APPENDIX 10: ASSESSMENT OF GEO-ARCHAEOLOGY

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1. Introduction

1.1 Two monolith samples were taken through the fills of a Bronze Age ring ditch. The aim of the monolith assessment was to characterise and attempt to interpret the fills in terms of the changing landscape processes on the site; and to suggest further work that should be undertaken in order to gain a better understanding of the changing environment and human activities in the environs of the site.

1.2 The monolith samples were obtained by hammering a 500m x 50mm x 50mm tin into the cleaned section face. The sediments and stratigraphy visible in section were described and drawn by the excavators on site. The monolith location was marked on the section drawing and a level, related to Ordnance Datum was taken on the top of the tin.

Methodology

1.3 The sediments sampled in the tin were cleaned and described using standard sedimentary criteria. This attempts to characterise the visible properties of each deposit, in particular relating to its colour, compaction, texture, structure, bedding, inclusions, clast-size and dip.

1.4 Each different unit observed was given a separate letter and the nature of the contacts between the units was described.

Quantifications

1.5 This section gives the results of the monolith assessment. The sequence is described in the following table. In this table the depth down from the top of the sampled profile is given for the contacts between the units and brackets denote the thickness of the individual units.

Table 21: Assessment of Geo-Archaeology

Unit	Depth of contact from top of sequence	**Description and Contacts** **Sample <23> through context (223) ring-ditch cut [224]**	Slabs of column sample <22>
		TOP OF MONOLITH SEQUENCE (c.80.65m OD)	
A	[0.50m thick]	Yellowish brown 10YR5/6 slightly clayey slightly sandy possibly humic SILT. Soft and variably compact, or crumbly and loose (may relate to former large root channels). Moderate to frequent small angular, with occasional rounded, flint gravel, typically 10-20mm diameter. Frequent manganese speckles and very occasional iron concretions.	1-9
	0.50m	Diffuse contact to:	
B	[0.10m thick]	Light yellowish brown 10YR6/4 slightly sandy silt. Moderately soft, compact and moderately hard. Moderate to frequent small angular, with occasional rounded, flint gravel, typically 10-20mm diameter. Frequent manganese speckles. This may be a transition Zone between units A and C.	10
	0.60m	Diffuse contact to:	
C	[0.10m thick]	Yellow 10YR7/6 slightly sandy silt. Compact and hard. Occasional small angular, with occasional rounded, flint gravel, typically 10-20mm diameter. Frequent manganese speckles and occasional iron concretions.	11
	0.70m	BASE OF DITCH and monolith profile	

Provenance

1.6 The fill in this segment of the ditch had been described as one context (223) on site. However description of the monolith identified a 0.10m thick paler, harder and slightly sandier lower unit (C) with a 0.10m thick gradual interface Zone (B) below a thicker and possibly more humic, silty upper fill (A) that was 0.50m thick.

1.7 Manganese and occasional iron concretions were present throughout the profile, suggesting episodically damp conditions in the ditch. However no visible plant remains were preserved.

1.8 Looser patches within Zone A may be the result of (ancient or recent) rooting or burrowing although no finer root channels were observed within the profile, which might suggest rapid infilling with little or no vegetation growth.

1.9 No depositional structures were observed and it is possible that the sediment accumulated gradually, perhaps as a result of soil creep from the banks and the surroundings of the ditch and became incorporated into the ditch soil. This would be compatible with the gradual contact and interface Zone (unit B) between units

A and C. The lack of rooting may possibly result from oxidising and possibly bioturbated conditions.

1.10 However the contrast in colour, texture and hardness between the lowest fill (C) and the thicker upper fill (A) indicates different sediment sources, depositional processes and / or post-depositional processes for these deposits.

1.11 This might suggest that the greyer unit B developed by weathering of the primary fill, unit C, which may have been derived from the sides of the ditch. This could have taken place at the same time as inputs from the source material (surrounding soil?) of unit C and was later buried by more rapid deposition of unit A.

1.12 This may support the suggestion that the initial environment of the ring-ditch was fairly stable but subsequent activities, perhaps linked to the establishment of the nearby late Bronze Age settlement, caused large scale earth movement and possibly levelling of the earthworks.

