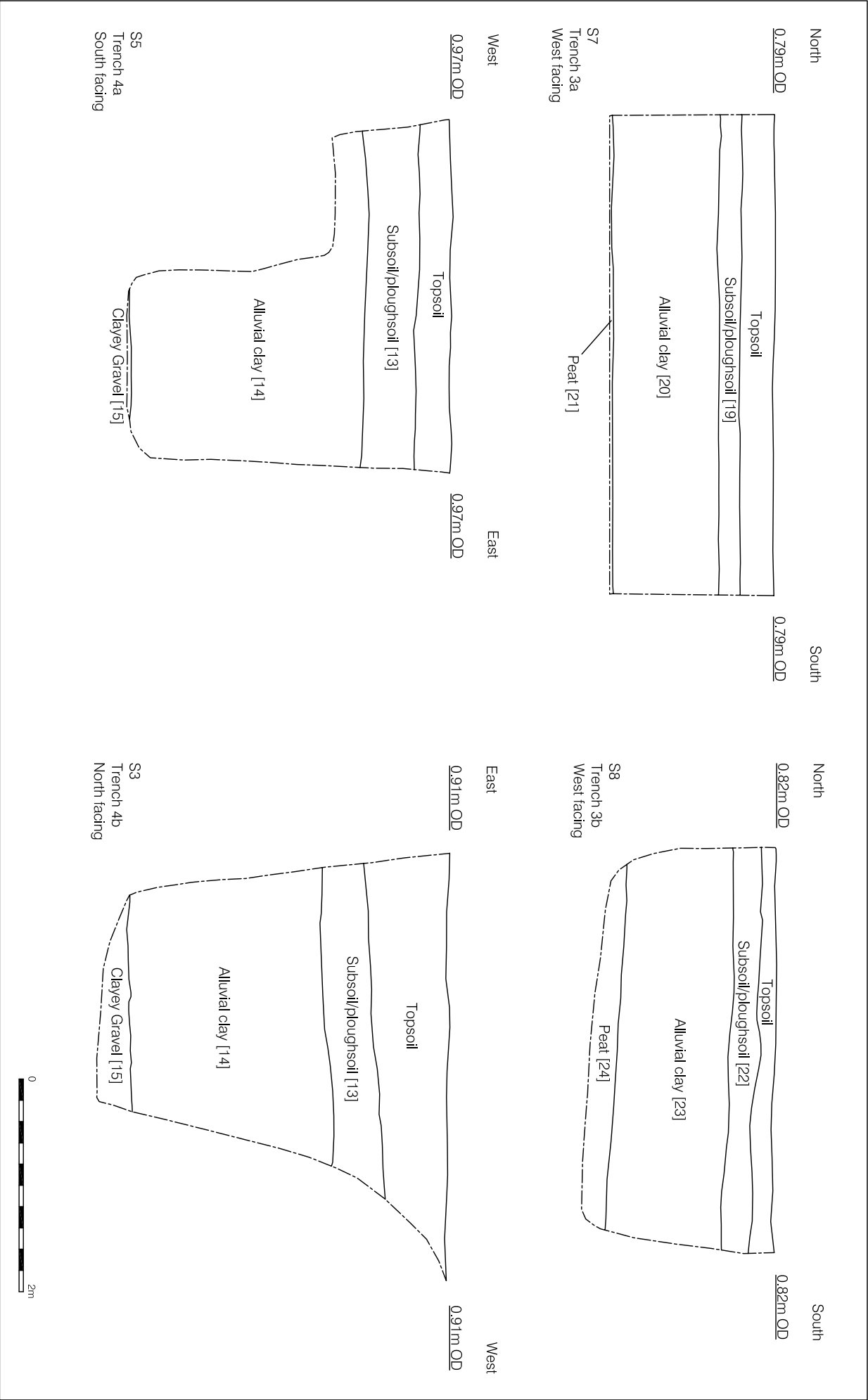


Figure 5  
Sections 3a, 3b, 4a and 4b  
1:50

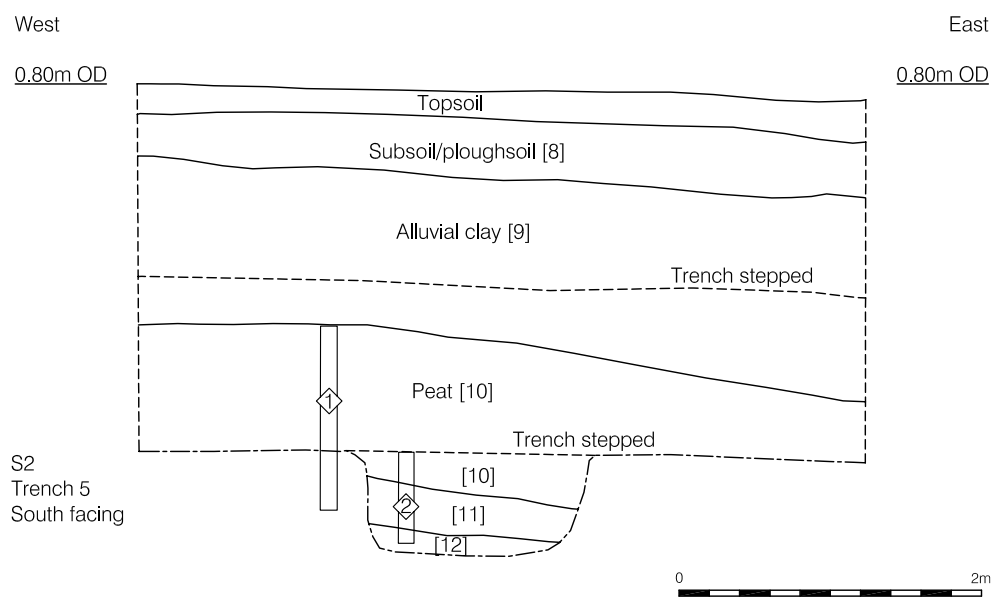
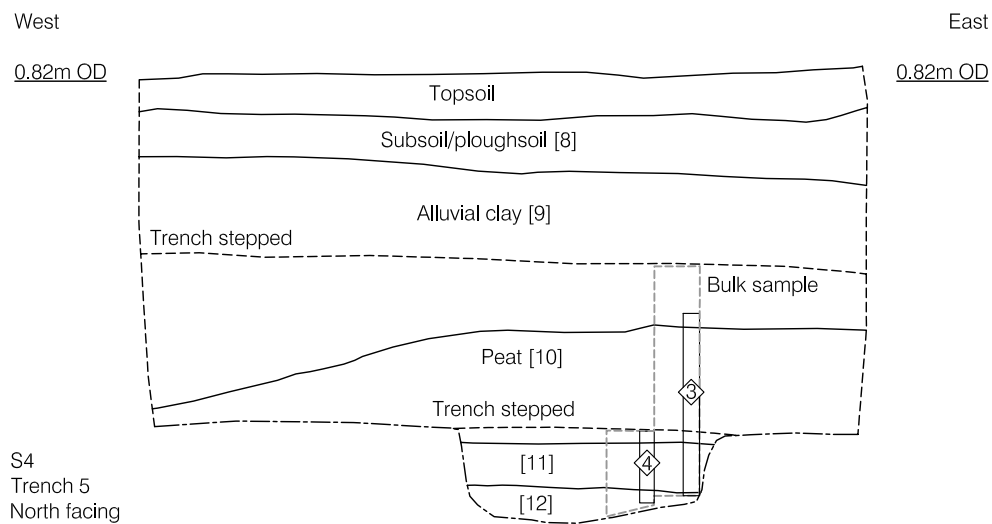


Figure 6  
Sections 2 and 4  
1:50



## **8 TRENCH SUMMARY**

### **8.1 TRENCH 1** (Figures 3, 4, 5 and 6)

- 8.1.1 Fluvial deposits were overlain by a band of peat which thinned to the west before lensing away altogether. Into the alluvial clay above the peat had been cut a 19<sup>th</sup> century drainage and boundary ditch associated with the use of the Site as farmland. Subsoil or ploughsoil and turf sealed the ditch.

