



Former Enron Works, Severnside South Gloucestershire

Archaeological Watching Brief Report and Sediment Analysis



**FORMER ENRON WORKS
SEVERNSIDE
SOUTH GLOUCESTERSHIRE**

**ARCHAEOLOGICAL
WATCHING BRIEF REPORT
AND SEDIMENT ANALYSIS**

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Figure 1 Site and Excavation area

Figure 2 Schematic section illustrating the stratigraphic unit observed in the previous borehole survey

Figure 3 Trench 1; plan, section and monolith 1 with summary of stratigraphic layers

Summary

Wessex Archaeology was commissioned by CPI Mortars Limited (through their agents Mike Davies Planning) to undertake a watching brief, carry out stratigraphic recording and recover environmental samples during excavation of an intake pit at the former Enron Works, Severnside, centred on NGR 353700 183100.

The Site is situated on the Henbury Level, an area of low lying, flat, artificially drained land forming part of the Avon Levels. Geotechnical test pits and boreholes, excavated in 1997 on the adjacent Avlon Works site, identified localised peat deposits within post-glacial alluvial deposits, whilst a possible Iron Age/Romano-British buried soil was identified on a site some 0.5km to the north-east. However, there is no evidence for archaeological remains of Prehistoric or Romano-British date on the Site itself.

Four cores taken to a depth of 6m below local ground surface during earlier investigations (Wessex Archaeology 2004d) established the sedimentary architecture of the site and highlighted the geoarchaeological potential of the stratified sequences. Analysis revealed a laterally consistent waterlogged local sequence that belongs to the established Wentlooge Formation. Periods of localised water recession or sea level changes resulting in partial stabilisation of the local area were demonstrated by the presence of *Phragmites*, indicating emergent reed populations, and by the formation of peat at *c.*4.50-5.00m depth (2.1-1.6m aOD, Wessex Archaeology 2004d). The peat horizon cannot be directly correlated to those in other sequences in the region since the peat horizons across the Middle Wentlooge Formation are neither planar nor continuous, however, such horizons have been dated to between 5790-5590 cal BC and 930-520 cal BC.

No archaeological remains were observed during the watching brief or earlier borehole survey. However, a thin horizon containing fine inwashed charcoal was recorded across the Site at a depth of *c.*2.20m (4.4m aOD). Comminuted charcoal from the horizon in Borehole 1 has been dated to 2570-2340 cal BC (3952±29 BP, KIA 24862). The presence of this charcoal indicates burning and probable human activity in the local area during the Early Bronze Age. The date is of interest in indicating the activity predates known sites in the area of Later Bronze Age and Iron Age date.

The watching brief was undertaken in order to establish the presence of the charcoal horizon beyond the area previously cored and to record its extent and nature across an open section face. The charcoal horizon was again encountered at 4.4m aOD and formed a consistent band along the section face. When coupled with the borehole findings, the horizon has, therefore, been shown to occur consistently on the site with little lateral variation. While the majority of the burnt material was finely divided, analysis of a small sample from Borehole 1 showed it included several recognizable charred plant fragments, including a fragment of a grass seed. The analysis of charred plant remains from a bulk sample recovered in the watching brief shows no wood charcoal was present, instead a concentration of charred herbaceous material including remains of large grasses, such as false-oat grass (*Arrhenatherum elatius ssp. bulbosum*), indicating the material had not travelled far and that the source was local. However neither the source of this material, nor any *in situ* archaeology was identified within the excavated area.

Acknowledgements

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The watching brief was carried out by David Budd. Processing of the bulk sample was carried out by Hayley Clark under the supervision of Sarah Wyles and assessment of the environmental remains by Sarah Wyles, Dr. Chris Stevens and Dr. Catherine Chisham. This report was compiled by Dr. Catherine Chisham who carried out the geoarchaeological analysis. Dr. Michael J. Allen reported on the radiocarbon dating and edited the environmental sections. The overall report was edited by Rob Armour Chelu, who managed the project on behalf of Wessex Archaeology. Linda Coleman prepared the illustrations.

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**ARCHAEOLOGICAL WATCHING BRIEF REPORT
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1 INTRODUCTION

1.1 Project Background

1.1.1 Wessex Archaeology was commissioned by CPI Mortars Limited (the Client), through their agents Mike Davies Planning, to undertake stratigraphic recording and the recovery of environmental samples during the excavation of an intake pit, created during preliminary engineering works at the Former Enron Works, Severnside, South Gloucestershire (**Figure 1**, hereafter ‘the Site’), centred on NGR 353700 183100.

1.1.2 This document presents the results of the investigations and analysis in accordance with a Project Design (WA 2004e) submitted to and approved by South Gloucestershire County Council and follows the completion of a Desk-based Assessment and geoarchaeological analysis of borehole cores recovered from the Site in 2004 (Wessex Archaeology 2004a; 2004d).

1.2 Site Location, Geology and Topography

1.2.1 The Site is located immediately south and west of an existing industrial site belonging to Terra Nitrogen UK Ltd. It is bounded to the north and west by a drainage ditch, which separates the Site from roads known as Central Avenue to the north and Severn Road to the west. The Site is bounded to the south by a disused railway. Pipelines and a building of the former works are situated in the northern part of the Site. An area of hard standing separates two fields to the west. To the west of the Site lies an area of grassland, generally flat, which extends to some 2.6ha.

1.2.2 The Site is situated on the Henbury Level, an area of low lying, flat, artificially drained land, forming part of the Avon Levels. Extensive sea defences prevent inundation. The solid geology consists of Triassic/early Jurassic mudrocks, overlain by marine alluvium and gravels. This material is overlain by a thick band of post-glacial alluvial deposits known as the Wentlooge Formation, comprising a series of estuarine silts/sands and peat up to 15m deep, formed by a long sequence of Holocene inundations, bog formations and dry episodes (Allen 1987; 1990; Allen and Rae 1987). Since post-Roman times, centuries of drainage and sea defence construction have resulted in the formation of a relatively stable terrestrial landscape, dominated by pastoral agriculture.

