CONTENTS

SPECIALIST APPENDICES

LIST OF TABLES

FIGURES

SUMMARY

As part of a larger programme of archaeological investigation along the route of the Channel Tunnel Rail Link, Union Railways (South) Limited (URS) commissioned the Museum of London Archaeology Service (MoLAS) to undertake detailed archaeological investigations and a watching brief between Dale Road and Hazells Farm to the south of the A2 at Gravesend, Kent (Area 330 Zone 2). In the light of the initial results certain areas of the site were identified for follow up excavation; these were ARC SSR 99 and ARC STP 99. The results from this zone also include the Roman cemetery at Pepper Hill (ARC NBR 98), associated with Springhead Roman Town, but this is the subject of a separate CTRL post-excavation assessment report.

The Zone includes parts of the upper Ebbsfleet Valley which divides into northern and western branches. The broad northern branch incorporated the spring zone for the Ebbsfleet River from the Neolithic period onwards, and the area is still referred to as 'Springhead'. During the Neolithic this northern dry valley was used for some form of occupation, with pits, a hearth and postholes recorded near to the spring line.

During the Bronze Age a vast amount of colluvial material entered the northern dry valley and clogged it. Spring lines within these colluvial layers attest to continuing phases of dampness, and snail samples indicate open country conditions. The cause of the colluvial slump was the probable deforestation of the area and agricultural practices. Late Bronze Age pits attest to some occupation cutting through the colluvial deposits.

At the western end of the Zone Late Iron Age and 1st century AD occupation was recorded. An enclosed area was located on the higher ground overlooking the western dry valley, the broader area of Springhead and the northern dry valley. Pottery dates indicate that occupation basically occurred between AD45/50 and AD100. No evidence for buildings was found and it is thought that the enclosure was probably for stock (perhaps for horses). The site was abandoned by the end of the 1st century AD.

In the central area of the Zone the Pepper Hill Roman Cemetery was recorded, on the high ground on the eastern side of the western dry valley. This cemetery was associated with a road, which proceeded along this valley edge to the south (presumably a precursor to the present New Barn Road).

Evidence for medieval, post-medieval and recent activity was limited to a small number of deneholes and field drains.

Limited artefactual and ecofactual material was recovered from the above features across the Zone.

The results in this area appear to closely reflect the land conditions since the prehistoric period. The damp and sandy soils in the valley floors limiting occupation/use to a more seasonal nature, with the Late Iron Age and Roman uses being influenced by Springhead Roman town. It is likely that a more detailed picture of settlement would have been found if the construction works had not been confined to the valley floors, as considerable evidence for occupation was recorded at Hazells Farm and to the east of Downs Road (Area 330 Zone 3).

Area 330 Zone 2 has the specific potential to contribute to the CTRL research strategy in terms of the spatial organisation of the landscape and environmental change resulting from landscape organisation. The potential increases significantly if combined with the results from the CTRL archaeological works in and around Roman Springhead.

1. INTRODUCTION

1.1 Project Background

1.1.1 The Museum of London Archaeology Service (MoLAS) was commissioned by Union Railways (South) Limited (URS) to undertake a combination of targeted watching brief and strip, map and sample excavations in Area 330 Zone 2 of the works. Zone 2 is identified by the chainage points 203+750 to 205+200 and is approximately 1.4km in length, from Dale Road to the west to Bridleway NU24 (close to Hazells Farm) to the east. This work formed part of an extensive programme of archaeological investigation carried out in advance of the construction of the Channel Tunnel Rail Link (CTRL).

1.1.2 The archaeological Written Scheme of Investigation was prepared by Rail Link Engineering (RLE), agreed in consultation with English Heritage and Kent County Council (KCC) on behalf of the Local Planning Authorities.

1.1.3 The site is located using the co-ordinates in Table 1:

Table 1: Zone location

Zone	Approximate compass direction of co-ordinate	URL Easting	URL Northing	NGR Easting	NGR Northing
2	South-west	41290.128	51798.594	561286.093	171800.189
	South-east	42560.439	51779.211	562556.403	171780.805
	North	41526.843	53710.964	561522.807	173712.559

1.1.4 This assessment, although covering the land to the east and west of the New Barn Road Roman road and cemetery (ARC NBR 98 undertaken by Oxford Archaeological Unit), does not include the cemetery itself, which is dealt with by a separate document. The work in Zone 2 is set out in the Table below:

Table 2: Fieldwork Events

Fieldwork event code	**Type**	**Contractor**	**Dates of Fieldwork**
ARC SPT 97	Evaluation	Wessex Archaeology	1997
ARC SSR 98	Evaluation	Oxford Archaeological Unit	1998
ARC 330 98	Watching Brief	MoLAS	1999 and 2000
ARC SSR 99	Excavation	MoLAS	1999
ARC STP 99	Excavation	MoLAS	1999

1.2 Geology and Topography

1.2.1 The geology of the area is Upper Chalk of Cretaceous Age, with the chalk bedrock overlain by varying thicknesses of gravels, Thanet Beds and Late Devensian waterlain deposits (Figure 2). These geological levels are sealed beneath extensive layers of colluvial material.

1.2.2 Zone 2 lies at a confluence between two tributaries, now dry valleys, for the Ebbsfleet. The western dry valley is located between ARC SSR 98 and ARC NBR 98 flowing from south to north. The second, northern, valley flows from the south along Downs Road to Hazells Farm, where it turns to flow from east to west on the south side of the A2, towards New Barn Road. The route of the CTRL in Zone 2 lies on gently rising land on the south side of the northern dry valley, with only the agricultural mitigation area of ARC STP 99 crossing the valley floor. The deep colluvial deposits presumed to lie in the western dry valley were not investigated as these were sealed beneath construction earthworks.

1.2.3 The area at the time of fieldwork was cultivated arable farmland with a surface level of between *c* 18m OD (northern valley floor, ARC STP 99) and *c* 30m OD (ARC SSR 99).

1.3 Archaeological and Historical Background

1.3.1 Zone 2 lies close to a significant archaeological area as it incorporates the upper reaches of the Ebbsfleet valley. The lower Ebbsfleet valley is a regionally/nationally important location for Palaeolithic, Neolithic, Bronze Age, Iron Age, Roman, Anglo-Saxon, medieval and post-medieval remains.

1.3.2 Directly within the zone previous CTRL evaluation work (ARC STP 97) demonstrated the survival of Bronze Age features and colluvial deposits. Previous work has noted Iron Age, Roman and Saxon remains and burials all associated with the Roman town of *Vagniacae* (Springhead Roman Town), part of which is a scheduled monument (SAM KE 198). The Roman town is located in the field formed by the angle between Station Road and New Barn Road and although adjacent to Zone 2 was not subject to archaeological works during this construction phase.

1.3.3 To the south of the Roman town a road has recently been found to the west of New Barn Road (ARC NBR 98) orientated from north to south, near to the break of slope at the top of the western dry valley. Associated with this road was an extensive inhumation and cremation cemetery (ARC NBR 98) connected with the Roman occupation of Vagniacae (the CTRL work on this site is dealt with under a separate assessment). It is presumed that the road connected with Roman Watling Street to the north, which roughly followed the line of the modern A2.

1.3.4 A limited area of Late Iron Age/Early Roman occupation was recorded during evaluation works on the higher ground to the south of Station Road (ARC SSR 98). This site only partly extended onto the route of the CTRL.

2. ORIGINAL PRIORITIES, AIMS AND METHODOLOGY

2.1 Landscape Zone Priorities

2.1.1 The following Landscape Zone Priorities, as supplied in the Written Scheme of Investigation (WSI) the *CTRL Archaeological Research Strategy,* were relevant to the site;

- Farming communities (2000 BC-100 BC)
- Towns and their rural landscapes (100 BC-AD 1700)
- Recent landscapes (AD 1700-1945)

2.2 Fieldwork Event Aims

2.2.1 The primary aims specified in the WSI relevant to this area of the project were:

- To establish the nature of the landscape through time
- To recover dating evidence from the features located to enable a chronology for the division of the landscape to be established
- To establish changes in the local environment through the recovery of suitable palaeo-environmental samples from the fill of cut features
- Recover a sequence of palaeo-environmental samples and dating evidence from the sedimentary sequence located in the Springhead area
- To determine the spatial organisation of the landscape, and changes through time
- To determine the late and post-Roman landscape
- To determine the ritual and ceremonial uses of the landscape

2.3 Fieldwork Methodology and Summary of Excavation Results

2.3.1 Further to two field evaluations, which identified limited archaeological features (URL 1997 and URL 1998), and a detailed excavation of the Roman cemetery (URS 1999 – dealt with under a separate assessment), the area was designated for a watching brief during construction works. A WSI was prepared by RLE and agreed with English Heritage and Kent County Council on behalf of the local planning authority. The WSI was to target the areas to the east and west of the New Barn Road cemetery and investigate more fully the previously evaluated areas South of Station Road (ARC SSR 98) and the 'Temple East of Springhead' site (ARC STP 97).

2.3.2 The methodology was to separately strip topsoil and subsoil deposits using a tracked excavator fitted with a flat bladed ditching bucket. Subsoil deposits were spitted to allow any potential archaeology to be exposed and recorded. Archaeological features were plotted using local grids tied into the URL grid by Main Contractor surveyors. Where concentrations of archaeological features occurred they were penmapped by MoLAS surveyors or hand drawn. Features were generally half sectioned or, where linear, excavated for 10% of the exposed

length. Richer pits were 100% excavated. Sampling and metal detecting was undertaken of most features as standard.

2.3.3 The investigations found:

- Natural 'spring' features, a palaeochannel and potential Neolithic occupation at ARC STP 99
- Colluvial deposits of Bronze Age date
- Natural 'spring' features at ARC 330 98 possibly dating to the Bronze Age
- Late Bronze Age pits near to the site of Springhead Roman Town
- Late Prehistoric pit(s) near to Hazells Farm
- Late Iron Age and 1st century AD enclosure and pits at ARC SSR 99
- Deneholes/chalk mines of medieval/post-medieval date
- Colluvial deposits of Late Iron Age to post-medieval date
- Modern field drains

2.3.4 The only limitation to the data collection was the paucity of dating evidence recovered from the majority of the features. At ARC STP 99 none of the features had any dating evidence – only a relative date can be inferred as they cut the Late Devensian layers and are sealed by colluvial deposits which are cut by Late Bronze Age features. This has had an effect on the interpretation of these features.

2.4 Assessment Methodology

2.4.1 This assessment report was commissioned by URS to the specification for assessment reports prepared by RLE (CTRL Section 1 Archaeology: Post-excavation Assessment Instruction no. 000-RMA-RLEVC-00030-AB), as discussed with English Heritage and Kent County Council. The production of the report was managed by Niall Roycroft and Gordon Malcolm and all specialist advice was provided by the Museum of London Specialist Services.

2.4.2 A phased matrix was produced for ARC STP 99, ARC SSR 99 and ARC 330 98. All data was entered on the MoLAS Oracle system and transferred to RLE Datasets.

3. FACTUAL DATA AND QUANTIFICATION

3.1 The Stratigraphic Record

Natural deposits

3.1.1 The underlying natural geological deposit of chalk bedrock was observed in places across the Zone but construction works were often limited to the glacial 'head' deposits above the chalk. These head deposits were a mixture of fine sandy and more gravelly material consisting of eroded Thanet Beds. In the area of ARC STP 99 (Figure 5) the earliest deposits were waterlain sediments from the Late Devensian (*c* 12,000 to 10,000 BC). No cultural material was observed within these deposits.