### **8.2 TRENCH 2** (Figures 3, 4, 5 and 6)

- 8.2.1 A 1.5m thick deposit of peat in Trench 2 was found beneath alluvial clay, subsoil / ploughsoil and topsoil. A core through the peat was drilled by Archaeoscape for environmental analysis (Appendix 3).

### **8.3 TRENCH 3** (Figures 3, 4, 5 and 6)

- 8.3.1 A peat deposit was recorded below alluvial clay, subsoil / ploughsoil and topsoil.

### **8.4 TRENCH 4** (Figures 3, 4, 5 and 6)

- 8.4.1 Riverine terrace gravel was recorded below alluvial clay, subsoil / ploughsoil and topsoil. No peat was found in the trench.

### **8.5 TRENCH 5** (Figures 3, 4, 5 and 6)

- 8.5.1 Fluvial gravel in a sand-silt matrix was found beneath a peat deposit up to 1.1m thick. This was below alluvial clay, subsoil / ploughsoil and topsoil. Column and bulk samples were taken through the peat by Archaeoscape for environmental analysis (Appendix 3).

## **9 DISCUSSION AND CONCLUSIONS**

### **9.1 DISCUSSION**

- 9.1.1 The evaluation has revealed the natural stratigraphy of the Site. Different fluvial deposits were observed in three of the five trenches suggesting that an underlying channel may be aligned approximately southwest to northeast.
- 9.1.2 The peat deposits showed discrepancies as well. No peat was seen to the south of the Site, suggesting that this area at least was not within marshland and hence the presence of a channel is possible. In the northeast corner of the Site the peat occurred as a band that lensed out to the west, also implying a channel. Peat which was found in the other three trenches had a high organic content, was between 1.1m and 1.5m thick and was recorded at comparable heights. Environmental samples taken from the peat in two places have revealed that the peat formed from the middle to late Bronze Age, and is likely to have created semi terrestrial conditions, possibly including a dry heath over the bog (see Appendix 3).
- 9.1.3 Where present, the fluvial deposits were purely natural horizons with no evidence for human activity. The only possible evidence for human activity within the peat was the presence of a water-scavenger beetle, *Ceryon melanocephalus*, which feeds exclusively on large animal dung (Appendix 3).
- 9.1.4 Evidence for the 19<sup>th</sup> century use of the Site for agriculture or pasture was seen from a drainage and / or boundary ditch. Subsoil or ploughsoil deposits in all trenches are also evidence for this use of the Site.

### **9.2 CONCLUSIONS**

- 9.2.1 The natural topography of the Site has been seen to be fluvial deposits overlain in places by peat, then alluvial clay. Variations in the fluvial deposits and peat suggest that a channel may have originally flowed through the Site, perhaps southwest to northeast.
- 9.1.2 The only signs of human activity on the Site come from a 19<sup>th</sup> century ditch and layers consistent with farmland. The only other possible evidence for earlier human exploitation of the marshland environment was the presence of a water-scavenger beetle from the peat horizon.
- 9.1.3 The archaeological evaluation of St Paul's Academy (Abbey Wood School) has therefore revealed very limited evidence for human activity in the area of the Site. However, the environmental sampling and initial assessment work (detailed in Appendix 3 of this report) conducted in conjunction with the archaeological evaluation has revealed important information on the environmental history of this area of the lower Thames Valley.

### **9.3 RECOMMENDATIONS**

- 9.3.1 It is recommended that a full pollen, insect and waterlogged wood analysis be conducted on the sedimentary sequence at St Paul's Academy to quantify changes in the local environment, in particular the vegetation history and nature of human activities. This study should be supplemented by further radiocarbon dating of specific events determined by the analysis of the sub-fossil biological remains. Such a study will have important implications for our knowledge and understanding of environmental changes in the lower Thames valley from the middle Bronze Age onwards, and will complement current work at Bellot Street, Maze Hill, Greenwich by Pre-Construct Archaeology Ltd and *ArchaeoScape*, where peat deposits of a similar age have been uncovered associated with a Bronze Age wooden structure. These two sites will usefully form an integrated publication for submission to a peer-reviewed academic journal.

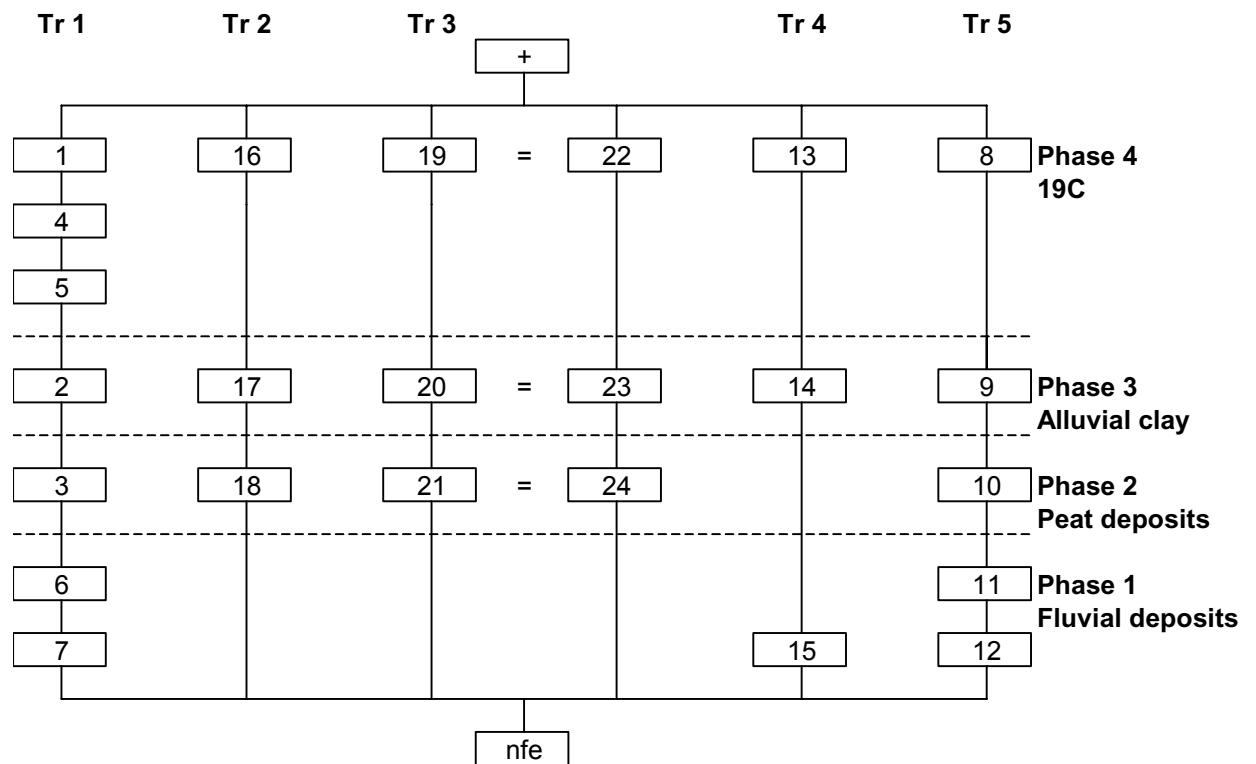
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## **10 ACKNOWLEDGMENTS**

- 11.1 Pre-Construct Archaeology Ltd. would like to thank Rydon Construction Ltd for commissioning and funding the work.
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- 11.4 Thanks also to Rebecca Lythe for her hard work on site, and also to Rick Archer, Tony Baxter, Strep Duckering and Andy Sargeant.