1.2.3 The Avon Levels are bounded to the east by uplands, which drain onto the fenland. The coastal margins of the Levels are slightly higher than the back-fen inland, and these have historically proved more attractive to settlement.

1.3 Planning Background

- 1.3.1 Wessex Archaeology undertook a borehole survey on the Site in May 2004 (Wessex 2004d). Four cores were retrieved within which a thin (4mm) layer of charcoal rich material was identified. This layer, thought to represent material washed in to the Site from elsewhere, was radiocarbon dated to the Early Bronze Age (see 5.1 below). Following advice from David Haigh, South Gloucestershire Archaeology and Conservation Officer, a strategy was prepared to further investigate this layer (Wessex 2004e).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Background

- 2.1.1 Human exploitation of the Levels has involved both use of wetland resources and the gradual reclamation and management of the land for agriculture. The visible landscape is largely of medieval and later date. Archaeological evidence for pre-medieval activity is typically buried within the alluvium.
- 2.1.2 Prior to the medieval period, settlement was typically centred on the uplands that fringe the Levels to the east. However, there is increasing archaeological evidence for human exploitation of the Levels from the Bronze Age period.
- 2.1.3 Land reclamation, the improvement of land through drainage and enclosure, was gradual and piecemeal, with the modern landscape the product of this process. Rippon (1997) has suggested a broad correlation between relief, history of reclamation, enclosure and drainage, and landscape type, in the form of a general trend from complex to simple field-boundary patterns over time.
- 2.1.4 The coastal areas of the Levels were settled first. The earliest settlements typically established around oval-shaped enclosed areas or ‘infields’, linked by trackways or droveways. These settlements gradually expanded through the enclosure of lobe-shaped parcels of land from the surrounding area. This type of reclamation led to the development of a landscape which Rippon (1997) has termed ‘irregular’, characterised by an often dispersed settlement pattern with small, irregular fields, long, sinuous droveways with extensive roadside waste, and occasional patches of common. Natural watercourses were frequently incorporated into the post-reclamation drainage systems of such landscapes, and the lines of meandering natural channels are often preserved in the field boundaries. These ‘irregular’ landscapes appear to have developed from Late Saxon times into the 12th and 13th centuries.
- 2.1.5 The subsequent enclosure of the lower lying back-fen and open fields was similarly piecemeal, and is typified by landscapes termed ‘intermediate’ by Rippon (1997), characterised by regularly arranged blocks of strip-fields laid out between long, often curving, and roughly parallel boundaries, and blocks of long, narrow, strip-like though enclosed parcels of land. The droveways are straighter than in ‘irregular’ landscapes, and became a focus for small scale settlement, with farmsteads and cottages developing along them. There is little evidence for medieval settlement in these areas, and the ridge and furrow which survives is limited in extent, the predominant land use apparently representing pasture. Rippon assigns no date range for these landscapes.

2.1.6 The final phase of enclosure on the Levels was associated with Post-medieval enclosure, often by Act of Parliament in the later 18th or early 19th centuries. These later landscapes are characterised by large blocks of rectilinear fields, laid out in a framework of straight, narrow roads with no roadside waste. There is little or no settlement in these landscapes.

2.2 Previous Archaeological Investigations

2.2.1 A number of archaeological assessments and surveys have been previously undertaken in connection with this part of the Avon Levels. Principal amongst these is an archaeological Desk-based Assessment undertaken in respect of the development of a distribution park on land immediately to the north and east of the Avlon Works, and submitted as part of an Environmental Statement in support of the WAP1 outline planning application. This development area, known as the Western Approaches Park (WAP1) lies approximately 1km north-east of the Site and is reported in Moore et al. 2002. Further work has been carried out at the Avlon Works (Wessex Archaeology 2001, 2002), about 900m east-north-east of the Site.

2.2.2 Additional documentary research was also undertaken by Wessex Archaeology in connection with reserved matters applications in respect of a number of plots on the WAP1 development. This drew on research commissioned from the Glamorgan-Gwent Archaeological Trust (GGAT) for the Second Severn Crossing and WAP1 (GGAT 1997) projects. A number of archaeological surveys and evaluations have also been undertaken in connection with the WAP1 development.

2.2.3 An archaeological Desk-based Assessment was undertaken in relation to the development considered in this report (Wessex Archaeology 2004a).

2.2.4 Wessex Archaeology also carried out a borehole survey and geoarchaeological investigation analysis of the recovered cores in May 2004. A total of four cores were taken to a depth of 6m below local ground surface with the aim of ascertaining both the presence/absence of archaeological deposits and the geoarchaeological potential of the stratified sequences.

2.2.5 The major sedimentary units were defined in that report (Wessex Archaeology 2004d, Figure 2) and comparison made to sedimentary sequences of the Wentlooge Formation previously established in the area (Allen 1987; 1990; Allen and Rae 1987, Allen and Scaife / WA 2001, Gardiner et al. 2002; Moore et al. 2002, Wessex Archaeology 2002, 2004b), so establishing the sedimentary architecture and sedimentary history of the Site. Analysis revealed a laterally consistent waterlogged alluvial local sequence that included a thin peat unit at c.4.50-5.00m depth (2.1-1.6m aOD). The sequence belongs to the established mid-late Holocene Middle and Upper Wentlooge Formation.