Prehistoric: potentially Neolithic – Early Bronze Age (c 4,000 - 1,600 BC)

3.1.2 The earliest features recorded in ARC STP 99, were deeply buried (between 2.00m and 3.00m), and consisted of a combination of shallow, bowl like features, a palaeo-channel [40], some pits and postholes and a possible hearth/burnt area, [79]. All these features had been truncated horizontally, apparently by subsequent erosion. They cut the lowest, Late Devensian, waterlain levels and were overlain by the (Bronze Age) colluvial sequence.

3.1.3 Occupation of the site was seen by cut features containing cultural and environmental material. None of the features contained any precise dating evidence, but Neolithic to Early Bronze Age type struck flint flakes were recovered from pits[62], [64] and [66] in the western part of the area. The hearth showed evidence for burning and a pit [5] in the eastern area contained 5400g of burnt flint. A pit [82] on the western part of the site contained 1100g of burnt flint. In addition the postholes, along with some of the bowl shaped features contained occasional flecks of charcoal. One small pit contained a fragment of (unidentifiable) animal bone.

3.1.4 The lower colluvial sequence was dated during evaluation ARC STP 97 and watching brief ARC 330 98 to the Bronze Age. This implies that the deeply buried features probably dated to the Neolithic period and indicate a temporary encampment around hollows of upwelling water (the bowl shaped features) and the palaeo-channel. Nearby occupation from this approximate period is attested by the presence of an Early Bronze Age (c 2000 – 1400 BC) cremation vessel recorded a short distance to the east at Hazells Farm (Area 330 Zone 3).

Bronze Age (c 2000 – 1000 BC)

3.1.5 The evidence suggests that much of the colluvial material at the base of the dry valley floor in the area of ARC STP 99 from the Bronze Age onwards (URL 1997). It was during this period that there was a general clearance of 'wild wood' for agriculture, with a resulting de-stabilisation of the landscape, so silts and sands began slipping into the valley and started to block it. There is evidence that the valley was still, probably only seasonally, wet, as seen during the 1997 evaluation.

3.1.6 Higher up in the colluvial sequence, towards the southern side of the valley another concentration of bowl shaped features and a possible palaeochannel were recorded (ARC 330 98, Figure 3). Again none of these features contained any precisely dateable cultural material (limited to small fragments of charcoal) but it

is suggested that they represent a spring line near the chalk/head interface which occurred at a later stage during the Bronze Age infilling of the valley. These features were sealed by approximately 1.0m of material.

3.1.7 Snail samples from these colluvial layers indicate open country conditions, which confirms the 'cleared landscape' impression of the colluvium.

Late Bronze Age (c 1000 – 700 BC)

3.1.8 Cutting the colluvial layers on the floor of the valley, just to the west of ARC STP 99, a Late Bronze Age pit and a pit containing later prehistoric pottery were recorded during watching brief ARC 330 98 (Figure 5). These features were sealed by modern topsoil.

Later Prehistoric –perhaps Mid to Late Iron Age (c 3rd to 1st century BC)

3.1.9 Two areas produced 'Later Prehistoric' pottery (the fragments being too small and undiagnostic to attribute a specific date). There were two pits in the eastern area of ARC 330 98 (only one [670] of which contained dating evidence) situated on the slightly higher ground towards Hazells Farm. Nearby pitting (Area 330 Zone 3) shows evidence for occupation at Hazells Farm during the Mid to Late Iron Age.

Later Prehistoric – perhaps Late Iron Age (1st century BC to 1st century AD)

3.1.10 This period is represented by features in ARC SSR 99 (Figure 4). Pottery from the Late Iron Age was found in features associated with the Early Roman period, possibly representing the location of a small settlement spanning the 1st century BC to the 1st century AD.

Early Roman (AD 45 – AD 100)

3.1.11 Part of a medium sized, partitioned, enclosure [9] was recorded. A pit [32] was located inside the enclosure but there were no other signs of occupation, perhaps due to later truncation. Cutting the partially filled enclosure ditch was an oven [36] which contained a large assemblage of 1st century AD pottery. The total lack of later Roman pottery would seen to suggest the site was abandoned before the end of the 1st century AD.

3.1.12 The corner of a large ditch (or pit) (ARC 330 98) located just to the east of the New Barn Road Roman cemetery (ARC NBR 98) also had 1st century AD finds.

Later Roman, Anglo-Saxon and medieval

3.1.13 No specific evidence for activity was found relating to these periods.

Post-medieval

3.1.14 Evidence for the post-medieval period was in the form of deneholes and field drains. Deneholes are widely recorded in North Kent and were usually dug in a corner of a field, near to a road/track, to extract chalk for marling the fields, lightening the soil and improving the drainage. Deneholes were also dug to extract chalk for slaking lime. Two deneholes were recorded; the western [46] in ARC SSR 99 (not fully investigated due to its depth) and the eastern (ARC 330 98 [703]) (Figure 5) near to Hazells Farm. The eastern denehole included seven galleries.

3.2 The Artefactual Record

Pottery

3.2.1 The majority of the Zone 2 assemblage is from the area of Station Road (ARC SSR 99) and dates to the late Iron Age/early Roman period. There is also a smaller quantity of later prehistoric flint-tempered pottery, although most of this is residual in later features.

CBM/fired clay

3.2.2 The majority of the material comes from ARC SSR 99, and consists of either Roman tile (from one context) or daub from contexts with Roman spot dates (ten contexts). The assemblage from ARC 330 98 contains daub from one (unstratified) context.

Flint

3.2.3 Small assemblages of worked flint were recovered from ARC SSR 99, ARC STP 99 and ARC 330 98. Varying quantities of burnt unworked flint were also recovered from these sites.

Stone

3.2.4 A single possible rubbing or smoothing stone, from context [35] with early Roman spot dates, was recovered from ARC SSR 99.

Metal

3.2.5 A total of nine metal accessions were recovered during archaeological work in Zone 2. Five metal accessions (one lead, one iron and three copper alloy) were recovered from ARC SSR 99 and four iron accessions from ARC 330 98. The majority of the metal finds are post-medieval or modern in date and the remaining objects are too fragmentary and corroded to be identified. The artefacts recovered are all probably related to the agricultural use of the area and a number of the artefacts may be of use for dating purposes.

Coins

3.2.6 The only coins recovered from Zone 2 came from ARC SSR 99, one is Roman and the other may be Iron Age.

Glass

3.2.7 A very small fragment of glass was recovered from ARC STP 99 and a fragment of modern opaque white glass came from ARC SSR 99. The former was intrusive and found in an environmental sample and the latter was also intrusive, in a context that produced pottery dating to AD70-100.

3.3 The Environmental Record

Animal bone

3.3.1 The quantities of bones recovered from these sites are as follows:

- ARC SSR 99 with 11 fragments weighing 0.13kg, from 6 contexts,
- ARC STP 99 with 1 fragment weighing 0.01kg from 1 context,
- ARC 330 98 with 5 bones weighing 0.02kg from 2 contexts.

3.3.2 These figures include the two samples taken from ARC SSR 99, and one each from the other two sites. While most of the bones from these assemblages were identifiable to species and were ageable, none could be measured and none were either butchered or worked.

3.3.3 The small quantities and the condition of the bones strongly indicate a poor overall potential value for further study. There are, however, two notable points of interest. The Roman levels of ARC SSR 99 provided horse and, possibly, rat bones. It is conceivable that the presence of horse may relate to high status, while the rat, as well as perhaps demonstrating local environmental conditions, could also be of some use in establishing the range of this Roman introduced species.

Molluscs

3.3.4 Mollusc shells were recovered from ARC SSR 99 and ARC STP 99. These sites produced approximately 85 shells; 12 from ARC SSR 99 samples and 75 from ARC STP 99 samples. The material included open country, shade-loving and burrowing terrestrial species only; there were no marine or freshwater forms. All recovered species are widespread and abundant in suitable habitats throughout south-east England.

Charred plant remains

3.3.5 Preservation in each site in the Zone was poor. The richest sample came from ARC SSR 99 (sample <7>) which contained an interesting charred assemblage from an early Roman oven feature.

Geo-archaeology

3.3.6 Three monolith samples were taken through colluvial deposits at ARC STP 99. Immediately overlying the valley gravels (or Head) was a bedded sand, silt and chalk deposit, deposited as a result of melt water and run off in the late Devensian period. On the slopes of the valley loess accumulated in dry periglacial conditions. Subsequent weathering and soil formation took place this, combined with human activity such as deforestation, may have triggered hillwash processes that redeposited this loess further downslope. The samples also indicate that wetter conditions previously existed on the valley floor, possibly as a result of seepage from springs at the valley sides.

3.4 Dating

3.4.1 No specialist techniques such as radiocarbon, dendrochronology, luminescence or archaeo-magnetic dating were carried out on any of the features or deposits in Zone 2.

3.5 Archive Storage and Curation

3.5.1 The stratigraphic archive has been microfilmed and can be prepared for long term storage. The contexts have been entered onto the MoLAS Oracle database, and subsequently transferred to RLE Datasets.

Finds and environmental archive

3.5.2 All the finds and environmental material, with the exception of the monolith samples is appropriately packed and conserved. There should be no problems for long term storage.

3.5.3 The shells are mainly small and fragile and therefore liable to accidental damage by crushing. They should be stored by context/sample groups in glass tubes or clear plastic boxes, each contained within labelled plastic bags

3.5.4 If thin sections are made of the monolith samples 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, the samples are not easily stored, need to be kept in a cool to cold and dark environment and are likely to deteriorate with time. Thin sections are easily available for further research and can be examined frequently without loss of information.

3.5.5 It is recommended that all material is retained at this stage, with the exception of some natural flint nodules from ARC STP 99 and the bulk glass fragments already discarded, in order to be incorporated into any analysis and publication aspect of the project.

3.6 Archive Index

Table 3: Archive index ARC 330 98 (Zone 2)

Item	Number Of Items or boxes or other	No of Fragments or litres or weight	Condition (No. of items) (W=washed; UW=unwashed; M=marked; P=processed; UP=unprocessed; D=digitised; I=indexed)
ARC 330 98 – Zone 2			
Contexts records	188		P, I
A1 plans			
A4 plans	36		P, I
A1 sections			
A4 sections	11		P, I
Small finds	Boxed with Zone 4	4	W, M, P, I
Films (monochrome) S=slide; PR=print		160	P, I
Films (Colour) S=slide; PR=print		160	P, I
Lithics (boxes)	1 box size 1	6	W, I
Burnt flint (boxes	Boxed with lithics	0.32kg	W, I
Pottery (boxes)	1 size 1	101	W,M,I
Fired clay (boxes)	1 size 1	2.8kg	W,I
CBM (boxes)	none		
Stone (boxes)	none		
Metalwork (boxes)	none		
Glass (boxes)	none		
Slag & metalwork debris (boxes)	none		
Human Bone (boxes)	none		
Animal Bone (boxes)	1 size 1	9	W, I
Molluscs	none		
Flora	Boxed with Zone 4		P, I
Flots	Boxed with Zone 4		P, I
Misc.	none		
Soil Samples (10lit. buckets)	4		P – 100%
Soil Samples (no. of contexts)	4		
Soil Samples (Monolith/kubiena tin)	none		
Samples absolute dating	None		

Quantification of Finds by volume (ARC 330 98 Zone 2)

Description	Capacity	No.	Total Volume
Shoe box (box size 1)	0.0108m^3	4	0.0432m^3