## APPENDIX 1: SITE MATRIX



## APPENDIX 2: CONTEXT INDEX

Site	Context	Type	Description	Trench	Plan	Section	High mOD	Low mOD	Sample	Same as	Finds	Photo	Phase
AWS05	1	layer	subsoil / ploughsoil	1		1	0.58	0.48			n	y	4
AWS05	2	layer	alluvial clay	1	tr1	1	0.04	0.02			n	y	3
AWS05	3	layer	peat	1	tr1	1	-1.22	-1.90			n	y	2
AWS05	4	fill	fill of 5	1	tr1		0.04				y	y	4
AWS05	5	cut	19C boundary ditch	1	tr1		0.04	-0.26			n	y	4
AWS05	6	layer	alluvial sandy clay	1	tr1	1	-2.00				n	y	1
AWS05	7	layer	alluvial clayey sand	1	tr1	1	-2.28				n	y	1
AWS05	8	layer	subsoil / ploughsoil	5		2, 4	0.64	0.46			n	y	4
AWS05	9	layer	alluvial clay	5	tr5	2, 4	0.36	0.08	2, 3		n	y	3
AWS05	10	layer	peat	5	tr5	2, 4	-0.72	-1.28	1, 2, 3, 4		n	y	2
AWS05	11	layer	sandy clayey alluvium	5		2, 4	-1.74	-1.98	2, 3, 4		n	y	1
AWS05	12	layer	sandy clayey gravel	5	tr5	2, 4	-2.06	-2.20	4		n	y	1
AWS05	13	layer	subsoil / ploughsoil	4		3, 5	0.30	0.10			n	y	4
AWS05	14	layer	alluvial clay	4	tr4	3, 5	-0.20	-0.31			n	y	3
AWS05	15	layer	river terrace gravel	4	tr4	3, 5	-2.01	-2.04			n	y	1
AWS05	16	layer	subsoil / ploughsoil	2		6, 9	0.43	0.41			n	y	4
AWS05	17	layer	alluvial clay	2	tr2	6, 9	0.23	0.13			n	y	3
AWS05	18	layer	peat	2	tr2	6, 9	-0.63	-0.73	5		n	y	2
AWS05	19	layer	subsoil / ploughsoil	3a		7	0.51			22	n	y	4
AWS05	20	layer	alluvial clay	3a		7	0.29			23	n	y	3
AWS05	21	layer	peat	3a	tr3	7	-1.34			24	n	y	2
AWS05	22	layer	subsoil / ploughsoil	3b		8	0.68	0.56		19	n	y	4
AWS05	23	layer	alluvial clay	3b	tr3	8	0.42	0.28		20	n	y	3
AWS05	24	layer	peat	3b	tr3	8	-0.73	-0.82		21	n	y	2

## APPENDIX 3: ENVIRONMENTAL ANALYSIS

### ST PAUL'S ACADEMY, ABBEY WOOD SCHOOL, EYNHAM DRIVE, ABBEY WOOD, LONDON BOROUGH OF GREENWICH (site code: AWS05): ENVIRONMENTAL ARCHAEOLOGICAL ASSESSMENT

*N.P. Branch, C.P. Green, A. Vaughan-Williams, S. Elias, G.E. Swindle, C.R. Batchelor and R. Gale*

*Department of Geography, Royal Holloway University of London, Egham Hill, Egham, Surrey, TW20 OEX, UK*

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#### INTRODUCTION

This report summarises the findings arising out of the environmental archaeological assessment undertaken by *ArchaeoScape* in connection with the proposed development at St Paul's Academy, Abbey Wood, London Borough of Greenwich (Site Code: AWS05; National Grid Reference: TQ 4630 7915). Geotechnical data consulted in advance of the archaeological investigations revealed the presence of extensive peat and fine-grained alluvial deposits at the site. These deposits have the potential to provide important information on the environmental history of the lower Thames river valley and its hinterland, in particular vegetation succession and changes in fluvial hydrology, and the impact of human activities on the landscape. In order to assess the potential for reconstructing the environmental history, *ArchaeoScape* implemented a targeted sampling strategy, which enabled the collection of column and bulk samples, and borehole core samples.

The environmental archaeological assessment consisted of:

1. Recovering four column samples (<1>, <2> <3> and <4>) and thirty-one bulk samples from Trench 5, and one borehole core sample (<5>) from Trench 2
2. Recording the lithostratigraphy (all column and borehole core samples) and quantifying the organic matter content (column samples <3> and <4>) to provide a preliminary reconstruction of the site formation processes
3. Assessment of the preservation and concentration of pollen grains and spores (column samples <3> and <4>) to provide a preliminary reconstruction of vegetation succession, and to detect evidence for human activities e.g. woodland clearance and cultivation
4. Assessment of the preservation and concentration of diatom frustules (column samples <3> and <4>) to provide a preliminary reconstruction of the fluvial hydrology
5. Assessment of the preservation and concentration of macroscopic plant (seeds, wood) and insect remains from selected bulk samples from Trench 5 (next to column samples <3> and <4>) to provide a preliminary reconstruction of the vegetation history and general environmental context
6. Radiocarbon dating of peat extracted from column sample <3>, from the top and base of the peat in Trench 5, to provide a provisional geochronological framework.

## **GEOLOGICAL CONTEXT**

The site is on the south side of the estuarine reach of the River Thames where the river curves to the north between Woolwich and Erith. The ground enclosed by this curve of the river is all low-lying and underlain by alluvium. The site lies towards the southern edge of this low-lying area and towards the western (upstream) end, about 0.3km to the north of the point where the Chalk bedrock rises from beneath the alluvium to form the lower valley-side slope. The British Geological Survey (1:50,000 Sheet 271 Dartford 1998) shows the alluvium overlying undifferentiated terrace gravel, but Gibbard (1994) assigns the deposits immediately underlying the alluvium to the Shepperton Gravel. Based on borehole evidence, Gibbard (1994, Figure 45b) reconstructs the floodplain sequence along a transect from the higher ground to the south around Plumstead to a point near the Abbey Wood School. The alluvium (Gibbard's Tilbury Deposits) rises consistently to a level just above OD but the thickness of the alluvium varies considerably between 2.0m and 8.0m. Devoy (1979) described these deposits at Crossness to the northeast of the Abbey Wood School. He recorded a peat layer sandwiched between two inorganic clay layers, and considerable variations in the thickness of the alluvial deposits and described the surface of the underlying gravel as "a series of ridges and undulating horizontal areas" with "surface levels of -5 to -6m OD cut by channels to -8 to -9m OD". He assigned the peat to his Tilbury III stage, dated to between 4000 and 2800BP. Spurrell (1889) described the peat from this area as rich in tree wood with the roots of most of the trees remaining in place and with Roman artefacts associated with the weathered upper part of the peat.

## **METHODS**

### ***Field investigations***

Four column samples (<3>, <4>, <5> and <6>) and thirty-one continuous bulk samples, each 5cm in thickness were recovered from Trench 5 (Figure 1). One series of borehole core sample was recovered from Trench 2 using a using an Eijkelpkamp gouge set (100 x 5cm) and Stitz piston corer (100 x 5cm) driven by an Atlas Copco 2-stroke percussion engine.

### **Lithostratigraphic descriptions**

The lithostratigraphy of all column and borehole core samples was described in the laboratory using standard procedures for recording unconsolidated sediment and peat, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter), unit boundaries and inclusions (e.g. artefacts). The results of the lithostratigraphic descriptions are provided in Tables 1 to 5, and Figure 1.



### **Organic matter determinations**

Sixty-eight sub-samples were taken from column samples <3> and <4> (between -1.97 and -0.72m OD) for determination of the organic matter content (Table 6, and Figure 2). These records are important for two reasons: (1) they identify lithostratigraphic units with a high organic matter content that will be suitable for radiocarbon dating, and (2) they identify increases in organic matter possibly associated with more terrestrial conditions. The organic matter content was determined by standard procedures involving:

1. Drying the sub-sample at 110<sup>0</sup>C for 12 hours to remove excess moisture
2. Placing the sub-sample in a muffle furnace at 550°C for 2 hours to remove organic matter (thermal oxidation)
3. Re-weighing the sub-sample obtain the 'loss-on-ignition' value (see Bengtsson and Enell, 1986)

### **Radiocarbon dating**

Two sub-samples of peat (-1.62 to -1.63m OD) and (-0.86 to -0.85m OD) were submitted for radiocarbon dating from column sample <3>, Trench 5, to Beta Analytic Inc, Florida, USA (Table 7). The results have been calibrated with Oxcal v.3.5 (Bronk-Ramsey, 1995 and 2001), using data from Stuiver *et al.* (1998).