2.2.6 No direct evidence of human occupation of the immediate area was evident, however the presence of an inwashed charcoal horizon was recorded at c.2.20m depth (4.4m aOD) in all four boreholes, indicating human activity within the vicinity.

2.2.7 In order to establish the date of the inwashed charcoal layer, a 0.4cm slice of the sediment containing fine comminuted unidentifiable charcoal was sampled from the defined layer in borehole 1 and submitted for radiocarbon analysis. The layer has been dated to the Early Bronze Age, as reported below (Section 5 and **Appendix 1**).

- 2.2.8 Periods of water recession (i.e. temporary drying) and partial stabilisation of the local area were indicated by the presence of *Phragmites*, suggesting emergent reed populations, and by the formation of peat, observed in all but the northernmost borehole, where *Phragmites* was noted in the same approximate stratigraphic position as the peat. Peat may have been formerly present, but removed by subsequent fluvial action or had not formed due to higher local water conditions.

3 AIMS AND OBJECTIVES

- 3.1.1 The general objective of the watching brief was to establish within the constraints of the agreed strategy, as set out in the approved Project Design (WA 2004e), the presence or absence, location, extent, date, character, condition, and depth of any surviving remains that may be affected by the proposed development.
- 3.1.2 The key aim, however, was to investigate the extent of the charcoal inwash layer identified in the borehole survey and add detail to its nature and its potential anthropogenic origin, aided by its observation in open section, and sampling for environmental remains.
- 3.1.3 Analysis of the samples was undertaken, since identification of woody or herbaceous material plant material included in the layer would provide detail on the source material burnt, and examination of the deposit itself could aid in defining the depositional nature and taphonomy of the layer.

4 FIELDWORK METHODOLOGY

4.1 Watching Brief & Sample Excavation

- 4.1.1 To fulfil the aim to observe an area of the charcoal inwash in plan, controlled archaeological excavation and environmental sampling was undertaken during excavation of an intake pit on the site.
- 4.1.2 The intake pit measured approximately 13m by 4m in plan and represented approximately a 4.5% sample of the total Site area likely to be disturbed by the development, although activity within this area was scheduled to be limited to piling with pile caps and ground beams raised above current ground level.
- 4.1.3 The accessible area available for observation at the time of the watching brief was of a 2m x 1.2m trench with battered edges within a 5m x 5m opening (**Figure 3**). The pit was located in the south-west of the Site, c.35m south of Borehole 1, examined during previous investigations (Wessex Archaeology 2004d)
- 4.1.4 A member of Wessex Archaeology's staff was present at the Site during excavation of the intake pit. Overburden and alluvial clays were removed by mechanical excavator to a depth of 4.70m aOD (2m below current ground level), and the charcoal layer was identified in the exposed section. The layer, and the fine alluvial sediments immediately above and below it, were hand cleaned, detailed descriptions made and a representative section recorded (**Figure 3**). The pit was also surveyed and recorded in plan (**Figure 3**).

4.1.5 All Site attendance and recording was conducted in compliance with the standards outlined in the Institute of Field Archaeologists' *Standard and Guidance for an Archaeological Watching Brief* (as amended 1994).

4.2 Sampling Strategy

4.2.1 A 0.53m monolith (Sample 1) was taken through the key layers (2.24-2.77cm below ground level (BGL), contexts **100-102** described in Section 5) and removed from the Site for full sedimentary description, according to Hodgson 1976) by the Wessex Archaeology geoarchaeologist, reported below.

4.2.2 A 5 litre bulk sample (Sample 2) was recovered from the length of the narrow charcoal inwash layer. This was processed using standard methodology for waterlogged and charred plant remains and the results are reported below.

5 RESULTS

5.1 Radiocarbon Dating

5.1.1 The radiocarbon determination for the inwashed charcoal layer from Borehole 1 is given in **Table 1**, below. The results indicate an event of Early Bronze Age date, typically Beaker period. A full report is available in **Appendix 1**.

Table 1: Radiocarbon Determination

<i>Borehole</i>	<i>Depth</i>	<i>material</i>	<i>lab no</i>	$\delta^{13}C$ ‰	<i>result BP</i>	<i>calibrated date cal BC</i>
BH1	231cm	Comminuted charcoal in alluvium – alkali residue, humic acids and water	KIA 24862	-25.29 ±0.20	3952±29	2570-2340

5.1.2 The presence of humic acids within the sample indicates the horizon may contain eroded soil material in addition to the charcoal. It is, therefore, unclear whether the date represents the charcoal from a local burning event that was directly washed into the sequence, or was first incorporated into a humic peaty soil that was subsequently eroded. The result provides evidence of a relatively early dated stabilisation within the Middle Wentlooge sequence for which few comparable dates have been obtained. It predates the main Late Bronze Age and Iron Age settlement complexes in the area (e.g. Gardiner *et al.* 2002).

5.1.3 It should be noted that whilst the presence of the layer indicates human activity in the general vicinity, it represents one or more inwash events, and can only provide an indication (or average of) a date when this/these human activities occurred, not the inwash event itself, and therefore does not provide a date for the associated alluvial sedimentation.