Table 4: Archive Index ARC SSR 99

Item	**Number Of Items or boxes or other**	**No of Fragments or litres or weight**	**Condition (No. of items)** (W=washed; UW=unwashed; M=marked; P=processed; UP=unprocessed; D=digitised; I=indexed)
South of Station Road ARC SSR 99			
Contexts records	65		P, I
A1 plans	None		
A4 plans	16		P, I
A1 sections	None		
A4 sections	19		P, I
Small finds	1 box size 1	9	W, M, P, I
Films (monochrome) S=slide; PR=print	2	45	P, I
Films (Colour) S=slide; PR=print	2	45	P, I
Lithics (boxes)	1 size 1	3	W, I
Burnt flint (boxes	Boxed with lithics	1.34kg	W, I
Pottery (boxes)	2 size 1	401	W, M, I
Fired clay (boxes)	1 size 1	1.34kg	W, I
CBM (boxes)	Boxed with fired clay	0.09kg	W, I
Stone (boxes)	Boxed with fired clay	1.02kg	W, I
Metalwork (boxes)	1 size 1	0.1kg	W
Glass (boxes)	none		
Slag & metalwork debris (boxes)	metalwork	3.5kg	W
Human Bone (boxes)	none		
Animal Bone (boxes)	Boxed with fired clay	11	W, I
Molluscs	1 size 1	12	P, I
Flora	Boxed with molluscs		P, I
Flots	1 size 1		P, I
Misc.	1 size 1		P
Soil Samples (10lit. buckets)	30		P – 100%
Soil Samples (no. of contexts)	23		
Soil Samples (Monolith/kubiena tin)	none		
Samples absolute dating	none		

Quantification of Finds by volume (ARC SSR 99)

Description	**Capacity**	**No.**	**Total Volume**
Shoe box (box size 1)	$0.0108m^3$	9	$0.0972m^3$

Table 5: Archive Index ARC STP 99

Item	**Number Of Items or boxes or other**	**No of Fragments or litres or weight**	**Condition (No. of items)** (W=washed; UW=unwashed; M=marked; P=processed; UP=unprocessed; D=digitised; I=indexed)
Temple East of Springhead ARC STP 99			
Contexts records	90		P, I
A1 plans			
A4 plans	22		P, I
A1 sections			
A4 sections	26		P, I
Small finds	Boxed with misc.	9	W, M, P, I
Films (monochrome) S=slide; PR=print	2	18	P, I
Films (Colour) S=slide; PR=print	2	18	P, I
Lithics (boxes)	1 size 1	9	W, I
Burnt flint (boxes	Boxed with lithics	7.26kg	W, I
Pottery (boxes)	none		
Fired clay (boxes)	none		
CBM (boxes)	none		
Stone (boxes)	none		
Metalwork (boxes)	none		
Glass (boxes)	none		
Slag & metalwork debris (boxes)	none		
Human Bone (boxes)	none		
Animal Bone (boxes)	1 size 1	1	W, I
Molluscs	Boxed with animal bone	75	P, I
Flora	Boxed with animal bone		P, I
Flots	1 size 1		P, I
Misc.	1 size 1		P
Soil Samples (10lit. buckets)	34		P – 100%
Soil Samples (no. of contexts)	25		
Soil Samples (Monolith/kubiena tin)	2		
Samples absolute dating	none		

Quantification of Finds by volume (ARC STP 99)

Description	**Capacity**	**No.**	**Total Volume**
Shoe box (box size 1)	$0.0108m^3$	4	$0.0432m^3$

4. STATEMENT OF POTENTIAL

4.1.1 The stratigraphic evidence has the potential to contribute in varying degrees towards the following Time Periods:

- Early Agriculturists (4500-2000 BC)
- Farming Communities (2000-100 BC)
- Towns and their rural landscapes (100 BC – AD 1700)

4.1.2 Within these time periods the stratigraphy can contribute towards the following Research Objectives:

- *To establish the nature of the landscape through time*

Upper Ebbsfleet Valley

4.1.3 The nature of the northern dry valley sequence has been established from the Late Devensian through to the post-medieval period. The nature of the western dry valley has not been established to any clear extent.

4.1.4 It appears that during the Neolithic period the northern dry valley was used for some form of occupation, with pits, a hearth and postholes recorded near to a spring zone. During the Bronze Age a vast amount of colluvial material entered the northern dry valley and clogged it. Spring lines within these colluvial layers attest to continuing phases of dampness and snail samples attest to open country conditions

4.1.5 At the western end of Zone 2, during the Late Iron Age and 1st century AD occupation occurred. It is presumed the valley floor was left mostly uncultivated during the later prehistoric and Roman periods as no field boundaries have been found and there is evidence for continued spring activity. The only evidence recovered for the nearby town of Springhead is the Roman road and cemetery (ARC NBR 98) which are dealt with under a separate assessment. The apparent abandonment of the ARC SSR 99 site around AD100 coincides with a much more widespread trend, possibly associated with the re-organisation of south-east Roman Britain at this time.

4.1.6 With increasingly dry conditions the area was drained and farmed during the post-medieval (and probably medieval) and modern periods.

- *To determine the spatial organisation of the landscape, and changes through time*

4.1.7 The areas of settlement activity are located spatially and reflect a shifting pattern of occupation and landuse (see above). There are, however, gaps in the sequence.

- *To determine the late and post-Roman landscape*

4.1.8 No evidence for determining the late and post-Roman landscape was recovered. Continuity is suggested due to the close proximity of the ARC NBR 98 Roman road and the modern New Barn Road.

- *To determine the ritual and ceremonial uses of the landscape*

4.1.9 No evidence for ritual and ceremonial use of the landscape was recovered. However, it may be stated that the Roman cemetery alongside the road to the

south of Springhead is located near to the crest of the western dry valley, in an area of great visibility on the town approach from the south.

4.2 Artefacts

Pottery

4.2.1 The pottery has potential to contribute to the following areas of research:

- *To recover dating evidence from the features located to enable a chronology for the division of the landscape to be established*
- *To determine the spatial organisation of the landscape, and changes through time*

4.2.2 The pottery has the potential to contribute to our understanding of the character, function and development of the Roman urban fringe. The pottery will provide a chronological framework for the excavated features and will assist in the study of how the landscape develops over time. The assemblage is large enough to provide meaningful analysis and can be examined in regard to functionality and status.

CBM/fired clay

4.2.3 Much of the daub and fired clay is from ovens and hearths and has the potential, when combined with the stratigraphic information, to provide information on the types of structure and activity in the area in the early Roman period. The single fragment of tile is probably an abraded tegula and has little significance.

4.2.4 The assemblage appears to be composed mainly of material of Late Iron Age to early Roman date, and it has the potential to provide information on the following original Landscape Zone aims and Field Event aims.

- *To determine the spatial organisation of the landscape, and changes through time*

4.2.5 The presence of Roman material on sites with ample evidence of Late Iron Age occupation has the potential to provide evidence of continuity of use from the Iron Age to the Roman period.

4.2.6 If the daub from ARC SSR 99 represents, as seems likely, the remains of kiln or oven structure, its analysis has the potential to provide information on Iron Age to early Roman land use and environment.

Flint

4.2.7 The flint can contribute to some of the Landscape Zone Priorities and Fieldwork Event Aims:

- *Farming communities (2000 BC-100 BC)*
- *To establish the nature of the landscape through time*

4.2.8 Given the restricted range of ARC STP 99 material recovered and given that the ARC SSR 99 flint is redeposited, the potential for further analysis is very low. The lack of diagnostic dating precludes anything other than a very broad date range being proposed for this material. The flint indicates sparse prehistoric activity occurring in the area.

Metal

4.2.9 The majority of the metal finds are post-medieval or modern in date and the remaining objects are too fragmentary and corroded to be identified. The

artefacts recovered are all probably related to the agricultural use of the area. They have no further potential in answering any of the research aims.

Coins

4.2.10 The coins cannot assist the Landscape Zones Aims or the Fieldwork Event Aims but are of use for dating purposes.

Glass

4.2.11 The glass has no potential for the project.

4.3 Environmental

Animal bone

- *To establish the nature of the landscape through time*

4.3.1 There is clearly very little value in attempting a study of these bone collections, when they are obviously biased in terms of skeletal part representations and possibly also regarding the range of species present. High levels of fragmentation will tend to favour the presence of the larger species.

4.3.2 The presence of the major domesticates clearly demonstrates the local use of these animals, presumably for their meat, if not for any other product. Again the information is too slight, and probably biased, to suggest how these animals may have been used to shape the local environment eg whether they were farm animals. Of some interest perhaps, is the presence of horse within the Romano-British levels at the Station Road site. This could be indicative of high status, as most of the farm work during this period was done by cattle. Horses were essentially used as pack animals or for riding.

4.3.3 The rat-size vertebra from ARC SSR 99 may be of some use in establishing local environmental conditions, and could also demonstrate the spread of an introduced species. The rat-size vertebra comes from the enclosure securely dated AD50 to 100. It has been established that the black rat was introduced to this country during the Roman period. The earliest confirmed archaeological specimen was recovered from an early second century AD fill of a well in York, while 1st and 3rd century AD examples have been found in London.

Molluscs

- *To establish the nature of the landscape through time*

4.3.4 The assemblage provides very limited potential for study of local habitats. The assemblage derives largely from the burrowing snail *Cecilioides acicula* with occasional recovery of shade-loving forms from ARC SSR 99 and open country species from ARC STP 99. The poor quality of the assemblage in terms of both abundance and species-diversity precludes any quantitative study and will not allow anything other than suggestion of overall habitat characteristics.

Charred plant remains

- *To establish the nature of the landscape through time*
- *To determine the spatial organisation of the landscape, and changes through time*

4.3.5 Sample <7> from ARC SRR 99 has the most potential to provide significant information about cereal cultivation in the early Roman period.

4.3.6 Identifiable fragments of charred wood were found in the following samples:

- ARC STP 99 <2> <4> <9> <15> <16> and <17>
- ARC 330 98 <83>

It is likely that the ARC STP 99 samples can be dated to the Neolithic period. The wood should be identified for the information about prehistoric landscape and fuel use.

4.3.7 Plant remains will be identified as closely as their level of preservation allows. Quantities of uncharred remains and charred wood fragments will be estimated and charred remains will be counted. This data has the potential to establish the nature of the landscape through time.

Geo-archaeology

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

- *To establish the nature of the landscape through time*
- *Recover a sequence of palaeo-environmental samples and dating evidence from the sedimentary sequence located in the Springhead area*

4.3.9 Sample <26> also has potential to provide information about the Late Glacial environment.

4.3.10 The achievement of these aims requires a well-dated framework within which to place the geo-archaeological data. The main sequence of colluviation in ARC STP 99 appears to be cut by Late Bronze Age features (and a Bronze Age horizon was identified in the evaluation ARC STP 97) and material seals apparent Neolithic occupation deposits. It is therefore considered that sufficient dating evidence for deposits exist for soil micromorphological examination of thin sections made from the monoliths. This work might enable the sequence of events that record the changing landscape and environment of the valley to be reconstructed. Combined with pollen analysis of the finer sediment towards the valley floor (sample <25>) this could provide information about past ecology and landuse and human–landscape interactions.

4.3.11 In order to extract the most reliable information from the thin sections, it is recommended that prior to resin impregnation for thin section manufacture the monolith inserts should first be x-rayed and subject to loop-sensor magnetic susceptibility determination. In addition, closer-spaced sub-samples than those taken for assessment should also be taken from the tins in case background particle size, loss-on-ignition and phosphate analysis is also needed to provide a suite of data with which trends through the profiles can be reconstructed. Such information is very important when interpreting thin section characteristics.

4.3.12 This data should be examined in conjunction with the archaeological and dating evidence from the site. As a result of these new data the monolith assessment presented here should be refined in order to make the most reliable interpretations about past landuse and environmental change for the environs of the site.