### **Pollen assessment**

Eighteen sub-samples were extracted from column samples <3> and <4> (between -1.97 and -0.72m OD) for assessment of the pollen content. The pollen was extracted as follows:

1. Sampling a standard volume of sediment (1ml)
2. Deflocculation of the sample in 1% Sodium pyrophosphate
3. Sieving of the sample to remove coarse mineral and organic fractions (>125µ)
4. Removal of finer mineral fraction using Sodium polytungstate (specific gravity of 2.0g/cm<sup>3</sup>)
5. Removal of unwanted organic fraction using acetolysis
6. Mounting of the sample in glycerol jelly

Each stage of the procedure was preceded and followed by thorough sample cleaning in filtered distilled water. Quality control is maintained by periodic checking of residues, and assembling sample batches from various depths to test for systematic laboratory effects. Pollen grains and spores were identified using the Royal Holloway (University of London) pollen type collection and the following sources of keys and photographs: Moore *et al* (1991); Reille (1992). Plant nomenclature follows the Flora Europaea as summarised in Stace (1997). The assessment procedure consisted of scanning the prepared slides at 2mm intervals along the whole length of the coverslip and recording the concentration and state of preservation of pollen grains and spores, and the principal pollen taxa (Table 8).

### ***Diatom assessment***

Twelve sub-samples for diatom assessment were extracted from column samples <3> and <4> (between -1.97 and -0.72m OD) from those layers most likely to preserve diatoms (i.e. having a higher mineral sediment content) (Figure 1). The diatom extraction involved the following procedures:

1. Treatment of the sub-sample (0.2g) with Hydrogen peroxide (30%) to remove organic material and Hydrochloric acid (50%) to remove remaining carbonates
2. Centrifuging the sub-sample at 1200 for 5 minutes and washing with distilled water (4 washes)
3. Removal of clay from the sub-samples in the last wash by adding a few drops of Ammonia (1%)
4. Two slides prepared, each of a different concentration of the cleaned solution, were fixed in mounting medium of suitable refractive index for diatoms (Naphrax)

The assessment procedure consisted of scanning the prepared slides at 2mm intervals along the whole length of the coverslip and recording the concentration and state of preservation of diatoms, and the principal diatom taxa (Table 9).

### ***Plant macrofossil assessment***

Ten bulk samples from Trench 5 were processed for the plant macrofossil assessment. The samples were wet-sieved using 300 micron and 1mm mesh sizes. The residues were scanned using a low power zoom-stereo microscope. Identifications were made with reference to the modern seed collection at Royal Holloway University London, and Berggren (1981) and Anderberg (1994). Plant nomenclature follows Stace (1997). The assessment procedure consisted of scanning the residues and recording the concentration and state of preservation of plant macrofossils, and the principal taxa (Table 10).

### ***Insect assessment***

Ten bulk samples from Trench 5 were processed for the insect assessment. The samples were prepared following the methodology outlined in Atkinson *et al.* (1987):

1. Wash bulk peat samples through a 5mm mesh using hot water to remove larger wood fragments
2. Wash remaining fraction onto a 300 micron mesh
3. Wash twice with hot water to remove the fine fraction, and two cold water washes to remove the possibility of a thermal gradient forming during the subsequent flotation
4. Drain well and mix with paraffin in a large bowl for 5 minutes
5. Decant excess paraffin back into the stock bottle through an 80 micron mesh
6. Add cold water to the organic fraction, mixing thoroughly

7. Leave to stand for 15 minutes
8. Decant the oil overlying the bulk material onto a 300 micron mesh and wash gently with detergent and hot water
9. Rinse with distilled water, dehydrate in 95% ethanol, and transfer to a sealed container for storage in 95% ethanol
10. Save remaining bulk material for further extraction of other fossil material

The assessment procedure consisted of scanning the residues and recording the concentration and state of preservation of insect remains, and the principal taxa (Table 11).

## **11 WATERLOGGED WOOD ASSESSMENT**

Ten bulk samples from Trench 5 were processed for the wood assessment. Wood was extracted from eight bulk samples during stages 1-3 of the insect preparation described above. The samples were prepared using standard methods (Gale and Cutler, 2000). Anatomical structures were examined using transmitted light on a Nikon Labophot-2 compound microscope at magnifications up to x400 and matched to prepared reference slides of modern wood. When possible, the maturity of the wood was assessed (i.e. heartwood / sapwood) and stem diameters recorded (Table 12).

## **RESULTS AND INTERPRETATION OF THE LITHOLOGICAL ASSESSMENT**

The deposits at the Abbey Wood site resemble deposits recorded in this area by Spurrell (1889), Devoy (1979) and Gibbard (1994). With a well-developed peat horizon, about 1.5m in thickness, sandwiched between inorganic sediments. The underlying deposits seem more likely to be part of the alluvial sequence rather than the Shepperton Gravel although the lowest unit (context (12)), in which little organic material is recorded, could be the uppermost part of the Shepperton Gravel. The alluvial sediments below (-1.99 to -1.61m OD) and above (-0.81 to -0.72m OD) the peat deposit in column samples <3> and <4> are broadly consistent in their physical properties and composition with those recorded in column samples <1> and <2>, and borehole sample <5>. The fine-grained nature of these sediments suggests deposition on the margins of a low energy water body (river), such as a floodplain. In contrast, peat formation indicates the creation of a semi-terrestrial environment that would have been colonised by woodland adapted to the wet conditions, such as alder (*Alnus glutinosa*).

## **RESULTS AND INTERPRETATION OF THE RADIOCARBON DATING**

The results of the radiocarbon dating indicate that alluvial sedimentation commenced at the site prior to 2020 – 1770 cal BC (middle Bronze Age) and continued after 1600 – 1380 cal BC (late Bronze Age). The results suggest that peat formation occurred for 400 to 700 years. The  $\delta^{13}\text{C}$  (‰) values are consistent with those expected for peat deposits, and there is no evidence for either biogenic or mineral carbon contamination.

## **RESULTS AND INTERPRETATION OF THE POLLEN ASSESSMENT**

Pollen grains and spores are moderately well preserved in the peat deposit, but absent from the alluvial sediments. The generally poor preservation in the peat may be due to oxidation of the surface, and hence destruction of pollen grains and spores following deposition. In alluvial sediment, destruction of pollen grains occurs due to physical abrasion or chemical oxidation during transportation within the suspended sediment load of the water body, and due to oxidation of the floodplain sediment surface following deposition. Those pollen grains and spores present in the peat indicate the presence of alder (*Alnus*) dominated woodland, forming fen Carr, with oak (*Quercus*), and an understory consisting of sedges (Cyperaceae) and grasses (Poaceae).

## **RESULTS AND INTERPRETATION OF THE DIATOM ASSESSMENT**

Unfortunately, no diatom frustules were preserved in the sedimentary succession. A number of factors influence diatom preservation, and it is probable that in the contexts examined here diatom concentrations were always low and that post-depositional destruction of the frustules has occurred due to drying-out, abrasion and possibly unfavourable chemical conditions. Dissolution of the diatom silica, for example, can occur as a response to the ambient dissolved silica concentration, the pH in open water, and the interstitial water in sediments. Using both fossil and modern diatoms, these and other environmental factors have been shown to affect the quality of preservation of assemblages (Flower, 1993; Ryves *et al.*, 2001). These studies have been particularly important in demonstrating differential preservation of diatom species and their effects on the results and interpretation of diatom-based environmental reconstruction.

## **RESULTS AND INTERPRETATION OF THE PLANT MACROFOSSIL ASSESSMENT**

### **-1.64m to -1.59m OD**

Occasional seeds mostly consisting of blackberry (*Rubus fruticosus*) and alder (*Alnus* sp.) were present in this sample.

### **-1.54m to -1.49m OD**

Occasional seeds mostly consisting of blackberry (*Rubus fruticosus*) and alder (*Alnus* sp.) were present in this sample.

### **-1.44m to -1.29m OD**

**No seeds were present in either of these samples.**

### **-1.29m to -1.19m OD**

**One waterlogged seed of a possible legume (Fabaceae sp.) was present.**

### **-1.09m to -1.04m OD**

Occasional to frequent waterlogged seeds of common spikerush (*Eleocharis palustris*) occurred at this depth.

#### **-0.99m to -0.84m OD**

No seeds were recovered from this depth.

#### **-0.74m to -0.69m OD**

Waterlogged seeds were frequent at this depth, providing a moderate assemblage of well preserved seeds representing rough ground through taxa such as knotgrass (*Polygonum* sp.) and blackberry along with wetland plants including buttercup (*Ranunculus* sp.) and sedge (Cyperaceae sp.).