5.2 Artefacts

5.2.1 No archaeological features were observed and no artefacts observed or recovered during the watching brief.

5.3 Geoarchaeological Analysis

Table 2: Sediment Descriptions

<i>Depth (m) below ground</i>	<i>M aOD</i>	<i>Context no.</i>	<i>Description</i>	<i>Unit</i>	<i>Formation</i>
			Excavator's description		
0.0-0.87m	6.76m-5.89m	-	0-0.40m Hardcore layer overlying terram sheet. 0.40-0.75m. Mid grey-brown clay silt, contains occasional modern vegetation, moderate stones up to 80mm sub-angular, occasional CBM, also has pockets of clean yellow sand. 0.75-0.87m. Hardcore layer. This is an earlier layer of mid pink hardcore material. Modern, made ground	-	-
0.87-2.47m.	5.89-4.29m	100	7.5YR 4/6 strong brown (reddish brown) stiff silty clay with common fine Fe and organic/ Mn? Mottling. Increasingly red colouration to base of unit, with a corresponding increase in small Fe nodules. Very coarse blocky peds, inter-ped faces coated with pale blue grey silt Alluvium	1	
			Detailed descriptions from monolith sample <1>		
(¹ 0-14cm) 2.24-2.38m	4.52-4.38m	100	10YR 4/2 dark greyish brown stiff silty clay with abundant 7.5YR 4/6 strong brown (reddish brown) strong fine Fe mottles and nodules. Very coarse blocky peds, inter-ped faces coated with pale blue grey silt. Clear boundary Alluvium	1 (equivalent to unit 2 in borehole survey, 15-211cm in Bh1)	Upper Wentlooge
(¹ 14-34cm) 2.38-2.58m	4.38-4.18m	101	10YR 5/1 grey smooth silty clay, at (¹ 23-26cm) 2.61-2.64m depth and (¹ 30-34cm) 2.68-2.72m depth, darkening to 10YR3/1 very dark grey with the inclusion of finely divided organic material and/or very fine comminuted charcoal. These bands are diffuse (some inclusion of comminuted charcoal between the two is apparent) but a clear defined 2mm defined black band of comminuted charcoal occurs at (¹ 25.5cm) 2.635m depth. The lower part of this layer exhibits fine (<1mm) laminations of charcoal rich and paler silty clay. No visible macroscopic charcoal or other inclusions. Abrupt slightly wavy boundary Alluvium with phases of charcoal in-wash	2 (equivalent to unit 3 in borehole survey, 211-231cm in Bh1)	Middle Wentlooge
(¹ 34-53cm) 2.58-2.77	4.18-3.99m	102	2.5Y 5/2 greyish brown smooth massive grey clay silt with common coarse medium 2.5Y 5/4 light olive brown and occasional fine medium 7.5YR 5/8 strong brown Fe mottles, faint flood couplets visible to base Alluvium (unit continued below monolith to base of trench at 3.17m depth/ 3.09m aOD)	3 (equivalent to unit 4 in borehole survey, 231-362cm in Bh1)	

¹# = depth below top of monolith

5.3.1 The sedimentary sequence at the site, as described in **Table 2** and illustrated in **Figure 3**, mirrored that described for the upper sequences of Boreholes 1-4 in the previous investigations (Wessex Archaeology 2004d). It represents fine estuarine alluvial sediments of the Upper and Middle Wentlooge Formation, which dates to the mid to late Holocene. Again uniform, repeated flood couplets throughout the lower sediments

described, indicate repeated and rhythmic inundation, with sorting into bands of sediments each of which fine upwards due to sorting in the flood waters. The Upper Wentlooge comprises characteristically red-brown clay silts, whilst the Middle Wentlooge is of olive to blue-grey clays, silts and fine sands. The thin peat unit previously described at c.4.50-5.00m depth (2.1-1.6m aOD) was not encountered here due to the comparatively shallow depth of excavation specified.

- 5.3.2 The charcoal inwash layer was again encountered. It formed a laterally consistent, horizontal band across the trench. As described in **Table 2**, the layer was diffuse, more so than in the nearby BH1, and comprised two bands of increased charcoal, or charcoal and organic inwash, separated by a band of lower charcoal content, forming a band of 11cm thickness (with a 2mm defined band). This may indicate a somewhat greater distance from source, but could also be explained by taphonomic issues such as differential settling of material in the slow moving waters and the effects of slight undulations of the underlying surface. Laminations again occurred within the lower portion of the band, indicating run-off from a nearby source. The defined charcoal band within the horizon was slightly thinner than that which was dated in BH1 (2mm rather than 4mm thick) but occurred at a near identical depth (2.635m below ground or 4.125m aOD) and can safely be correlated. The previous suggestion that the band is laterally consistent and widespread within the Site is supported, it having been found in the four boreholes and the trench, together representing a transect of nearly 200m.

5.4 Charred Plant Remains

- 5.4.1 Microscopic examination of smeared sediment from the charcoal horizon dated for BH1 of the previous investigations (2.31m-2.32m) was undertaken at x40 magnification. This revealed that while the alluvium may contain some humified, organic material, a substantial proportion was of fine comminuted charcoal. In addition, 35ml of sediment was wet sieved from the same level using a mesh of 250µm and macroscopic charcoal fragments observed. These included 17 charred fragments >2mm and a 5mm fragment of a grass grain (feasibly cereal).
- 5.4.2 Flotation of the 5L bulk sample 2 from the watching brief was undertaken. The flot was 15ml in size and produced fine charcoal and several charred remains of plant stems. In some cases the stems could be identified as the basal culms from large grasses, such as false-oat grass (*Arrhenatherum elatius ssp. bulbosum*). Many of the other stems are also likely to be of the basal stems of large grasses, although some may be of more woody species. While it is possible that the grass stems may be of cereal straw, in the absence of cereal grains in the sample it would seem more probable that they are from wild grasses. Swathes of false-oat grass would seem commonplace within Bronze Age landscapes representing land that was only periodically grazed and the remains may indicate landscape burning but it is noted that remains of false-oat grass stems, rootlets and corms/tubers are also commonplace from Bronze Age cremations (Robinson 1988)