4.4 Conservation

Pottery

4.4.1 There are no conservation requirements for the pottery assemblage from Zone 2 or any implications for the long-term storage posed by further analysis

CBM/fired clay

4.4.2 The material is well-preserved and should not deteriorate as long as it is stored in clean, dry conditions.

Flint

4.4.3 The flint is appropriately bagged and boxed for long-term storage. Some of the burnt unworked flint is beginning to disintegrate, however, there is little that can be done to prevent this. No conservation is required. All of the natural flint has been discarded.

Metal

4.4.4 The metal artefacts are stable and packed appropriately for long term archive storage. There are no conservation treatment requirements.

Coins

4.4.5 Both of the coins have been X-rayed and conserved. Both of the coins are to be retained.

Glass

4.4.6 The glass appears to be in a stable condition and no conservation treatment is required. The glass is to be discarded.

Animal Bones

4.4.7 There are no conservation requirements. It is recommended that all material be retained for the next stage of analysis and for any future comparative work.

Molluscs

4.4.8 Further analysis of this material would involve more detailed examination under a binocular microscope in order to ensure precise identification of all species present. There is no reason why such work would damage the shells or impose any restriction on long-term storage procedures. The shells are mainly small and fragile and therefore liable to accidental damage by crushing. They should therefore all be stored by context/sample group in glass tubes or clear plastic boxes, each contained within labelled plastic bags. The complete assemblage should then be stored in an archive quality 'shoe-box'.

Charred plant remains

4.4.9 Sample ARC SSR 99 <7> should be retained for further analysis. Sub-samples of identifiable charred wood fragments (larger than 5mm³ in size) from ARC STP 99 <2> <4> <9> <15> <16> <17> and ARC 330 98 <83> should be saved and stored dry prior to further analysis.

Geo-archaeology

4.4.10 If thin sections are made of the monolith blocks 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 the 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.

4.4.11 In the same way, processed sub-samples taken from the monoliths will be easier to store and less likely to deteriorate than the original soil material.

4.5 Overall potential

4.5.1 The principal site data has the potential to contribute towards the following Time Periods as defined in the CTRL Archaeology Research Strategy.

Early Agriculturists (4,500-2,000 BC)

- *Define nature of contemporary environment*
- *Determine nature and effect of clearance for agricultural activity*
- *Define ritual and economic landscapes and their relationships*

4.5.2 The nature of the contemporary environment can be determined from a combination of wood identification from the samples of ARC STP 99 and pollen analysis from the monolith sample sequences.

4.5.3 Evidence from ARC STP 99 appears to show the effect of clearance of woodland from the landscape, perhaps begun before 2,000 BC, in a massive destabilisation throughout the Bronze Age in the northern dry valley.

4.5.4 There is no evidence for ritual or economic use of the landscape at this date.

Farming Communities (2,000-100 BC)

- *Determine spatial organisation of the landscape in terms of settlement location in relation to fields, pasture, woodland, enclosed areas and ways of moving between these*
- *Determine how settlements were arranged and functioned over time*
- *The socio-economic landscape of later agriculturists*

4.5.5 Evidence for spatial organisation of the landscape was found in the occupation activity at ARC STP 99, which, judging from other sites in the area (for example Area 330 Zone 3) is likely to date to the Later Neolithic-Early Bronze Age. It is possible this occupation is related to the Early Bronze Age cremation recovered a short distance to the east at Hazells Farm (Area 330 Zone 3).

4.5.6 During the Bronze Age a massive destabilisation occurred in the northern dry valley, presumably a combination of loose sand geology, spring activity and, potentially, agricultural practices. Mollusc analysis appears to indicate the northern dry valley was ‘open country’ and sediments and archaeological evidence suggests the area was damp. It is perhaps therefore more probable that the area was kept clear for pasture and the wetness was of a more seasonal nature. The wetness may have helped the movement of sandy material downslope.

4.5.7 Settlement activity in the form of Late Bronze Age pits was recorded immediately to the west of ARC STP 99. Possible mid to Late Iron Age pits occur near to Hazells Farm to the east. This area is known as a settlement focus in this period and is discussed in Area 330 Zone 3 Assessment.

4.5.8 It is therefore considered that Zone 2 was used for a combination of dispersed occupation and limited agricultural activity.

Towns and their rural landscapes (100 BC – AD 1700)

- *How were settlements and rural landscapes organised and how did they function?*
- *How did the organisation of the landscape change through time?*
- *Consider the effect on the landscape of known historical events, eg. the arrival of Roman administration*
- *The late and immediate post-Roman period*
- *The impact and development of Roman Watling Street*

4.5.9 The evidence suggests that an enclosed area of ARC SSR 99 was made on the higher ground overlooking the western dry valley, the broader area of Springhead and the northern dry valley. Pottery dates indicate that occupation basically occurred between AD45/50 and AD100. No evidence for buildings were found and it is thought that the enclosure was probably for stock (perhaps for horses). A rat-sized vertebra may indicate the range of this species, thought to have been introduced by the Romans.

4.5.10 The ARC SSR 99 site is abandoned before the end of the 1st century – the enclosure ditch being filled by the time of the late 1st century oven. A similar abandonment of an enclosed 'native' site is seen at Northumberland Bottom ARC WNB 98 (Area 330 Zone 3), this time dated to around AD70. There is thus potential for these sites to contribute to the understanding of the introduction of the Roman administration and control of the landscape.

4.5.11 This leads to further lines of enquiry. Traditionally it has been seen that Late Iron Age – Early Roman occupation spans 100BC to AD100 with the 'native' sites being removed/replaced with by the Roman administration. However, a possible new theme for this area of Kent would be to establish exactly when this removal/replacement happened. Detailed pottery analysis is dating the main abandonment of these sites to the late 1st century (possibly around AD70 in the case of ARC SSR 99 and ARC WNB 98) so it is therefore possible, that the sites were cleared in the aftermath of the Boudican revolt. The land is then re-occupied in a new 'Roman' style by the end of the 1st /beginning of the 2nd century AD (in the case of ARC WNB 98).

4.5.12 No evidence for the influence of Roman Watling Street or the Late and immediate post Roman landscape was recovered.

4.5.13 Evidence for possibly medieval, post-medieval and recent activity was limited to deneholes and field drains. A study of the layout of the fields on the first edition Ordnance Survey Map (or earlier tithe and parish maps if they exist) will clarify the approximate nature of post-medieval land use.

4.5.14 The new aims are summarised below. They enhance the existing aims rather than replacing them.

- Can the context and date of the Late Neolithic – Early Bronze Age occupation in the upper Ebbsfleet valley be further refined? Can this occupation be precisely related to the colluvial sequence at ARC STP 99?
- Can the colluvial sequence of ARC STP 99 be better dated using pollen analysis?
- Can the nature of the late 1st century AD abandonment of the Late Iron Age – Early Roman sites in the area be further established? Is the landscape cleared of the native peoples and re-occupied by new 'Roman' owners or are

the sites abandoned through instability and later re-occupied by 'Romanised' native British?

4.5.15 The environmental data from this zone can be used in conjunction with the evidence from the CTRL Ebbsfleet Valley sites and the Tollgate sites (ARC TGW 97 and ARC TLG 98) to determine any diversity in the environment in the prehistoric period in the area. The early Roman evidence indicates agricultural activity associated with rural settlements and is likely to be heavily influenced by the development of Springhead Roman town but the evidence needs to be looked at in a very broad context.

5. BIBLIOGRAPHY

URL [Union Railways Limited], *1994 Channel Tunnel Rail Link, Assessment of Historic and Cultural Effects,* Final Report, Oxford Archaeological Unit

URL, 1995 Channel Tunnel Rail Link, *Assessment of Historic and Cultural Effects, Supplementary Fieldwork Report,* Oxford Archaeological Unit

URL, 1996 Channel Tunnel Rail Link, *Geophysical Surveys, Final Report*, A Bartlett Associates, Oxford

URL 1997, *Archaeological evaluation at Temple East of Springhead (ARC STP 97), Gravesend, Kent* prepared by Wessex Archaeology

URL, 1998 *Agreement for the provision of archaeological investigations at Pepper Hill to the River Medway (package 381)*

URL 1998, *Waterloo Connection, Southfleet, Kent ARC SSR 98* Archaeological Evaluation Report prepared by Oxford Archaeological Unit

URS (Union Railways (South) Limited), 1999a, *West of Northumberland Bottom Interim report* prepared by MoLAS

URS 1999b, *Waterloo Connection, Northfleet, Kent ARC NBR 98* Interim Report prepared by Oxford Archaeological Unit

URS, 2000, *Area 330 Archaeological Watching Brief Interim Report* prepared by MoLAS

URS, 2000, Channel Tunnel Rail Link *Section 1 Archaeology: Post-excavation Assessment Instruction no. 000-RMA-RLEVC-00030-AB* prepared by RLE

6. ACKNOWLEDGEMENTS

This assessment report was prepared by Tony Mackinder, Portia Askew, Niall Roycroft and the following MoLSS specialists; Liz Barham (conservation), Philippa Bradley (flint), Jane Corcoran (geo-archaeology), Lisa Gray-Rees (botany), Jackie Keily (registered finds), Kevin Rielly (animal bones) Alan Pipe (molluscs), Susan Pringle (ceramic building material), Louise Rayner (prehistoric and Roman pottery). The figures were by Sophie Lamb and Kate Pollard of MoLAS. OS information was supplied by URS. The work was project managed by Niall Roycroft and Gordon Malcolm.

APPENDIX 1: ASSESSMENT OF POTTERY

Louise Rayner

1. Introduction

1.1 The majority of the Zone 2 assemblage was recovered from ditches and an oven in the area of Station Road (ARC SSR 99) and dates to the late Iron Age/early Roman period. There is also a smaller quantity of later prehistoric flint-tempered pottery, although some of this is residual in later features. A smaller quantity of pottery was recovered from ARC 330 98.

1.2 There was no pottery found from ARC STP 99.

1.3 The pottery will assist the following fieldwork event aims:

- *To recover dating evidence from the features located to enable a chronology for the division of the landscape to be established.*
- *To determine the spatial organisation of the landscape and changes through time.*

2. Methodology

2.1 All of the hand-collected pottery was recorded using standard MoLSS recording methods. The material is recorded on a context by context basis using fabric, form and decoration as unique identifiers. The prehistoric sherds were recorded using the Canterbury Archaeological Trust regional fabric codes.

2.2 The Late Iron Age/Belgic and Roman pottery was recorded using the Canterbury Archaeological Trust (CAT) fabric reference collection codes. In some cases, particularly for the Late Iron Age/Belgic and early Romano-British material these codes should be taken to indicate broad fabric groupings and not defined fabric types; because of local variation sherds recorded under the same fabric code (both within the Zone 2 assemblage and from other sites recorded using CAT codes) will not represent one defined fabric but enable sherds to be grouped with other similar material. The pottery was quantified by count and weight and aspects of condition were also noted.

3. Quantifications

3.1 A total assemblage of 522 sherds was recovered from the area of Zone 2. The quantities breakdown as follows:

Table 6: Quantifications of prehistoric pottery

Event code	count	Weight
ARC 330 98	58	415
ARC SSR 99	29	259
Total	67	514

Table 7: Quantifications of Roman pottery

Event code	count	Weight
ARC 330 98	63	445
ARC SSR 99	372	3049
Total	435	3494

4. Provenance

4.1 From ARC 330 98 the prehistoric pottery was recovered from three contexts all of which were pit fills. Only a small group was recovered which totalled 38 sherds (255g). The pottery is all flint-tempered and generally of later prehistoric date. A single small jar is present from the area just to the west of ARC STP 99 which is probably of late Bronze Age date.