1.13 The very high silt content of the fills is also notable. This may be comparable to the fine, well sorted fills of Bronze Age ditches and postholes frequently found elsewhere in southern Britain. These fills have been attributed to drier climatic conditions during the Bronze Age (Evans 1975, 142) which, together with landscape disturbance is likely to have led to widespread wind erosion and transport.

1.14 In order to better understand the significance of the ring-ditch fills in terms of the changing landscape and landuse in the environs of the site, pollen and soil micromorphological analysis should be undertaken. This work will enable the sediment source, depositional processes and changing vegetation of the site and surrounding area to be investigated. The filling of the ditch has been dated by pottery to the early Bronze Age by pottery, furthermore there is the potential for the charcoal in the ditch fill to be dated using ^{14}C and this should provide an adequate framework for this environmental work.

Conservation

1.15 If thin sections are made of the monolith they will take up less storage space, stand a better chance of long term preservation and be amenable to a similar method of archiving to that for finds and environmental samples. As monoliths, samples are not easily stored, need to be kept in a cool to cold and dark environment and will be likely to deteriorate with time. In addition thin sections are easily available for further research and can be examined frequently without loss of information. Stored monoliths are less accessible and will gradually loose their potential for preserving information, especially as each time they are examined further cleaning will wear away the surface.

1.16 In the same way, processed sub-samples taken from the monolith will be easier to store and less likely to deteriorate than the original soil material and will provide supporting information to the thin sections.

1.17 Long term storage as a monolith sample is likely to be costly and is not an efficient use of space or archive material. After analysis, if not impregnated with resin and converted to thin sections, the sample should be discarded.

Comparative material

1.1 The pottery suggests that the ditch was excavated in the early Bronze Age and was filled by the middle Bronze Age (no artefacts from the nearby middle and late Bronze Age settlement were recovered from the ditch).

1.2 The evidence from further analysis of the monoliths should be compared to other evidence for the changing environment during the Bronze Age in the North Downs area and further afield. This will enable a better understanding of the perception, exploitation and modification of the landscape by Bronze Age societies to be gained.

1.3 No snails were preserved in sample column <22> taken adjacent to the monoliths.

1.4 The pollen and soil micromorphological analysis from the monolith samples taken through the Bronze Age barrow ditch at Whitehill Road (ARC WHR 99) should provide good comparative material relating to the infilling of a similar feature and timeframe.

1.5 Comparative material will also include the colluvial sequences sampled during CTRL investigations in many of the North Downs sites. Also published or otherwise available accounts of soil, pollen and snail evidence from buried soils and valley sediments from south-east England (eg: Godwin 1962; Thomas, 1989; Allen 1995; Preece & Bridgland 1998; Waller 1998; Waller and Hamilton 1998).

Potential for further work

1.6 The data from the monolith samples has potential to address the following landscape Zone and fieldwork aims:

- *To study the natural landscape, its geomorphology, vegetation and climate, as the context within which the archaeological evidence can be interpreted.*
- *Farming communities (2,000 BC-100 BC): to consider environmental change resulting from landscape organisation and re-organisation.*

1.7 These aims may be achieved by pollen and soil micromorphological analysis of the ring-ditch fills.

1.8 Pollen analysis should enable the nature of the changing landscape during and after the construction of the ring-ditch to be reconstructed and soil micromorphology should enable the sequence of events that led to the infilling of the ditch to be unravelled.

Table 22: Recommendations for further work on the monolith samples

Task	**Requirement**
Preparation and analysis of pollen samples (*): • 5 at c. 0.40mm intervals through units A1 and A2 in <31> • 11 at c.40mm intervals through units A1 and A2 in <33>	Pollen specialist
a) Impregnation of the 3 monolith samples and manufacture of 6 thin sections of c.110 x 70mm • from across contacts A1/A2 + A2/B in monolith <31> • from A1, A1/A2 and A2/B in monolith <33> • from A1/A2 in monolith <32> b) analysis / interpretation of the depositional and post-depositional characteristics recorded in these samples (*)	Likely to take 3 months to prepare the thin sections. Thin sections to examine PLUS report preparation
Comparison of the sequence and chronology of events with valley sediment profiles from other CTRL sites and from the published literature for the area.	Geoarchaeologist
* It is suggested that the thin sections / pollen slides should initially be scanned to assess their potential and, if suitable the analysis should be undertaken.	

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