6 DISCUSSION & RECOMMENDATIONS

- 6.1.1 A laterally consistent waterlogged local sequence has been described from both the borehole survey and watching brief at the Site. The sequence belongs to the mid to late Holocene Wentlooge Formation, already well documented for the Severn Estuary.
- 6.1.2 Although the sedimentary sequence may contain pollen, foraminifera and diatom data, the Upper and Middle Wentlooge sequence has been well studied elsewhere where it is better associated with human activity (as discussed in Gardiner *et al.* 2002 and Allen and Scaife 2001). Further assessment of this material is unlikely to add significantly to known data.
- 6.1.3 No artefactual evidence indicative of human occupation of the immediate area has been found, however the presence of charcoal inwash suggests activity within the vicinity. The analysis of charred plant remains from the layer lend to the possibility of pyre burning, although the possibility of landscape burning of marginal wetland vegetation is not discounted. No wood charcoal was found, instead fresh, intact herbaceous material, indicating the material had not travelled far and that the source was local. The charcoal horizon has been dated to the Early Bronze Age.
- 6.1.4 The analyses reported here have elucidated the nature and timing of activity within the area and no further work is recommended for these remains.
- 6.1.5 Publication of the combined results of the borehole survey and the watching brief as a note in the journal of the Severn Estuary Levels Research Committee is suggested
- 6.1.6 Arrangements will be made with Bristol City Museum for deposition of the archive, subject to agreement with the landowners. A museum Accession Number will be sought for the project.

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APPENDIX 1: RADIOCARBON DATING

One horizon (unit 3) within the sequence in Borehole 1 was described as containing very fine comminuted charcoal:

10YR 6/2 light brownish grey smooth, finely laminated silty clay, gradual boundary. At 221-222cm, 226-226.5cm dark grey horizons consisting of organic staining and/or very fine comminuted charcoal with sharp boundaries occurred. A 4mm defined black band of charcoal occurred at 231cm, abrupt boundary - Alluvium with phases of charcoal in-wash

The presence and date of this charcoal is of significance to the archaeological potential of the sequence and the archaeological potential of the land in the immediate vicinity. The description indicates that charcoal has washed in, and is not *in situ*, but does therefore indicate archaeological burning events in the locality.

The nature of the charcoal

Charcoal was originally recorded in the borehole (see above) and is too small to identify or reliably pick out any fragments exposed in the core. A sample of the material was extracted from the core and submitted for Accelerator Mass Spectrometry radiocarbon dating. Unfortunately the radiocarbon lab, (Prof. Dr. Pieter M. Groot, Leibniz Labor, Christian-Albrechts Universität, Keil) could not extract individual charcoal pieces as these, if present were too small. They report as follows:

We looked at the sample under the microscope. The notes in the laboratory book say: "dark sediment, mostly clay with some sand; no visible charcoal, cannot be picked". Thus you may be right in thinking there were very fine charcoal fragments in the sample, but these were too fine to be separated out under the microscope. Thus the sample was treated as "bulk sediment" sample. Actually, your sample gave us quite a bit of trouble. It started dissolving already at low pH as we washed after the first HCl extraction (brown solution). After extraction with NaOH one normally gets a brown color of dissolved humic acids, which gets progressively weaker with continued washing. In this case the color was more black, like a very fine coal particle suspension. Yet this could not be centrifuged down. We continued washing till neutral (pH<8.7) and collected the dark/black liquid as "washwater". When we acidified to pH 0.85 we obtained a precipitate, which started to dissolve or go in suspension again at pH 0.94. This material we collected as the "water" fraction. Comparison of the 14C content of this "water" fraction with the regular humic acids obtained from the first alkali extract showed the two to be similar and both younger than the residue.

The remaining material from core at Wessex Archaeology was removed and examined in further detail. Microscopic examination of smeared sediment from the same level (BH1 231-232cm) was examined at x40 magnification by Dr Cathie Chisham and revealed that while the alluvium may contain some humified, organic material a substantial proportion was of fine comminuted charcoal. In addition, 35ml of sediment were wet sieved from the same level using a mesh of 250µm and macroscopic charcoal fragments observed. These included 17 charred fragments >2mm and 1 of 5mm length which is a fragment of a possible cereal grain, overall a high concentration given the small volume of sediment under consideration.

Results

	<i>Context</i>	<i>material</i>	<i>lab no</i>	$\delta^{13}C$ ‰	<i>result BP</i>	<i>cal date</i>
BH1	231cm	charcoal in alluvium – alkali residue, humic acids and water	KIA 24862	-25.29 ±0.20	3952 ± 29	2570-2340 cal BC

The radiocarbon laboratory report that three elements were dated the alkali residue fraction, the humic acid fraction, and water:

KIA24862 55450 14C BHI 231cm charcoal in alluvial sediments, Enron works			
<i>Fraction</i>	<i>Corrected pMC</i> †	<i>Conventional Age</i>	$\delta^{13}C$ (‰)‡
dark, organic sediment, Alkali Residue, 16.9 mg C	61.14 ± 0.22	3950 ± 30 BP	-25.29 ± 0.20
dark, organic sediment, Humic Acids, 2.2 mg C	62.94 ± 0.24	3720 ± 30 BP	-25.89 ± 0.14
dark, organic sediment, Water, 1.9 mg C	63.08 ± 0.25	3700 ± 30 BP	-25.13 ± 0.12

The result indicates an event of Early Bronze Age date, typically Beaker. Whether this dated event is a local burning event, the charcoal of which has been washed into the sequence, or the date of the development of a humic peaty soil which was subsequently eroded creating a band within this sequence has yet to be determined. Regardless of this fact the result provides evidence of a relatively early dated stabilisation within the Middle Wentlooge sequence for which few comparable dates have been obtained. It predates, however, the main Late Bronze Age and Iron Age settlement complexes in the area (e.g. Gardiner *et al.* 2002).