4.2 The second prehistoric group is 20 sherds of shell-tempered pottery which were recovered from the fill of a posthole from the west of Dale Road. There are no diagnostic sherds so the dating is uncertain, although a later prehistoric date, probably Iron Age seems most likely.

4.3 The Roman pottery from ARC 330 98 consisted of one group recovered from a ditch fill. This comprised two jars, which were partially complete.

4.4 From ARC SSR 99 the prehistoric pottery was again all flint-tempered and formed a small group of 29 sherds (259g). The pottery was recovered from ditches and pits and is primarily residual with later material. The bulk of the pottery is of Late Iron Age/early Roman date and was recovered from a series of ditches, pits and an oven.

4.5 From the fill of pit (sg 109) in ARC SSR 99 a group of late Iron Age/early post-conquest pottery was recovered which includes a sherd of *Terra Rubra* from a platter type Cam. 5. Although this form is dated to AD 40, the fabric (TR1A) is generally dated to AD 25. In either case this group is of note because it appears to be of earlier date than the pottery recovered from the ditches and because *Terra Rubra* vessels are generally rare. Further examples were recovered from Area 330 Zone 1 which might suggest a still sparse but wider distribution than previously evidenced.

4.6 A large group of early Roman pottery was recovered from the oven feature. This assemblage includes 'native' wares such as shell-, grog- and flint-tempered fabrics with clear Iron Age origins. These occur alongside early Romanised wares such as Upchurch fine wares and also south Gaulish imported samian, including a plate Drag. 18. The presence of these wares suggests a date in the later 1st century is most likely for this assemblage. Also in this assemblage are a high number of sherds from Thameside Kent shell-tempered storage jars with stabbed decoration on the shoulder. The composition of the assemblage suggests

it derives from domestic settlement and appears to have been dumped into the oven, once the feature had gone out of use.

4.7 The remainder of the pottery is primarily derived from the backfill of ditches. The pottery is of a similar nature to the assemblage recovered from the oven, with both native type fabrics and Roman wares, including further sherds of Samian.

5. Conservation

5.1 There are no conservation requirements for the pottery assemblage from Zone 2 or any implications for the long-term storage posed by further analysis.

6. Comparative material

6.1 A number of other sites in the region have produced evidence for early Roman activity. These will provide good comparative data for the Area 330 Zone 2 assemblage. The assemblage also finds comparison amongst the pottery from CTRL Area 330 Zones 1 and 3.

6.2 The shell-tempered prehistoric pottery from the posthole fill should be compared to the fabrics defined in Zone 3. This may improve the dating for the material.

7. Potential for further work

7.1 The pottery has potential to contribute to the following areas of research:

- *Landscape Zone Priorities: Spatial organisation of the landscape and changes through time - the character, function and development of the Roman rural urban fringe*

7.2 The pottery will provide a chronological framework for the excavated features, which clearly represent rural activity, and will assist in the study of how the landscape functions and develops over time. The assemblage is large enough to provide meaningful analysis and can be examined in regard to functional composition and status.

7.3 The character and dating of the assemblage should be compared to similar pottery from Fawkham Junction (Zone 1) and West of Northumberland Bottom (Zone 3).

7.4 The following further work is suggested in order to fulfil the potential of the assemblage:

- Define fabric descriptions for early Roman assemblage. This should be done in conjunction with the assemblage from ARC 330 98 (Zone 1) and ARC WNB 98 in order to establish whether any fabrics appear in more than one assemblage. This type of analysis will also refine the chronologies of this activity, which is important to fully address the question of the change in landscape organisation through time.

- Detailed consideration of the stratigraphic relationship of the assemblage in order to detect changes in the assemblage composition that may be of chronological importance.
- Analysis of the functional composition of the assemblage by comparing the relative quantities of different form types represented. This will contribute to the characterisation of the activity, taking place in this vicinity. By comparison with the assemblages from Zone 1 and 3, it will be possible to detect patterns of continuity or change in the functional bias over time and space.
- Prepare publication text
- Illustration of key groups

8. Bibliography

None

Table 8: Assessment of prehistoric Pottery, quantifications and attributes

Event Code	Context	Count	Weight	Period	Comments
ARC 330 98	667	13	90	LPR	FLIN
ARC 330 98	1251	18	57	LPR	FLIN
ARC 330 98	1253	7	108	LBA	FLIN 2 FLIN Late Bronze Age: plain wares
ARC SSR 99	1	5	2	LPR	FLIN
ARC SSR 99	15	1	2	LPR	FLIN
ARC SSR 99	31	17	235	LPR	FLIN 2
ARC SSR 99	48	6	20	LPR	FLIN

Table 9: Assessment of Roman Pottery, quantifications and attributes

Event Code	Context	Count	Weight	Period	D_Min	D_Max	Comments
ARC 330 98	296	41	201	RO	50	100	CR73 2B CR75 2T
ARC 330 98	370	20	161	LIA/RO	50	100	SHEL
ARC SSR 99	10	1	7	RO	50	100	R17.4
ARC SSR 99	11	2	7	RO	50	150	R68
ARC SSR 99	12	79	319	RO	45	100	B2 B2.3 2A B2.3 B6.1
ARC SSR 99	13	5	51	RO	45	100	B2 2T B6
ARC SSR 99	18	9	10	RO	50	100	R17.4
ARC SSR 99	24	1	3	RO	45	100	B2
ARC SSR 99	27	3	37	RO	45	100	B2 B6 B9
ARC SSR 99	28	9	59	RO	45	100	B2 B5 R73
ARC SSR 99	31	14	215	RO	40	70	B12ELG 5AM5 B2 2 BUD B6
ARC SSR 99	35	90	784	RO	70	100	B2 B21 2 COMB B6 2 B6 2A B6.1 2 B6.1 2A B6.1 2T R16 R17.4 R42 5DR18 R69 2M STAB R73 9A R8.1
ARC SSR 99	39	26	200	RO	50	100	B2 COMB B2 B6 2V NCD B6.1 B9 R17.4 R42 5
ARC SSR 99	40	17	433	RO	50	100	B2 2 B2 B21 2A RLD B6 B6.1 2A R42 5 R68 2
ARC SSR 99	42	9	26	RO	70	100	B2 B6 R16 R17.3 R73
ARC SSR 99	49	57	172	RO	50	100	B6 B9 R17.4
ARC SSR 99	59	13	104	RO	50	100	B6 R42
ARC SSR 99	60	20	187	RO	70	100	B2 B6 B9 R16 RM 69 2M
ARC SSR 99	62	10	251	RO	50	100	B2.3 R69 2M STAB
ARC SSR 99	63	7	184	RO	50	150	B2 2 B6 R69

APPENDIX 2: ASSESSMENT OF CERAMIC BUILDING MATERIAL AND FIRED CLAY

Susan Pringle

1. Introduction

1.1 All the building material from ARC SSR 99, a total of 3.360kg, including 2.25kg of daub or fired clay, 1.02kg of stone and 0.09kg of tile, was examined. A further 2.8kg of daub from ARC 330 98 (Zone 2) was examined, but is unstratified.

1.2 The study of the material should assist with the following fieldwork event aims:

- *to establish a record of changing settlement and landscape morphology for the area, to include habitation areas and associated enclosures and trackways etc;*
- *to determine the function of these areas and changes through time;*

2. Methodology

2.1 All the material was examined and recorded for the assessment using a binocular microscope. Fired ceramic building material has been divided by form, and fragments counted and weighed. The fabric types have been noted, using the Museum of London fabric type series, and any complete dimensions or other features of interest recorded.

2.2 The fired clay assemblage has been counted and weighed, and the presence of features such as original surfaces, impressions, and the presence of mortar or tempering noted.

2.3 The data have been entered on an ORACLE database and transferred to the RLE Datasets.

2.4 All the material has been retained for reference at present.

3. Quantifications

3.1 The total weight of building material scanned for the assessment is 6.16kg, including 5.05kg of daub, 0.09kg of tile, and 1.02kg of stone. Daub accounts for 67% of the assemblage from ARC SSR 99 by weight (2.25kg), with tile comprising 2.7% (0.09kg), and stone 30.4% (1.02kg). The assemblage from ARC 330 98 (Zone 2) consists entirely of daub (2.8kg), from a single, unstratified, context.

3.2 Building materials were recorded from 15 contexts of which four are large, four medium and seven small; of these, one context contains datable material, of Roman date (ARC SSR 99, sg 118), details of which are set out below.

3.3 The Roman tile fabric is similar to examples of the 2815 group from London. This group comprises red-firing fabrics made from London clays, with varying quantities of quartz sand, and occasional red iron-rich and/or white calcareous

inclusions. The tile fabric in ARC SSR 99 [29] contains some medium to coarse quartz grains and sparse white calcareous inclusions. The tile itself, from sg 118, is abraded and could be a tegula or a brick, although the former is more likely. Apart from its use as evidence for Roman activity on the site, there is little significance in the presence of a very small quantity of such abraded material.

3.4 The daub assemblages from both ARC SSR 99 and ARC 330 98 are of interest. ARC SSR 99 produced 2.25kg of daub from 12 contexts, ten of which have early Roman spot dates (sgs 114, 115, 116, 117 and 120). Much of the daub was made from a fine, sandy, slightly micaceous, orange-firing clay, but other types were also noted. Seven of the contexts contain samples taken from ovens or hearths, and appear to represent early Roman domestic or industrial activity. Samples <4>, <14>, <17>, <20>, and <22> contain fragments of a 'skin', *c* 10-20mm thick, of compressed, fairly coarse, clay granules. The light yellowish-brown clay contains fine black iron oxides and flint inclusions of similar grade to the clay granules; surfaces are flat. Samples <21> and <23> are slightly different in character, consisting of lumps of very reduced and blackened fine clay with very coarse pebbles. Probable wattle impressions were noted on the daub in context [35] (sg 114), which suggests that it is from a wattle and daub structure, possibly a house or hut.

3.5 A single fragment of stone was examined from ARC SSR 99, sgp115, which has an early Roman spot date. It has not been securely identified, but resembles a laminated, fairly fine-grained, puddingstone. It is 35-40mm thick, and its function is uncertain; it may have been used for paving, or could be a fragment of artefact such as a hone, quern or rubbing stone.

4. Provenance

4.1 The bulk of the building material from Zone 2 is of Late Iron Age/early Roman date and was recovered from an oven (sgs 114, 115) and a series of ditches (sgs 116, 117, 118).

5. Conservation

5.1 The material is well-preserved and should not deteriorate as long as it is stored in clean, dry conditions.

5.2 Access may be needed to the daub from ARC SSR 99 for further analysis before the material is published.

6. Comparative material

6.1 The material can be compared with that from a number of other sites in the project which have produced assemblages of fired clay and daub of late Iron Age/early Roman date.

7. Potential for further work

7.1 The assemblage appears to be composed mainly of material of Late Iron Age to early Roman date, and it has the potential to provide information on the following original Landscape Zone aims and Field Event aims.

7.2 Towns and their rural landscapes (100 BC – 1700 AD)

- *How were settlements and rural landscapes organised and how did they function?*

7.3 The presence of Roman material on sites with ample evidence of Late Iron Age occupation has the potential to provide evidence of continuity of use from the Iron Age to the Roman period.

7.4 The Roman tile indicates the presence of Roman activity in the vicinity of the site.

7.5 Field event aims:

- *To establish a record of changing settlement and landscape morphology for the area, to include habitation areas and associated enclosures and trackways etc.*
- *To determine the function of these areas and changes through time*

7.6 The daub from ARC SSR 99 represents the remains of kiln or oven structures from a well dated, 1st century AD deposit. Its analysis has the potential to provide information on Iron Age to early Roman land use and environment.