#### **-0.59m to -0.54m OD**

**This uppermost sample contained occasional seeds of buttercup possibly representing a damp habitat.**

The plant macrofossil evidence was sparse from the samples assessed. At -1.64m to -1.59m OD (peat) and -1.54m to -1.49m OD (peat), the plant remains indicate shrubland (brambles), forming an understory within alder woodland. Further indications of wet ground are provided by the seeds of common spikerush between -1.09m to -1.04m OD (peat), which requires slow-flowing water to prosper. From -0.74m OD (alluvium), there is an increase in the quantity and diversity of seeds, although overall the concentration remains low. The remains indicate plants commonly found in damp environments, such as sedges, but also grassland, such as buttercup and knotgrasses. The presence of charcoal between -0.59m to -0.54m OD (alluvium) is interesting, and suggests either a wild fire or deliberate burning by humans. However, because of the fluvial nature of the environment, the provenance of the charcoal is uncertain.

### **RESULTS AND INTERPRETATION OF THE INSECT ASSESSMENT**

The lower two-thirds of the samples from the site appear to represent alder carr environments. Alder carr inhabitants, such as the ground beetle, *Pterostichus minor*, the marsh beetle, *Cyphon palustris*, and the leaf beetle, *Plagiodera versicolora* occur in levels from -1.44m to -0.84m OD (peat). There is beetle and caddisfly evidence, from a variety of species, for standing water habitats throughout the sequence. Most of these habitats were richly vegetated, with abundant cover of reeds, duckweed and mosses. There is also evidence for the presence of running water, based on beetles found in samples -1.24m to -1.19m OD (peat), and -0.89m to -0.84m OD (peat). Various host trees are indicated by plant-feeding beetles; the click beetle, *Athous haemorrhoidalis* (-1.24m to -1.19m OD) feeds on the roots of willow, hazel and oak. The leaf beetle, *Plagiodera versicolora* (-1.44m to -1.39m OD), feeds on various species of alder. The weevil, *Rhyncholus punctulatus* (-0.99m to -0.94m OD, -1.04m to -1.09m OD and -1.44m to -1.39m OD) feeds on the rotting wood of deciduous trees.

Finally, the elm bark beetle, *Scolytus multistriatus*, was found in level -0.94m to -0.99m OD. The one indicator of animal husbandry in the vicinity comes from the presence of the water-scavenger beetle, *Cercyon melanocephalus*, in level -1.24m to -1.19m OD. This beetle feeds exclusively on large animal dung, and is one of the most common beetle species associated with cow dung.

## **RESULTS AND INTERPRETATION OF THE WOOD ASSESSMENT**

The samples consisted of narrow roundwood (many of which retained bark), fragments from large wood and pieces of loose bark. The wood in each sample was poorly preserved and many fragments were too degraded for identification. In contrast, the corky bark layers were well preserved and firm. Apart from horizon -0.89 to -0.84m OD, in which a single stem was provisionally identified as sweet gale (*Myrica gale*), the samples examined appeared to consist exclusively of alder (*Alnus glutinosa*) roundwood, ranging in diameter from <5mm – 60+mm. Most samples also included a high ratio of loose bark. Although it was not possible to identify these from structural features, the thinner pieces bore lenticels on the outer surfaces and almost certainly originated from alder. The thicker fragments were evidently from fairly mature trees although possibly not alder.

## **SUMMARY AND CONCLUSIONS**

The environmental archaeological assessment of the stratigraphic sequences at St Paul's Academy, Abbey Wood, indicates that sedimentation commenced prior to 2020 – 1770 cal BC (middle Bronze Age). During that time, fine-grained alluvial sediments were deposited on a floodplain surface, probably overlying the Shepperton Gravel. Peat formation from 2020 – 1770 cal BC (middle Bronze Age) led to the creation of semi-terrestrial conditions and the colonisation of alder woodland, and willow and blackberry shrubland. Oak, hazel and elm may also have been present on the bog surface, although it is more likely that these trees and shrubs were growing on nearby dryland. Peat formation continued for 400 to 700 years until the renewal of alluvial sedimentation sometime after 1600 – 1380 cal BC (late Bronze Age). The presence of bog myrtle at the site is particularly interesting since this shrub is rarely found in palaeoecological records from southern England. It suggests the formation of dry heath on the bog surface. The only unequivocal record of human activity, i.e. animal husbandry, is the presence of the water-scavenger beetle, *Cercyon melanocephalus*, in level -1.24m to -1.19m OD, which feeds exclusively on large animal dung.

## **RECOMMENDATIONS**

It is recommended that a full pollen, insect and waterlogged wood analysis be conducted on the sedimentary sequence at St Paul's Academy to quantify changes in the local environment, in particular the vegetation history and nature of human activities. This multi-proxy study should be supplemented by further radiocarbon dating of specific events determined by the analysis of the sub-fossil biological remains. Such a study will have

important implications for our knowledge and understanding of environmental changes in the lower Thames valley from the middle Bronze Age onwards, and will complement current work at Bellot Street, Maze Hill, Greenwich by Pre-Construct Archaeology Ltd and *ArchaeoScape*, where peat deposits of a similar age have been uncovered associated with a Bronze Age wooden structure. These two sites will usefully form an integrated publication for submission to a peer-reviewed academic journal.

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**Table 1: Lithostratigraphic sequence from column sample <1>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Depth (m OD)	Depth (m from datum)	Context Number	Description
-1.72 to -1.19	1.00 to 0.47	10	2/1 10YR black slightly clayey peat with frequent plant/root material (poorly humified) and large fragments of wood throughout; gradual contact
-1.19 to -1.02	0.47 to 0.30	9?	Brown-black very organic clay, mottled with grey brown clay and fragments of well preserved wood; gradual contact
-1.02 to -0.80	0.30 to 0.08	9?	Grey brown, black organic mottled slightly silty clay with pockets of fine silt/sand; sharp contact
-0.80 to -0.72	0.08 to 0.00	9?	Grey-brown slightly silty clay with organic mottling; charcoal fragments

**Table 2: Lithostratigraphic sequence from column sample <2>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Depth (m OD)	Depth (m from datum)	Context Number	Description
-2.15 to -2.03	0.60 to 0.48	12	4/2 2.5Y dark greyish brown sandy clay with wood fragments and gravel; sharp contact
-2.03 to -1.75	0.48 to 0.20	11	2/2 10YR very dark brown; slightly sandy clay with waterlogged plant material; sharp contact
-1.75 to -1.55	0.20 to 0.00	10	2/1 10YR black slightly clayey peat with frequent plant/root material (poorly humified) and large fragments of wood throughout.

**Table 3: Lithostratigraphic sequence from column sample <3>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Depth (m OD)	Depth (m from surface)	Context Number	Description
-1.72 to -1.63	1.00 to 0.91	11	4/1 5Y dark grey sandy clay with fine gravel; sharp contact
-1.63 to -0.81	0.91 to 0.09	10	2/1 10YR black slightly clayey peat with frequent plant/root material (poorly humified) and large fragments of wood throughout; sharp contact
-0.81 to -0.72	0.09 to 0.00	9	4/1 5Y dark grey slightly silty clay with small fragments of black organic matter

**Table 4: Lithostratigraphic sequence from column sample <4>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Depth (m OD)	Depth (m from surface)	Context Number	Description

-2.05 to -1.99	0.43 to 0.37	12	4/2 2.5Y dark greyish brown fine-coarse gravel with a matrix of dark greyish brown clayey sand; sharp contact
-1.99 to -1.86	0.37 to 0.24	11	4/2 2.5Y dark greyish brown clayey sand with frequent fine-coarse gravel; sharp contact
-1.86 to -1.67	0.24 to 0.05	11	3/3 2.5Y dark olive brown sandy clay with frequent fragments of wood and waterlogged plant material.; sharp contact
-1.67 to -1.62	0.05 to 0.00	11	3/1 5Y dark grey sandy clay with plant fragments