The nature of the charcoal (see above), does not indicate major settlement activity in the vicinity and this would fit with the model of prehistoric activity in this landscape by Allen and Gardiner (2002, 27-32). Dated evidence at this period is, however, rare in this landscape, and it is likely that activity at this time is small-scale and ephemeral.

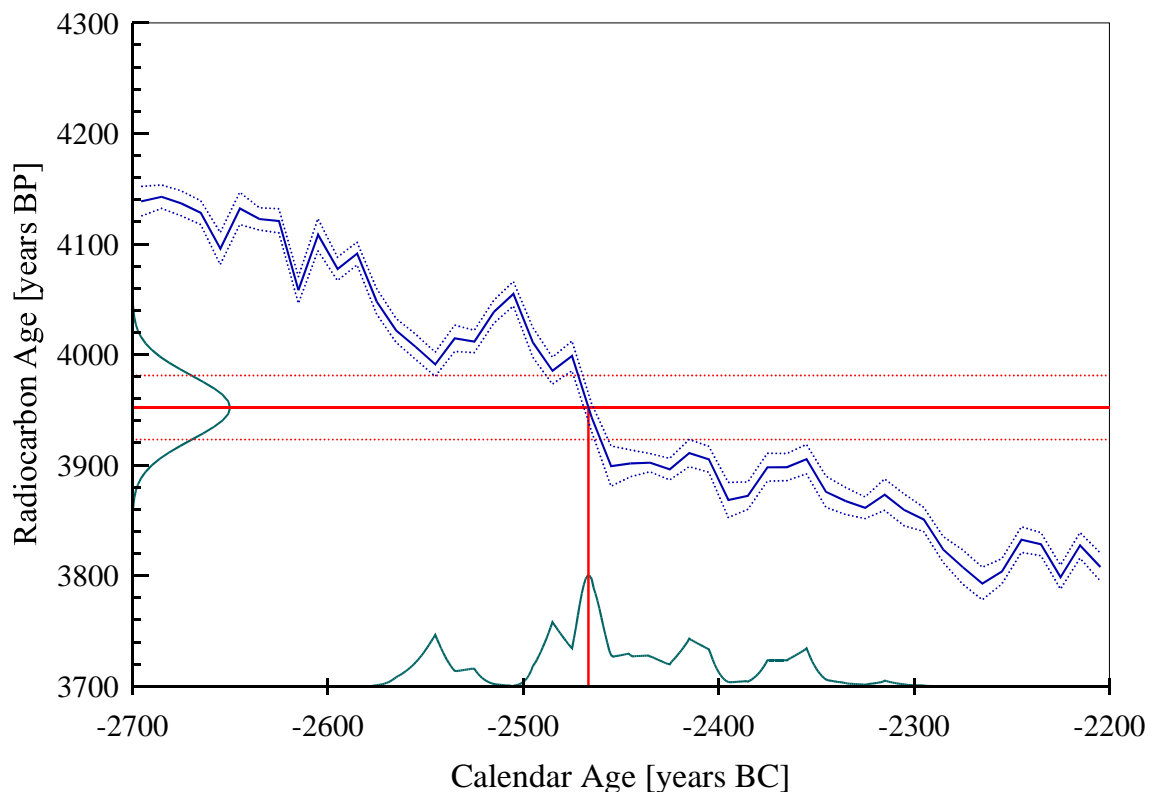
References

Allen, M.J. and Gardiner, J., 2002. A model for the late prehistoric exploitation of the Avon Levels, in Gardiner, J., Allen, M.J., Hamilton-Dyer, S., Laidlaw, M and Scaife, R.G., 2002 Making the most of it: Late prehistoric pastoralism in the Avon Levels, Severn Estuary, *Proc. Prehist. Soc.* 68, 1-39

Gardiner, J., Allen, M.J., Hamilton-Dyer, S., Laidlaw, M and Scaife, R.G., 2002 Making the most of it: Late prehistoric pastoralism in the Avon Levels, Severn Estuary, *Proc. Prehist. Soc.* 68, 1-39

Radiocarbon Calibration

Radiocarbon Age:	BP	3952 ± 29
Calibrated Age:	cal BC	2467
One Sigma Range:	cal BC	2552 - 2540 (Probability 7.6 %)
(Probability 68,3 %)		2492 - 2454 (Probability 37.3 %)
		2453 - 2435 (Probability 8.3 %)
		2422 - 2404 (Probability 11.0 %)
		2362 - 2353 (Probability 4.1 %)
Two Sigma Range:	cal BC	2566 - 2520 (Probability 16.2 %)
(Probability 95,4 %)		2498 - 2397 (Probability 65.8 %)
		2383 - 2345 (Probability 13.4 %)