7.7 No further work is needed on the Roman ceramic building materials.

7.8 Tasks: building materials or fired clay specialist.

- re-examine the daub to define more precisely the function of the different types and materials of which the structures were built (e.g. dimensions of wattles and other organics), and select material for illustration
- write report
- editing time to check text and illustrations

8. Bibliography

None

Table 10: ARC SSR 99: count and weight of Roman tile types

Form	Number of fragments	Count as % of total	Weight (g)	Weight as % of total
Tegula (?)	1	100	90	100
Total	1	100	90	100

Table 11: Assessment of Ceramic Building Material /Assessment of Fired Clay

Event code	Context	Count	Weight	Type (brick/ tile etc.)	Period (spot date)	Comments (decoration/ glaze/ fabric)
ARC SSR 99	10	11	200	DAUB	UN	3102
ARC SSR 99	12	2	85	DAUB	UN	3102
ARC SSR 99	13	1	10	DAUB	UN	3102
ARC SSR 99	16	1	10	DAUB	UN	3102
ARC SSR 99	28	1	10	DAUB	UN	3102
ARC SSR 99	35	1	25	DAUB	UN	3102
ARC SSR 99	40	10	70	DAUB	UN	3102
ARC SSR 99	49	15	160	DAUB	UN	3102
ARC SSR 99	59	1	1020	PAV	UN	3120
ARC SSR 99	62	31	220	DAUB	UN	3102
ARC SSR 99	63	25	400	DAUB	UN	3102
ARC SSR 99	64	30	440	DAUB	UN	3102
ARC SSR 99	65	20	620	DAUB	UN	3102
ARC SSR 99	29	1	90	TEG	RO	2815
ARC 330 98	1066	24	2800	DAUB	UN	3102

APPENDIX 3: ASSESSMENT OF WORKED FLINT

Philippa Bradley

1. Introduction

1.1 Small groups of worked flint were recovered from the excavations. The worked flint consists of mostly hard-hammer struck flakes. A single blade-like flake came from ARC STP 99 and a possible soft-hammer struck flake cane from ARC 330 98. This material is not closely datable but is entirely consistent with a Neolithic or Bronze Age date, and probably no later than the early Bronze Age.

1.2 Burnt unworked flint was recovered from all sites within this zone, with ARC STP 99 producing the most in terms of both number and weight. The burnt unworked flint consists of a range of small to large sized fragments or pebbles of heavily calcined flint.

2. Methodology

2.1 The worked and burnt unworked flint was recorded onto the Oracle database using standard MoLSS methods and transferred to RLE Datasets. The material was recorded by typological group, where appropriate, notes were made on pertinent technological attributes. Brief notes were also made on the general condition of the material. The burnt unworked flint was briefly scanned and quantified, a general note of the condition of the material was also made. Natural unworked flint was discarded.

3. Quantifications

3.1 A total of 18 pieces of worked flint and 1164 pieces of burnt unworked flint (weighing 8916g) was recovered from ARC SSR 99, ARC STP 99 and ARC 330 98. The flint is summarised in the Tables below.

4. Provenance

4.1 The worked flint was recovered from only 14 contexts, with a maximum of two pieces being recovered from any one feature. The burnt unworked flint was spread over more contexts (23) but apart from a few contexts (eg ARC STP 99 [4] and [83]) the numbers of pieces recovered was less than 10. The distribution by weight is slightly more varied.

4.2 The flint came from a range of features across the zone including cut features, natural features and layers. The flint from ARC STP 99 came from pits sealed beneath alluvium dating to the Bronze Age. The flint itself is not diagnostic, consisting of flakes (including a slightly blade-like flake and a possible soft-hammer struck flake) but would not be inconsistent with a later Neolithic or early Bronze Age date. It should, however, be stressed that this is a very small undiagnostic assemblage from several contexts. The flint from ARC SSR 99 and

ARC 330 98 contexts have been dated to the Iron Age and Roman periods, thus the flint would appear to have been redeposited. It consists largely of debitage and a single possible pebble smoother/rubber.

4.3 The probable rubber or smoother from ARC SSR 99, context [35] is not a diagnostic artefact and may be prehistoric in date but may equally be contemporary with the Roman pottery recovered.

5. Conservation

5.1 The flint is appropriately bagged and boxed for long-term storage. Some of the burnt unworked flint is beginning to disintegrate, however, there is little that can be done to prevent this. No conservation is required. All of the natural flint has been discarded.

5.2 Selected burnt unworked flint could be discarded, keeping only a selection of representative material for archive purposes. The full quantification (by weight and number), together with a description of the material discarded would provide sufficient records for any future work.

6. Comparative material

6.1 In the local context this flint compares well with material from West of Northumberland Bottom (Area 330 Zone 3) and also from ARC NBR 98 (separate assessment).

6.2 Considerable quantities of Neolithic and Bronze Age flintwork have been recovered from Kent principally through the fieldwork undertaken for the CTRL but also from other, mostly as yet unpublished excavations.

7. Potential for further work

7.1 Given the restricted range of material recovered and given that the flint is redeposited, the potential for further analysis is very low. The lack of diagnostic dating precludes anything other than a very broad date range being proposed for this material. The flint indicates sparse prehistoric activity occurring in the area. The flint can contribute to some of the Landscape Zone Priorities and Fieldwork Event Aims:

- *Farming communities (2000 BC-100 BC)*
- *To establish the nature of the landscape through time*

7.2 If the flint is to be included within the publication, it is recommended that this assessment report can be used as a basis. It may be worth comparing the material from ARC STP 99 to other Late Neolithic – Early Bronze Age assemblages from the CTRL route in order to try and refine the dating. No illustrations would be required.

8. Bibliography

URS 2001a, '*Assessment of Worked Flint from Pepper Hill, Waterloo Connection'*, unpublished report prepared by Bradley, P, for OAU

URS 2001b, '*Assessment of Worked Flint Area 330 Zone 3*', unpublished report prepared by Bradley, P for MoLAS

Table 12: Worked Flint ARC STP 99

Event code	Context	Count	Period	Comments
ARC STP 99	1	2		1 wholly cortical Bullhead flake, 1 partly cortical flake
ARC STP 99	39	1		1 slightly blade-like flake
ARC STP 99	61	1		1 almost wholly cortical flake
ARC STP 99	63	1		1 small ?SH flake, worn
ARC STP 99	65	2		2 small broken flakes
ARC STP 99	73	2		1 small flake, 1 ?trimming flake
ARC STP 99	78	-		5 natural discarded
Total		9		

Table 13: Burnt Flint ARC STP 99

Event code	Context	Count	Weight	Comments *
ARC STP 99	4	1100	5429	mix of large and many small frags
ARC STP 99	46	1	8	
ARC STP 99	61	1	9	
ARC STP 99	74	5	222	
ARC STP 99	78	1	2	small reddish tinged fragment
ARC STP 99	81	5	1143	
ARC STP 99	83	10	442	
Total		1123	7255	

***** all heavily calcined white to grey

Table 14: Worked Flint ARC SSR 99

Event code	Context	Count	Period	Comments
ARC SSR 99	13	2		1 small burnt flake, 1 HF ?side trimming flake, also 1 natural discarded (Accession 2)
ARC SSR 99	35	-		2 natural discarded
ARC SSR 99	35	1		1 small round pebble with areas of polish, probably a smoothing/rubbing stone
ARC SSR 99	60	-		1 natural discarded
Total		3		

Table 15: Burnt Flint ARC SSR 99

Event code	Context	Count	Weight	Comments*
ARC SSR 99	1	1	25	
ARC SSR 99	12	5	243	
ARC SSR 99	12	1	47	
ARC SSR 99	13	1	78	
ARC SSR 99	26	1	13	
ARC SSR 99	28	2	115	
ARC SSR 99	28	1	11	
ARC SSR 99	35	3	192	
ARC SSR 99	35	1	8	
ARC SSR 99	39	3	144	
ARC SSR 99	39	1	35	
ARC SSR 99	40	3	136	
ARC SSR 99	48	1	62	
ARC SSR 99	59	1	40	
ARC SSR 99	60	2	53	
ARC SSR 99	62	1	86	
ARC SSR 99	63	1	49	
Total		29	1337	

***** all heavily calcined white to grey

Table 16: Worked Flint ARC 330 98

Event code	Context	Count	Period	Comments
ARC 330 98	296	2		small flakes, also 7 natural discarded
ARC 330 98	381	1		side trimming flake?
ARC 330 98	1009	-		2 natural discarded
ARC 330 98	2002	2		1 with hinge fracture, other is slightly irregular
ARC 330 98	2002	1		1 ?SH flake, broken, possible used edges, Accession 141
Total		6		

Table 17: Burnt Flint ARC 330 98

Event code	Context	Count	Weight	Comments *
ARC 330 98	296	7	163	
ARC 330 98	381	3	118	
ARC 330 98	2002	2	43	
Total		12	324	

***** all heavily calcined white to grey

APPENDIX 4: ASSESSMENT OF METALWORK

Jackie Keily
Conservation by Liz Barham

1. Introduction

1.1 A total of nine metal accessions were found during archaeological work in Area 330 Zone 2. Five metal accessions (one lead, one iron and three copper alloy) were recovered from ARC SSR 99 and four iron accessions from ARC 330 98.

1.2 The three iron accessions from Chainage (CH) 204+540 (ARC 330 98) were metal detected, as was the lead fragment from ARC SSR 99. The remaining artefacts were recovered by hand excavation.

1.3 The metal finds can assist with the following fieldwork event aims:

- *To recover dating evidence from the features located to enable a chronology for the division of the landscape to be established*
- *To determine the late and post-Roman landscape*

2. Methodology

2.1 The metal artefacts were recorded using the Museum of London accessioning system. The records have been entered onto the Oracle relational database and transferred to RLE Datasets. All of the iron and the copper alloy where necessary have been X-rayed. None of the metal has been sampled.

3. Quantifications

Table 18: Assessment of Metalwork from ARC SSR 99

Context	Special Number	Material	Count	Period	Comments (Description)
19	11	Lead	1	UN	MD; a molten fragment, possibly waste or possibly part of a melted object or fitting.
42	10	Iron	2	UN	Unidentifiable; fragmentary and corroded
3	7	Copper alloy	1	MO	Ferrule or tag; letters PATEN visible
35	9	Copper alloy	1	PM	Eyelet; small with possible traces of tinning visible on the X-ray
20	8	Copper alloy	1	PM	Small fitting with a screw thread

Table 19: Assessment of Metalwork from ARC 330 98

Context	Special Number	Material	Count	Period	Comments (Description)
CH204 +540	26	Iron	1	PM	Hinge; incomplete
CH204 +540	104	Iron	1	UN	Part of a socketed tool or fitting
CH204 +540	103	Iron	2	UN	Unidentifiable; one possibly part of a nail
342	74	Iron	1	PM	Horseshoe; complete

4. Provenance

4.1 The metal finds from ARC SSR 99 were recovered from a variety of contexts. The fragment of lead came from [19], an undated ditch. The fragment of iron came from [42], the north half of the oven, which also produced pottery dating to AD70-100. The copper alloy ferrule or tag came from [3], an undated ditch and the small copper alloy fitting came from [20], a modern feature. The copper alloy eyelet came from [35], the north half of the oven. This context also produced pottery dating to AD70-100 and the eyelet is, therefore, a modern intrusion.

4.2 The three iron accessions from CH 204+540 (ARC 330 98) were metal detected and are unstratified. The remaining iron artefact, a post-medieval/modern horseshoe <74> came from [342], a pit.

5. Conservation

5.1 The metal artefacts are stable and packed appropriately for long term archive storage.

5.2 There are no conservation treatment requirements.

6. Comparative material

6.1 The majority of the metal finds are post-medieval or modern in date and the remaining objects are too fragmentary and corroded to be identified. There is therefore no requirement for comparative work.