**Table 5: Lithostratigraphic sequence from borehole sample <5>, St Paul's Academy, Greenwich (AWS05)**

Depth (m OD)	Depth (m from surface)	Context Number	Description
-3.28 to -3.17	4.00 to 3.89	11?	5Y4/3 olive moderately sorted slightly silty fine-medium sand; unstructured; no acid reaction; well-marked transition to
-3.17 to -3.04	3.89 to 3.76	11?	5Y4/3 olive; moderately sorted gravelly slightly silty fine-medium sand with clasts up to 20mm (mainly well-rounded flint pebbles); unstructured; no acid reaction; well-marked transition to
-3.04 to -2.72	3.76 to 3.44	11?	5Y4/3 olive; moderately sorted gravelly slightly silty fine-medium sand with clasts up to 20mm (mainly well-rounded flint pebbles); common plant remains; wood fragment (30mm); no acid reaction; well-marked transition to:
-2.72 to -2.28	3.44 to 3.00	11?	10YR5/2 greyish brown passing down to 5Y4/3 olive; well sorted silty fine sand with very infrequent flint pebbles becoming less silty downward; common plant remains; wood fragment (100mm); no acid reaction;
-2.28 to -2.23	3.00 to 2.95	11	10YR4/2 dark greyish brown; well sorted slightly peaty silty fine sand becoming less peaty downward; unstructured; scattered plant remains; no acid reaction; sharp contact with:
-2.23 to -1.28	2.95 to 2.00	10	2/1 10YR black slightly clayey peat with frequent plant/root material (poorly humified) and large fragments of wood throughout.
-1.28 to -0.83	2.00 to 1.55	10	2/1 10YR black slightly clayey peat with frequent plant/root material (poorly humified) and large fragments of wood throughout.
-0.83 to -0.28	1.55 to 1.00	9	10YR5/3 brown with 5YR5/8 yellowish red mottles and darker inclusions at 33-37cm and 47-50cm from top of core; well sorted silty fine to medium sand; unstructured but with roughly horizontal peaty partings at 33cm and 40-46cm from top of core; piece of wood (13mm) at 28cm from top of core; broken mollusc shell in upper of two darker inclusions; calcareous concretion ('race') at 32cm from top of column; patchy weak acid reaction; sharp contact with:

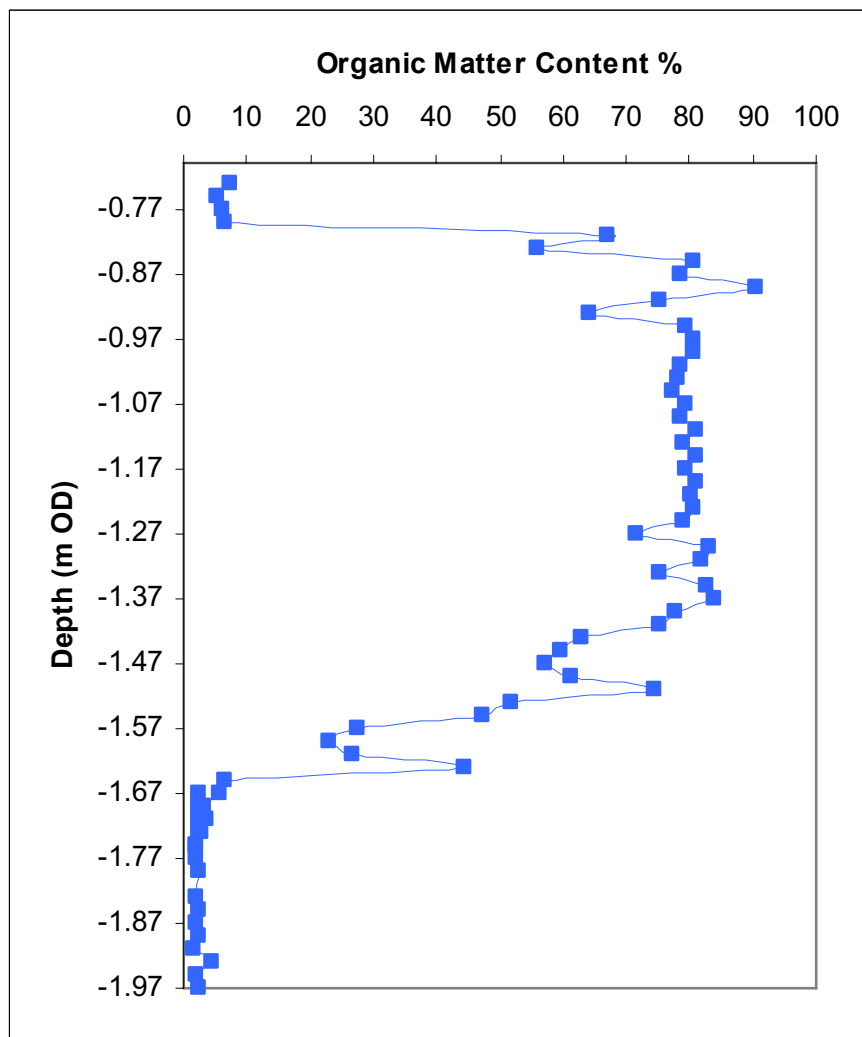


Figure 2: Organic matter content of column samples <3> and <4>, Trench 5, St Paul's Academy, Greenwich (AWS05)

**Table 6: Organic matter content of column samples <3> and <4>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Context Number	Column Sample Number	Depth (m OD)		Depth (m from datum)		% Organic matter
		From	To	From	To	
11	4	-1.96	-1.97	1.39	1.40	2.48
11	4	-1.94	-1.95	1.37	1.38	1.93
11	4	-1.92	-1.93	1.35	1.36	4.55
11	4	-1.90	-1.91	1.33	1.34	1.59
11	4	-1.88	-1.89	1.31	1.32	2.52
11	4	-1.86	-1.87	1.29	1.30	1.92
11	4	-1.84	-1.85	1.27	1.28	2.27
11	4	-1.82	-1.83	1.25	1.26	2.10
11	4	-1.80	-1.81	1.23	1.24	2.30
11	4	-1.78	-1.79	1.21	1.22	2.50
11	4	-1.76	-1.77	1.19	1.20	2.10
11	4	-1.74	-1.75	1.17	1.18	2.22
10	4	-1.72	-1.73	1.15	1.16	2.65
10	4	-1.70	-1.71	1.13	1.14	2.35
10	4	-1.68	-1.69	1.11	1.12	2.29
10	4	-1.66	-1.67	1.07	1.08	2.41
10	3	-1.74	-1.75	1.03	1.04	2.24
10	3	-1.72	-1.73	1.01	1.02	2.94
10	3	-1.70	-1.71	0.99	1.00	3.69
10	3	-1.68	-1.69	0.97	0.98	3.15
10	3	-1.66	-1.67	0.95	0.96	5.58
10	3	-1.64	-1.65	0.93	0.94	6.61
10	3	-1.62	-1.63	0.91	0.92	44.60
10	3	-1.60	-1.61	0.89	0.90	26.79
10	3	-1.58	-1.59	0.87	0.88	23.17
10	3	-1.56	-1.57	0.85	0.86	27.56
10	3	-1.54	-1.55	0.83	0.84	47.33

10	3	-1.52	-1.53	0.81	0.82	51.76
10	3	-1.50	-1.51	0.79	0.80	74.50
10	3	-1.48	-1.49	0.77	0.78	61.30
10	3	-1.46	-1.47	0.75	0.76	57.37
10	3	-1.44	-1.45	0.73	0.74	59.58
10	3	-1.42	-1.43	0.71	0.72	62.94
10	3	-1.40	-1.41	0.69	0.70	75.27
10	3	-1.38	-1.39	0.67	0.68	77.88
10	3	-1.36	-1.37	0.65	0.66	84.01
10	3	-1.34	-1.35	0.63	0.64	82.63
10	3	-1.32	-1.33	0.61	0.62	75.44
10	3	-1.30	-1.31	0.59	0.60	81.85
10	3	-1.28	-1.29	0.57	0.58	83.11
10	3	-1.26	-1.27	0.55	0.56	71.51
10	3	-1.24	-1.25	0.53	0.54	79.00
10	3	-1.22	-1.23	0.51	0.52	80.55
10	3	-1.20	-1.21	0.49	0.50	80.32
10	3	-1.18	-1.19	0.47	0.48	81.02
10	3	-1.16	-1.17	0.45	0.46	79.55
10	3	-1.14	-1.15	0.43	0.44	80.89
10	3	-1.12	-1.13	0.41	0.42	78.92
10	3	-1.10	-1.11	0.39	0.40	81.23
10	3	-1.08	-1.09	0.37	0.38	78.47
10	3	-1.06	-1.07	0.35	0.36	79.57
10	3	-1.04	-1.05	0.33	0.34	77.55
10	3	-1.02	-1.03	0.31	0.32	78.08
10	3	-1.00	-1.01	0.29	0.30	78.69
10	3	-0.98	-0.99	0.27	0.28	80.83
10	3	-0.96	-0.97	0.25	0.26	80.84
10	3	-0.94	-0.95	0.23	0.24	79.51
10	3	-0.92	-0.93	0.21	0.22	64.14
10	3	-0.90	-0.91	0.19	0.20	75.50
10	3	-0.88	-0.89	0.17	0.18	90.65