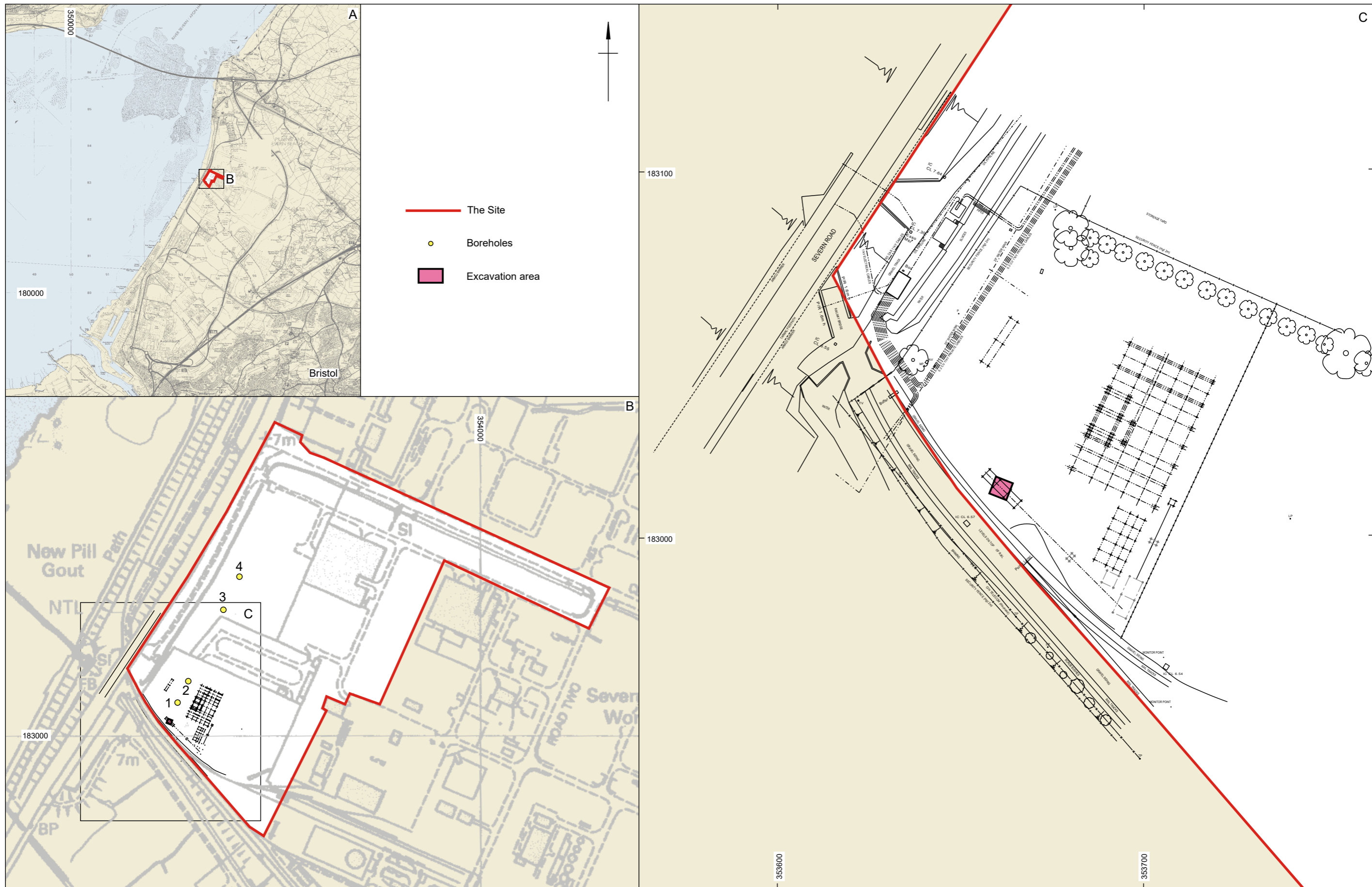


References for calibration:

The calibrated age is according to "CALIB rev 4.3" (Data set 2),
 Stuiver et al., Radiocarbon **40**, 1041 - 1083, 1998

† "Corrected pMC" indicates the percent of modern (1950) carbon corrected for fractionation using the ^{13}C measurement. The indication "> AD 1954*" denotes the influence of bomb ^{14}C

‡ Please note that the $\delta^{13}\text{C}$ includes the fractionation occurring in the sample preparation as well as in the AMS measurement and therefore cannot be compared to a mass-spectrometer measurement.