7. Potential for further work

7.1 The metal finds can assist with the following fieldwork event aims:

- *To recover dating evidence from the features located to enable a chronology for the division of the landscape to be established*

7.2 The post-medieval and modern material may be of use for dating purposes.

- *To determine the late and post-Roman landscape*

7.3 The artefacts recovered are all probably related to the agricultural use of the area.

7.4 The following are the recommendations for further work:

- Further research on and identification of the socketed tool or fitting from ARC 330 98

8. Bibliography

None

APPENDIX 5: ASSESSMENT OF COINS

Jackie Keily (coin identifications by Mike Hammerson)

1. Introduction

1.1 Two coins were recovered from ARC SSR 99 in Zone 2. A copper alloy coin of Vespasian (AD 69-79) came from [13] and a possible Iron Age coin came from [18].

1.2 The coins were recovered by hand excavation.

2. Methodology

2.1 The coins have been accessioned using the Museum of London system.

2.2 The records have been entered into the Oracle relational database.

2.3 No sampling of the coins was undertaken.

3. Quantifications

Table 20: Assessment of Coins

Context	Special Number	Count	Period	Comments
13	1	1	RO	Copper alloy; Vespasian AD 69-79; possible cast copy/'light weight' forgery 2nd century?
18	2	1	IA?	Copper alloy; odd Iron Age coin or object fragment?

4. Provenance

4.1 Both of the coins came from a ditch, from contexts that also produced Roman pottery dating to the mid- to late 1st century AD.

5. Conservation

5.1 Both of the coins have been X-rayed and conserved.

5.2 Both of the coins are to be retained.

6. Comparative material

6.1 There is little scope for comparative work except possibly in trying to identify the possible Iron Age coin further.

7. Potential for further work

7.1 The coins cannot assist the Landscape Zones Aims or the Fieldwork Event Aims but are of use for dating purposes.

7.2 The only further work required is to try and identify the possible Iron Age coin.

8. Bibliography

None

APPENDIX 6: ASSESSMENT OF GLASS

Jackie Keily

1. Introduction

1.1 Only two glass accessions came from archaeological work in Zone 2. A very small fragment was recovered from an environmental sample from ARC STP 99 and a modern fragment was recovered from ARC SSR 99.

1.2 The glass fragment from ARC STP 99 was recovered from a sample which had been taken for environmental purposes and had been wet sieved. The glass from ARC SSR 99 was recovered by hand excavation.

1.3 The glass has little to contribute to the fieldwork event aims.

2. Methodology

2.1 The glass was accessioned in accordance with the Museum of London system.

2.2 The records were entered onto the Oracle relational database.

2.3 The glass itself has not been sampled.

3. Quantifications

Table 21: Assessment of Glass from ARC STP 99

Context	Count	Type	Period	Comments (Description)
6	1	Vessel?	UN	<1> Small fragment recovered from an environmental sample

Table 22: Assessment of Glass from ARC SSR 99

Context	Count	Type	Period	Comments (Description)
35	1	Vessel	MO	<12> Small fragment of an opaque white glass vessel with moulded ridges. Modern (identification by John Shepherd).

4. Provenance

4.1 The glass from ARC STP 99 came from an environmental sample taken from a possible pit [6]. No other dating evidence is available for the context. The glass fragment from ARC SSR 99 came from [35], Group 18,114, the north half of an oven. This context also produced pottery dating to AD70-100 and the glass is, therefore, intrusive.

5. Conservation

5.1 The glass appears to be in a stable condition and no conservation treatment is required.

5.2 The glass is to be retained.

6. Comparative material

6.1 There is no requirement for comparative work.

7. Potential for further work

7.1 There is no potential for further work.

8. Bibliography

None

APPENDIX 7: ASSESSMENT OF ANIMAL BONE

Kevin Rielly

1. Introduction

1.1 Animal bones were recovered during excavation works at ARC STP 99, Station Road ARC SSR 99 and also from the Watching Brief ARC 330 98.

1.2 Animal bones were recovered by hand-collection on site and through wet-sieving bulk samples taken in the field. All hand-collected animal bones were washed and air-dried, then bagged and labelled as context groups. Bulk samples were washed using a modified Siraf tank fitted with 1.0mm and 0.25mm flexible nylon mesh to retain the residue and flot fractions respectively. These fractions were visually sorted for floral and faunal remains and labelled as individual sample groups.

1.3 The study of the material was carried out to study the following fieldwork event aims:

- *to establish changes in the local environment through the recovery of suitable palaeo-environmental samples from the fill of cut features.*
- *to determine the spatial organisation of the landscape, and changes through time.*

2. Methodology

2.1 All contexts containing faunal remains were analysed and recorded onto the ORACLE CTRL animal bone database. No sub-sampling of contexts was carried out.

3. Quantifications

3.1 The quantities of bones recovered from this zone is shown on the tables below. No measurable, worked or butchered bones were recovered. Each of the tables lists the data recorded from both the hand collected and sieved assemblages.

3.2 The tables show the percentage of identifiable fragments represented by all of the specified species groups. Cattle and sheep/goat are clearly the dominant species among the generally small collections of identifiable bones. Other species include pig, horse and small mammal (possible rat).

4. Provenance

4.1 A large proportion of the bones were moderately well preserved, while fragmentation levels were generally moderate to high. Such levels of preservation and fragmentation where noticed within five and four assemblages respectively, out of the eight ARC SSR 98 assemblages; and within one out of the two ARC 330 98 assemblages. Higher levels of fragmentation, as described here, refer to collections of bones where the majority are under 75mm in length.

A moderate to poor preservation level is where most of the bones show some to heavy surface abrasion. The overall results suggest that there may well have been some disturbance of the faunal material after deposition, although adverse soil conditions could also be cited as causatory agents.

4.2 There was just one prehistoric feature with bones, represented by a gully in ARC STP 99. This provided a single unidentified bone fragment. There is a notable paucity of other bone fragments within the various prehistoric features. It is difficult to assess whether absence is related to lack of use or to disturbance and/or soil conditions. This single fragment is actually well preserved.

4.3 Most of the bones were recovered from ditch fills within ARC SSR 99, all of which are likely to date to the 1st century AD. Each of these fills provided just one or two fragments, invariably representing loose teeth (mainly identified as cattle and sheep/goat), with the exception of a horse tarsal from [27] and the possible rat vertebra from [30]. Otherwise, this site also produced a small collection of fragments, again cattle and sheep/goat teeth, from a floor level within a 1st century oven. The dominance of teeth fragments within these assemblages can be taken as a sure sign of high fragmentation, where, in such cases, teeth stand a better chance of survival and retrieval.

4.4 The bones recovered from ARC 330 98 were taken from three undated fills, a pit, a ditch and one other deposit. Identifiable bones were limited to the pitfill, which provided a cattle and a horse fragment, and the third feature from which was recovered a possible partial articulation of a juvenile pig.

5. Conservation

5.1 It is recommended that all material be retained for the next stage of analysis and for any future comparative work. No specific conservation needs are required.

6. Comparative material

6.1 There are a number of sites within the present project which provided large comparable collections of animal bones, most notably the Iron Age through to medieval deposits from Area 330 Zone 3 and the medieval deposits from Area 430 Parsonage Farm. Other published sites in the North Kent area include the Iron Age farmstead at Farningham Hill in the Darent Valley (Locker 1984. 71) and the Roman villa at Keston within the London Borough of Bromley (Locker 1999).

7. Potential for further work

7.1 Each of these three sites provided rather small collections of bones which can be seen to be only moderately well preserved and obviously highly fragmented. The dating evidence, where present, appears to be rather broad.

7.2 There is clearly very little value in attempting a study of these bone collections, when they are obviously biased in terms of skeletal part representations and

7.3 The presence of the major domesticates clearly demonstrates the local use of these animals, presumably for their meat, if not for any other product. Again the information is too slight, and probably biased, to suggest how these animals may have been used to shape the local environment eg whether they were farm animals. Of some interest perhaps, is the presence of horse within the Roman-British levels at the Station Road site. This could be indicative of high status, as most of the farmwork during this period was done by cattle. Horses were essentially used as pack animals or for riding (Maltby 1981, 184).

7.4 The rat-size vertebra from the Station Road site (ARC SSR 99) may be of some use in establishing local environmental conditions, and could also demonstrate the spread of an introduced species. It has been established that the black rat was introduced to this country during the Roman period. The earliest confirmed archaeological specimen was recovered from an early second century AD fill of a well in York, while 1st and 3rd century AD examples have been found in London (Armitage *et al* 1984).

8. Bibliography

Armitage, P.L., West, B. and Steedman, K. 1984. New evidence of Black Rat in Roman London. *The London Archaeologist* **4**: 375-383.

Locker, A. 1984. Finds and environmental reports 5-8. 5. The Animal Bone. In Philp, B. *Excavations in the Darent Valley, Kent*. Fourth Research Report in the Kent Monograph Series. Kent Archaeological rescue Group. 71 and Microfiche M1 to M6.

Locker, A. 1999. The animal bone. In Philp, B., Parfitt, K, Willson, J and Williams, W. *The Roman villa site at Keston, Kent. Second Report (Excavations 1967 and 1978-1990)*. Eighth Research Report in the Kent Monograph Series. The Kent Archaeological Rescue Group. 145-159.

Maltby, M. 1981. Iron Age, Romano-British and Anglo-Saxon animal husbandry - a review of the faunal evidence. In M. Jones and G. Dimbleby (eds). *The environment of man: the Iron Age to the Anglo-Saxon period.* B.A.R. British Series 87. 155-203.

Table 23. The site assemblages – overall quantities and the proportions of useful data

Site	Hand collected					Soil samples			
	N. Con-texts	Weight (kg)	N. bones	N. Iden	Num. Agable	N. samples	Weight (kg)	N. bones	N. iden
ARC SSR 99	5	0.10	8	6	4	3	0.03	3	3
ARC STP 99	0	0	0		0	1	0.01	1	0
ARC 330 98	2	0.08	8	4	3	1	0.01	1	0

N total number. Iden identifiable to species or species group.

Table 24: Assessment of Animal Bone – quantity of identifiable bones, age, measurements

Site	Context	S.No	N. iden.	N. Ageable
ARC SSR 99	12	0	1	1
ARC SSR 99	12	6	1	0
ARC SSR 99	19	0	1	1
ARC SSR 99	27	0	2	1
ARC SSR 99	30	5	1	0
ARC SSR 99	39	0	1	1
ARC SSR 99	65	0	1	0
ARC SSR 99	65	23	1	0
ARC STP 99	81	22	0	0
ARC 330 98	304	78	0	0
ARC 330 98	1066	0	2	1
ARC 330 98	1262	0	2	2

S.No – sample number. N - approximate number of bones. Iden - bones identifiable to species/species group

Table 25: Assessment of Animal Bone – species, quantity and interpretation

Site	**Context**	**S.No**	**Interpret-ation**	**Period**	**% of identified fragments**									**Count**	**Weight**
					Sheep goat	Cattle	Pig	Horse	Dog	Small mammal	Bird	Fish	Other		
ARC SSR 99	12	0	Ditch	LIA-ER	100	0	0	0	0	0	0	0	0	1	0.01
ARC SSR 99	12	6	Ditch	LIA-ER	100	0	0	0	0	0	0	0	0	1	0.01
ARC SSR 99	19	0	Ditch		0	0	100	0	0	0	0	0	0	1	0.01
ARC SSR 99	27	0	Ditch	LIA-ER	0	50	0	50	0	0	0	0	0	2	0.03
ARC SSR 99	30	5	Ditch		0	0	0	0	0	0	0	0	100	1	0.01
ARC SSR 99	39	0	Ditch	LIA-ER	0	100	0	0	0	0	0	0	0	2	0.02
ARC SSR 99	65	0	Floor of oven	Ro	0	100	0	0	0	0	0	0	0	2	0.03
ARC SSR 99	65	23	Floor of oven	Ro	100	0	0	0	0	0	0	0	0	1	0.01
ARC STP 99	81	22	Gully	?Preh	0	0	0	0	0	0	0	0	0	1	0.01
ARC 330 98	304	78	Ditch		0	0	0	0	0	0	0	0	0	1	0.01
ARC 330 98	1262	0			0	0	100	0	0	0	0	0	0	4	0.07

APPENDIX 8: ASSESSMENT OF MOLLUSCS

Alan Pipe

1. Introduction

1.1 Mollusc shells were recovered during excavation works at the sites ARC SSR 99 and ARC STP 99.

1.2 Mollusc shells were recovered by wet-sieving/flotation of bulk samples taken in the field. These were washed using a modified Siraf tank fitted with 1.0mm and 0.25mm flexible nylon meshes to retain the residue and flot fractions respectively. These fractions were air-dried and visually sorted for mollusc remains, which were bagged and labelled as individual sample groups.