10	3	-0.86	-0.87	0.15	0.16	78.70
9	3	-0.84	-0.85	0.13	0.14	80.59
9	3	-0.82	-0.83	0.11	0.12	55.92
9	3	-0.80	-0.81	0.09	0.10	66.99
9	3	-0.78	-0.79	0.07	0.08	6.64
9	3	-0.76	-0.77	0.05	0.06	6.33
9	3	-0.74	-0.75	0.03	0.04	5.44
9	3	-0.72	-0.73	0.01	0.02	7.41

**Table 7: Results of the radiocarbon dating of column sample <3>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

<b>Laboratory Code</b>	<b>Material and Location</b>	<b>Context Number</b>	<b>Column Sample</b>	<b>Depth (m OD)</b>	<b>Un-calibrated Radiocarbon Years Before Present (yrs BP)</b>	<b>Calibrated age BC (BP) (2-sigma, 95.4% probability)</b>	<b>δ13C (‰)</b>
Beta-206519	Base of Peat	10	3	-1.63 to -1.62	3570 ±40 BP	2020 – 1770 cal BC (3970 – 3720 cal BP)	-27.4
Beta-206518	Top of Peat	10	3	-0.86 to -0.85	3190 ±60 BP	1600 to 1380 cal BC (3550 – 3320 cal BP)	-28.4

**Table 8: Pollen-stratigraphic assessment column samples <3> and <4>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Column sample No	Context Number	Depth (m OD)		Sample Depth (m from datum)		Main Pollen Taxa Present	Common Name	Concentration	Preservation
4	11	-1.97	-1.96	1.40	1.39	None			
4	11	-1.91	-1.90	1.34	1.33	None			
4	11	-1.85	-1.84	1.28	1.27	None			
4	11	-1.77	-1.76	1.20	1.19	None			
4	10	-1.69	-1.68	1.12	1.11	None			
3	10	-1.71	-1.70	1.00	0.99	None			
3	10	-1.63	-1.62	0.92	0.91	Quercus Cyperaceae Poaceae Plantago lanceolata Alnus Filicales	Oak Sedge family Grass family Ribwort plantain Alder Fern	Moderate	Good
3	10	-1.55	-1.54	0.84	0.83	Quercus Cyperaceae Poaceae Plantago lanceolata Alnus	Oak Sedge family Grass family Ribwort plantain Alder	Moderate	Good
3	10	-1.47	-1.46	0.76	0.75	Quercus Cyperaceae Alnus Filicales	Oak Sedge family Alder Fern	Moderate	Good
3	10	-1.39	-1.38	0.68	0.67	Quercus Cyperaceae Poaceae Plantago lanceolata Alnus Filicales	Oak Sedge family Grass family Ribwort plantain Alder Fern	Moderate	Good
3	10	-1.31	-1.30	0.60	0.59	Quercus Cyperaceae	Oak Sedge family	Moderate	Good



						Poaceae Plantago lanceolata Alnus Filicales	Grass family Ribwort plantain Alder Fern		
3	10	-1.23	-1.22	0.52	0.51	Quercus Cyperaceae Poaceae Plantago lanceolata Alnus Filicales	Oak Sedge family Grass family Ribwort plantain Alder Fern	Moderate	Good
3	10	-1.15	-1.14	0.44	0.43	Cyperaceae	Sedge family	Low	Poor
3	10	-1.07	-1.06	0.36	0.35	None			
3	10	-0.99	-0.98	0.28	0.27	None			
3	10	-0.91	-0.90	0.20	0.19	None			
3	9	-0.83	-0.82	0.12	0.11	None			
3	9	-0.75	-0.74	0.04	0.03	None			

**Table 9: Diatom-stratigraphic assessment for column samples <3> and <4>, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Column Sample No	Context Number	Depth (m OD)		Sample Depth (m from datum)		Main Diatom Taxa Present	Concentration	Preservation
4	11	-1.97	-1.96	1.40	1.39	-	-	-
4	11	-1.91	-1.90	1.34	1.33	-	-	-
4	11	-1.85	-1.84	1.28	1.27	-	-	-
4	11	-1.79	-1.78	1.22	1.21	-	-	-
4	11	-1.75	-1.74	1.16	1.15	-	-	-
3	10	-1.73	-1.72	1.04	1.03	-	-	-
3	10	-1.67	-1.66	0.96	0.95	-	-	-
3	10	-1.63	-1.62	0.92	0.91	-	-	-
3	10	-0.85	-0.84	0.14	0.13	-	-	-
3	9	-0.81	-0.80	0.10	0.09	-	-	-
3	9	-0.77	-0.76	0.06	0.05	-	-	-
3	9	-0.73	-0.72	0.02	0.01	-	-	-

**Key:**

- Absent

**Table 10: Plant macrofossil assessment for Trench 5, St Paul's Academy, Greenwich (AWS05)**

Context Number	Depth (m OD)	Sample Depth (m from datum)	Sample vol. (l)	Concentration of Waterlogged Seeds and Fruits	Charcoal	Wood Waterlogged	Main Taxa Present
11	-1.64 to -1.59	1.20 to 1.15	1	*		A2	<i>Rubus fruticosus</i> .
10	-1.54 to -1.49	1.05 to 1.10	1	*		A3	<i>Rubus fruticosus</i> , <i>Alnus</i> sp.
10	-1.44 to -1.39	1.00 to 0.95	1			A3	
10	-1.34 to -1.29	0.90 to 0.85	1			A3	
10	-1.24 to -1.19	0.80 to 0.75	1	*		A3	cf. <i>Fabaceae</i> sp.
10	-1.09 to -1.04	0.65 to 0.60	1	**		F2	<i>Eleocharis palustris</i>
10	-0.99 to -0.94	0.55 to 0.50	1			A1	
10	-0.89 to -0.84	0.45 to 0.40	1				
9	-0.74 to -0.69	0.30 to 0.25	1	**		O1	<i>Polygonum</i> sp., <i>Ranunculus sceleratus</i> -type, <i>Cyperaceae</i> sp., <i>Rubus fruticosus</i>
9	-0.59 to -0.54	0.15 to 0.10	1	*	O1	O1	<i>Ranunculus sceleratus</i> -type

**Key:**

*	<11	O1	occasional (unidentifiable)
**	11-30	F2	frequent (potentially identifiable)
***	31-50	A3	abundant (identifiable)
****	>50		

**Table 11a: Insect assessment for Trench 5, St Paul's Academy, Greenwich (AWS05)**

Context Number	Depth (m OD)	Sample Depth (m from datum)	Sample vol. (l)
11	-1.64 to -1.59	1.20 to 1.15	3.0
10	-1.54 to -1.49	1.05 to 1.10	3.0
10	-1.44 to -1.39	1.00 to 0.95	3.0
10	-1.34 to -1.29	0.90 to 0.85	3.0
10	-1.24 to -1.19	0.80 to 0.75	4.0
10	-1.04 to -1.09	0.65 to 0.60	3.0
10	-0.99 to -0.94	0.55 to 0.50	3.0
10	-0.89 to -0.84	0.45 to 0.40	2.0
9	-0.74 to -0.69	0.30 to 0.25	4.0
9	-0.54 to -0.59	0.15 to 0.10	4.0