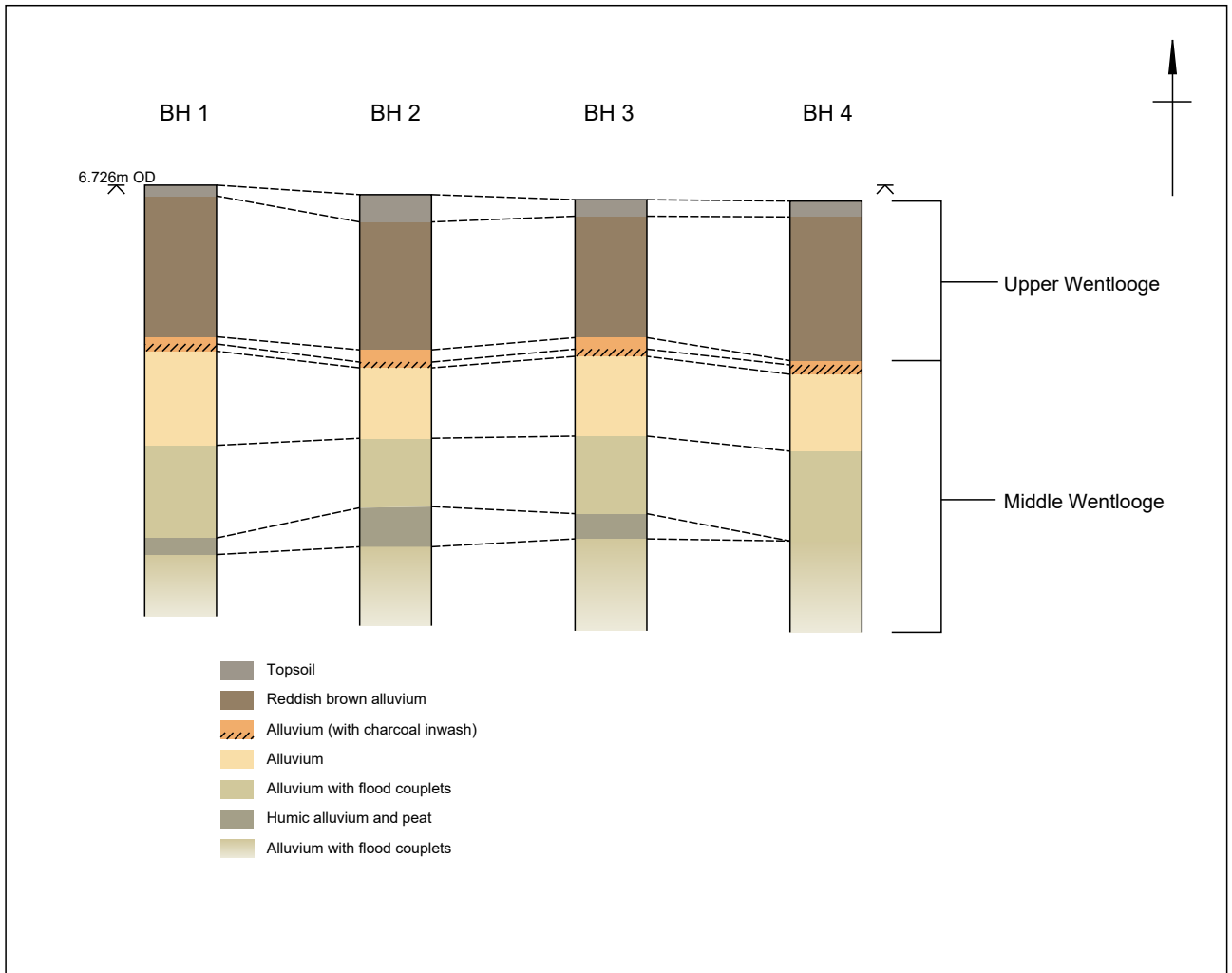


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Date:	04/11/04	Revision Number:	
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Site and excavation area

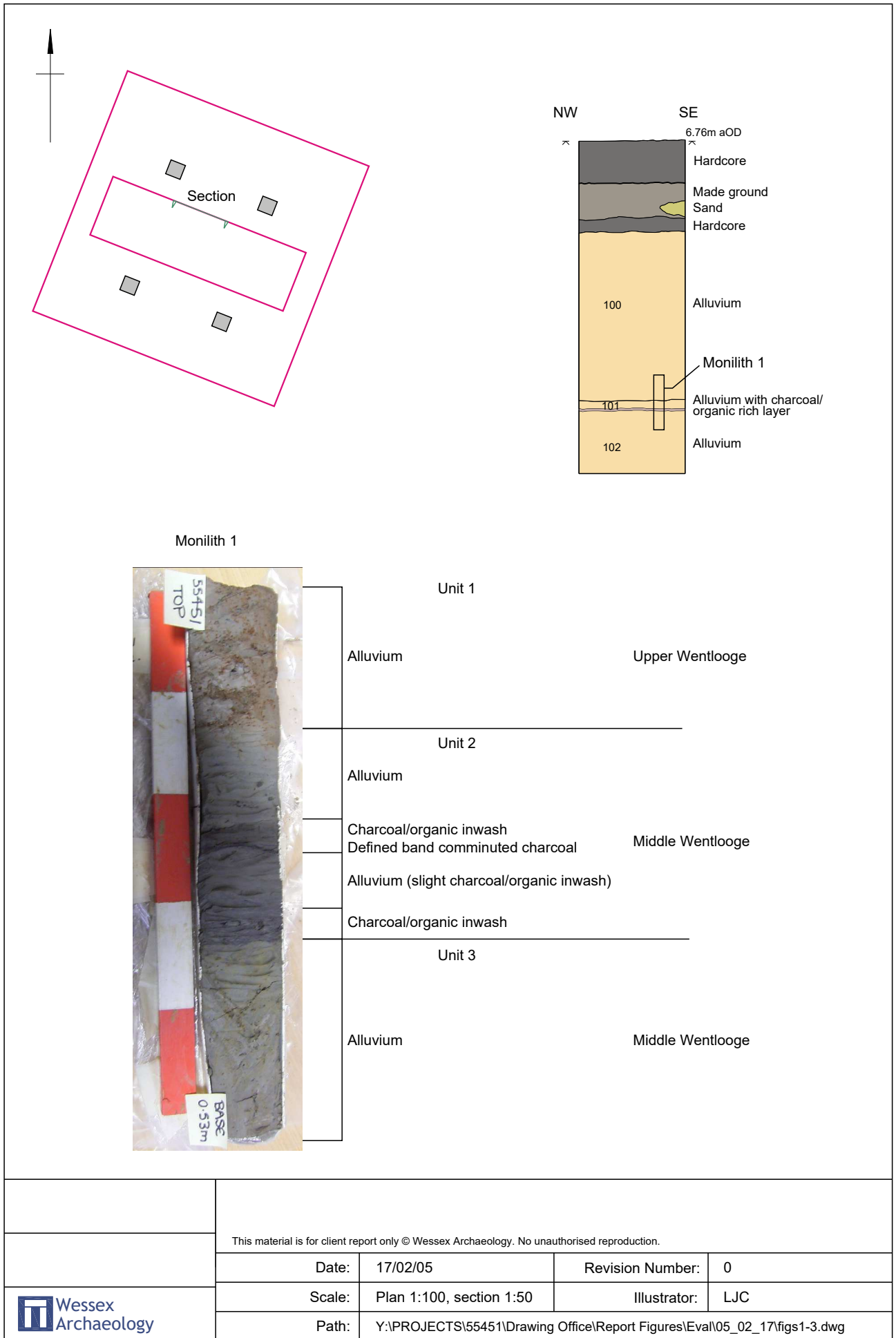
Figure 1



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Date:	02/06/04	Revision Number:	0
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Schematic section illustrating the stratigraphic units observed in previous borehole survey

Figure 2



Trench 1; plan, section and monolith 1 with summary of stratigraphic layers

Figure 3