**Table 11b: Insect assessment for Trench 5, St Paul's Academy, Greenwich (AWS05)**

	-0.59 to - 0.54	-0.74 to - 0.69	-0.89 to - 0.84	-0.99 to - 0.94	-1.09 to - 1.04	-1.24 to - 1.19	-1.34 to - 1.29	-1.44 to - 1.39	-1.54 to - 1.49	-1.64 to - 1.59
COLEOPTERA										
<i>Elaphrus cupreus</i> Duft.			1		1					
<i>Bembidion</i> spp.			1			1		1		
<i>Pterostichus minor</i> (Gyll.)			2	2	1				1	
<i>Pterostichus</i> sp.					1					
<i>Agonum</i> sp.		1								
<i>Lebia cruxminor</i> (L.)								1		
<i>Graphoderus</i> spp.		1			1					
<i>Cercyon marinus</i> Thom.				1		1		1	3	

<i>Cercyon melanocephalus</i> (L.)						1				
<i>Cercyon</i> spp.			1	2	3				1	
<i>Hydrobius fuscipes</i> (L.)		1						1		
<i>Chaetarthria seminulum</i> (Herbst.)				1	1	2				
Hydraenidae										
<i>Ochthebius minimus</i> (F.)		2				1			1	
<i>Limnebius papposus</i> Muls.									1	
<i>Hydraena testacea</i> (Curt.)	1	3	3	3	4	5		3		
<i>Philonthus</i> spp.									1	
<i>Geodromicus nigrita</i> Müll					1	1				
<i>Arpedium quadrum</i> Grav.		1		2	2	3				
<i>Stenus</i> spp.		1	1	1	2	2			1	
<i>Lathrobium</i> spp.				1		1		1	2	
<i>Oxytelus</i> spp.		1						1	1	
Aleocharinae						1			1	
<i>Tachyporus</i> sp.		1								
<i>Tachinus</i> sp.									1	
<i>Rybaxis</i> cf. <i>laminata</i> (Mots.)				1						
<i>Helichus substriatus</i> (Müll)			1	2	1					
<i>Esolus parallelopipedus</i> Müll		1				1				

<i>Athous haemorrhoidalis</i> (Fab.)						1				
<i>Epuraea</i> sp.		1								
<i>Lathridius</i> spp.			1	1						
<i>Corylophus cassidoides</i> (Marsh)		1	1	2	1	1		1		
<i>Cyphon palustris</i> (Thom.)				1		3		2	2	
<i>Donacia</i> spp.		1	1	1	1	1				
<i>Prasocuris phellandris</i> (L.)		1				1				
<i>Plagiodera versicolora</i> (Laich.)								1		
<i>Magdalis</i> spp.		1			1	1				
<i>Tanysphyrus lemnae</i> (Payk.)				1					2	
<i>Rhyncolus</i> cf. <i>punctulatus</i> Bohe.				1	1			1		
<i>Phyllotreta nemorum</i> (L.)		1								
<i>Bagous</i> spp.						1				
<i>Miarus</i> spp.		1		1	1	1				
<i>Scolytus multistriatus</i> (Marsh.)				1						
<i>Limnephilus</i> spp.					1	3		3		
<i>Daphnia</i> sp.		1			1	4		1	1	

**Table 12: Wood assessment, Trench 5, St Paul's Academy, Greenwich (AWS05)**

Context Number	Depth (m OD)	Sample Depth (m from datum)	Taxa identified	Comments
11	-1.64 to -1.59	1.25 to 1.20	21 x alder ( <i>Alnus glutinosa</i> )	2 x stem Ø 50mm incl. bark; remaining stems, Ø 10-25mm, some with bark
10	-1.49 to -1.54	1.10 to 1.05	9 x alder ( <i>Alnus glutinosa</i> )	Wide roundwood Ø 40x60mm, narrow stems Ø 5-20+mm, some with bark
			8 x unidentified bark	Mostly thin
10	-1.44 to -1.39	1.00 to 0.95	13 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 5-35mm, some with bark
			7 x unidentified bark	Mostly thin
10	-1.34 to -1.29	0.90 to 0.85	9 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 15mm and wider, some with bark
			23 x unidentified bark	As above
10	-1.24 to -1.19	0.80 to 0.75	9 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 5-10+mm, some with bark
			24 x unidentified bark	As above
10	-1.09 to -1.04	0.65 to 0.60	8 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 10 – 20+mm, some with bark
			17 x unidentified bark	As above
10	-0.99 to -0.94	0.55 to 0.50	6 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 8x11 – 40mm, some with bark
			21 unidentified bark	Both thick and thin (as above)
10	-0.89 to -0.84	0.45 to 0.40	1 x cf. sweet gale, <i>Myrica gale</i>	Stem, Ø 10x12mm
			6 x alder ( <i>Alnus glutinosa</i> )	Stems, Ø 10mm, plus stem fragments, some with bark
			18 x unidentified bark	Some from large wood, including thick scaly bark and thin (e.g., 2mm) bark with lenticels

## APPENDIX 4: OASIS REPORT FORM

OASIS ID: preconst1-9043

### Project details

Project name	St Paul's Academy (Abbey Wood School)
Short description of the project	<p>An archaeological evaluation was conducted by Pre-Construct Archaeology Ltd. at St Paul's Academy (Abbey Wood School), Abbey Wood, London Borough of Greenwich, to assess the nature of surviving remains and test ground conditions across the site. The work was commissioned by Rydon Construction Ltd. It comprised five trenches to assess potential peat deposits on Site, with one of these designed to cut completely through the peat. The natural sequence of the Site, comprising fluvial deposits, peat and alluvial clay, was seen. The peat was seen to be sporadic, with concentrated thicknesses surviving in the northwest of the Site. The lack of peat in the other areas may suggest the presence of an underlying prehistoric tributary of the Thames. The peat was sampled for environmental analysis. In one trench a 19th century boundary ditch was found, attesting to the post-medieval use of the area for agriculture or pasture.</p>
Project dates	Start: 20-06-2005 End: 28-06-2005
Previous/future work	No / Not known
Any associated project reference codes	AWS 05 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Other 14 - Recreational usage
Significant Finds	PEAT Bronze Age
Methods & techniques	'Targeted Trenches'
Development type	Public building (e.g. school, church, hospital, medical centre, law courts etc.)
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)



### Project location

Country	England
Site location	GREATER LONDON GREENWICH WOOLWICH St Paul's Academy (Abbey Wood School)
Postcode	SE2 9AJ
Study area	52000.00 Square metres
National grid reference	TQ 4630 7915 Point
Height OD	Min: -2.01m Max: 0.42m

### Project creators

Name of Organisation	Pre-Construct Archaeology Ltd
Project brief originator	Pre-Construct Archaeology
Project design originator	Tim Bradley
Project director/manager	Tim Bradley
Project supervisor	Chris Mayo
Sponsor or funding body	Rydon Construction Ltd

### Project archives

Physical Archive recipient	LAARC
Physical Contents	'Ceramics','Glass'
Physical Archive Exists?	Yes
Digital Archive recipient	LAARC

Digital Contents	'Environmental','Stratigraphic','Survey'
Digital Media available	'Images raster','Spreadsheets','Survey','Text'
Digital Archive Exists?	Yes
Paper Archive recipient	LAARC
Paper Contents	'Environmental','Stratigraphic','Survey'
Paper Media available	'Context sheet','Correspondence','Diary','Map','Photograph','Plan','Report','Section'
Paper Archive Exists?	Yes

### Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	An Archaeological Evaluation at St. Paul's Academy (Abbey Wood School), Eynsham Drive, Abbey Wood, London Borough of Greenwich
Author(s)/Editor(s)	Mayo, C
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# PCA

PRE - CONSTRUCT ARCHAEOLOGY LIMITED

UNIT 54

BROCKLEY CROSS BUSINESS CENTRE

96 ENDWELL ROAD

BROCKLEY

LONDON SE4 2PD

TEL: 0207 732 3925 0207 639 9091

FAX: 0207 639 9588

EMAIL: [info@pre-construct.com](mailto:info@pre-construct.com)

PRE-CONSTRUCT ARCHAEOLOGY LIMITED (NORTHERN OFFICE)

UNIT 19A

TURSDALE BUSINESS PARK

DURHAM DH6 5PG

TEL: 0191 377 1111

FAX: 0191 377 0101

EMAIL: [info.north@pre-construct.com](mailto:info.north@pre-construct.com)