1.3 The material was assessed to determine any possible value to the Fieldwork Event Aims:-

- *to establish changes in the local environment through the recovery of suitable palaeo-environmental samples from the fill of cut features*
- *to determine the spatial organisation of the landscape, and changes through time*

2. Methodology

2.1 All samples containing mollusc remains were recorded onto a table template in terms of habitat preference and approximate quantification as specified in the CTRL project requirements. No sub-sampling of sample groups was carried out. Preliminary identifications of genus and species were made using a binocular microscope and following Cameron & Kerney 1976; allocations of habitat preference followed Kerney 1999.

3. Quantifications

3.1 A total of seven small groups of mollusc shells, an approximate total of 87 shells, were assessed. This material derived entirely from terrestrial species; there were no marine or freshwater forms. The identified taxa recovered were:

- *Cecilioides acicula, Vallonia sp., Retinella sp. and Helicella sp.*

3.2 The table below groups this material in terms of habitat preference and relative abundances specified by the CTRL assessment template.

3.3 The assemblage included open country (*Helicella sp., Vallonia sp*.), shade-loving (*Retinella sp*) and burrowing forms (*Cecilioides acicula*). Although the bulk of the shells derived from *C.acicula*, ARC SSR 99 also produced shade-loving species, and ARC STP 99 produced a few open-country snails.

4. Provenance

4.1 The material is in good condition and presents no difficulty in terms of species identification. The value of the assemblage will not be affected by factors of preservation.

5. Conservation

5.1 Further analysis of this material would involve more detailed examination under a binocular microscope in order to ensure precise identification of all species present. There is no reason why such work would damage the shells or impose any restriction on long-term storage procedures.

5.2 The shells are mainly small and fragile and therefore liable to accidental damage by crushing. They should therefore all be stored by context/sample group in glass tubes or clear plastic boxes, each contained within labelled plastic bags. The complete assemblage should then be stored in an archive quality 'shoe-box'.

5.3 There is no reason to discard any of the mollusc assemblage.

6. Comparative material

6.1 Although the very small size of this assemblage does not justify detailed inter-site comparison with any other particular site, for completeness it should be included in any overall review of the CTRL zonal molluscan groups.

7. Potential for further work

7.1 The assemblage has very little potential for further study in terms of quantification of species, or of ecological interpretation, and will be of little value for either of the selected Fieldwork Event Aims. Identification of all species will allow some comment on the general nature of the local environments at ARC SSR 99 and ARC STP 99. It will not be possible to specify spatial and temporal variation resulting from changes in landuse or to accurately define the characteristics of the habitat at each site.

8. Bibliography

Cameron, R A D & Redfern, M, 1976 British land snails *Linnean Society of London synopses of the British fauna no. 6* London

Kerney, M, 1999 *Atlas of the land and freshwater molluscs of Britain and Ireland* Harley Books. Colchester

+ present (0-5 items), ++ some (6-10 items), +++ many (11+).

Table 26: Assessment of molluscs from Zone 2

Event code	**ARC SSR 99**	**ARC SSR 99**	**ARC SSR 99**	**ARC STP 99**	**ARC STP 99**	**ARC STP 99**	**ARC STP 99**
Column/Sectn							
Sample	2	7	11	15	16	17	23
Context	13	35	43	63	65	67	88
Date /interpretation	/ditchfill	/demolition oven feature	Modern/pitfill	fill stakehole	fill stakehole	fill stakehole	modern/pitfill
Depth							
Catholic species							
Open country species				+			+
Shade-loving species	+		+				
Burrowing species	+	+		+++	+++	+	+++
Aquatic species							
Approx totals	**2**	**5**	**5**	**20**	**30**	**5**	

APPENDIX 9: ASSESSMENT OF CHARRED PLANT REMAINS & CHARCOAL

Lisa Gray-Rees

1. Introduction

1.1 This assessment reports on environmental samples taken during excavations at ARC SSR 99, ARC STPP 99 and ARC 330 8. Fifty-three environmental samples were taken. Fifty samples were bulk samples and were processed by flotation. The remaining samples were column samples. Seven of the bulk samples produced flots. The purpose of the study of this material was to gain further information about the contemporary environment and landscape and possible economic activities, for example, crop processing.

2. Methodology

2.1 Fifty samples were processed using a Siraf type flotation tank. Residues were collected in a 1mm mesh and flots were collected in a 250-micron mesh. Flots and residues were dried prior to scanning. Residues were scanned by eye. Environmental remains and artefacts (such as burnt flint, brick or tile fragments) were collected and transferred to the relevant specialists. Flots and plant remains recovered from the residues were examined in more detail using a low powered stereo microscope.

2.2 The modes of preservation, species diversity and abundance of organic remains in each sample were recorded on sheets then entered into the Oracle MoLAS/MoLSS database and transferred to the RLE Datasets. Full sample details are given below.

3. Quantifications

Preservation

3.1 Charring or waterlogging preserved the plant remains in these samples. The quality of preservation was generally poor. Full details of these samples are given in the tables below. For ARC SSR 99 plant remains were present in eleven out of 23 samples with low numbers of poorly preserved grain present in seven samples. For ARC STP 99 plant remains were present in nine of the 25 bulk samples with seven of those sampled producing flots.

Recording

3.2 The quantities of remains were estimated and recorded in the following manner: -

For charred remains
+ = 1-10
++ = 11-50
+++ = 51-100
++++ = 101-1000
1000+ = >1000.

For waterlogged remains
+ = 0-5
++= 6-10
+++=11+

4. Provenance

South of Station Road (ARC SSR 99)

4.1 Ten of these samples were Roman and one was Iron Age/Roman. Identifiable fragments of charred wood were present in low numbers in four of the samples. These were Roman ditch fill samples <6>, <2> and <4>, and a Roman sample from a demolition layer, sample <19>. Seven of these samples were pot-dated as Romano-British; <7>, <8>, <16>, <17>, <19>, <20> and <21>. One was provisionally dated as Iron Age/Roman, sample <23>.

4.2 The richest sample was sample <7> ([35] sg 114) from the oven feature. This sample was pot dated as early Roman. The flot and residue contained moderate numbers of poorly preserved charred wheat (*Triticum* spp.) grains. The flot also contained low numbers of chaff fragments, glumes, charred seeds, campion (*Silene* sp.) and plantain (cf. *Plantago* sp.). In addition there were uncharred seeds including goosefoot (*Chenopodium* spp.) and sedge (*Carex* sp.).

Temple East of Springhead (ARC STP 99)

4.3 Of the 25 samples, 16 were dated as Neolithic to Early Bronze Age, eight samples were technically undated and one was modern. Identifiable fragments of charred wood were present in the residues of <2> <4> <9> <15> and the flots of <16> <17> and <23>. Samples <2> and <15> were undated and <23> was modern.

4.4 Low numbers of poorly preserved charred grain were present in the residues of <2>, <4> and <10>. A charred weed seed, bedstraw (*Galium* sp.) was recovered from sample <15>.

4.5 Uncharred root and moss fragments were present in the flots.

Watching brief - New Barn Road (ARC 330 98)

4.6 No flots were produced from these samples. The only plant remains were low to moderate quantities of charred wood fragments in samples <83> and <87>.

5. Conservation

5.1 Sample ARC SSR 99 <7> should be retained for further analysis. Sub-samples of identifiable charred wood fragments (larger than 5mm³ in size) from ARC STP 99 <2> <4> <9> <15> <16> <17> and ARC 330 98 <83> should be saved and stored dry prior to further analysis.

6. Comparative material

6.1 The richest remains in this zone came from an early Roman oven feature (<7> [35] sg 114 g 18) from ARC SSR 99. These may be compared with charred plant remains from Roman sites in along the CTRL route, particularly those at West of Northumberland Bottom (Area 330 Zone 3) but also with other samples in Kent such as Lullingstone near Orpington (Arthur 1974; Metcalf and Doherty 1974) and Keston in Bromley (Hillman 1991; Straker 1999).

7. Potential for further work

7.1 It is recommended that further work be carried out on sample <7> from ARC SRR 99. This sample has the most potential to provide detail information about cereal cultivation.

7.2 Identifiable fragments of charred wood were found in the following samples provisionally dated as pre-historic or undated:-

- ARC STP 99 <2> <4> <9> <15> <16> and <17>
- ARC 330 98 <83>

7.3 The wood samples which can be firmly dated as prehistoric should be identified for the information about landscape and fuel use.

7.4 The flot sample will be examined using a stereo-microscope with magnifications of between 10 and 40 times. Modern seed and cereal reference collections and reference manuals (eg Anderberg 1994, Berijinck 1947 and Berggren 1969,1981) will be used.

7.5 Charred wood will be examined using an epi-luminating microscope. Diagnostic features will be recorded and the wood identified using an atlas of microscopic wood anatomy (Schweingruber 1978).

7.6 Plant remains will be identified as closely as their level of preservation allows. Quantities of uncharred remains and charred wood fragments will be estimated and charred remains will be counted. This data will be recorded onto record sheets and transferred to the MoLAS/MoLSS Botanical ORACLE database.

7.7 Additional work:

- Identification and recording of the contents in one dry flot
- Identification of charred wood in 7 samples
- Table creation and data analysis
- Report Writing
- Editing and Archiving

8. Bibliography

Arthur, J,R,B, 1974 "Carbonised Grain from Granary." in Meates G, W, *The Roman Villa at Lullingstone Kent.* Kent Archaeological Society Monograph Series No. 3 page 318

Anderberg, A-L, 1994: *Atlas of Seeds Part 4: Resedaceae - Umbelliferae.* Swedish Museum of Natural History, Stockholm

Beijerinck, W., 1947: *Zadenatlas der Nederlandsche Flora.* Veenman and Zonen, Wageningen

Berggren, G, 1969: *Atlas of Seeds Part 2: Cyperaceae.* Swedish Museum of Natural History, Stockholm

Berggren, G., 1981: *Atlas of Seeds Part 3: Saliaceae- Crucifereae.* Swedish Museum of Natural History

Hillman,G, 1991"A Sample of Carbonised Plant Remains." in Philp, B, et al *The Roman Villa Site at Keston, Kent – first Report (Excavations 1968-1978)* The Kent Archaeological Rescue Unit

Metcalf, C,R, and Doherty, G, 1974 "Botanical Remains." in Meates G, W, *The Roman Villa at Lullingstone Kent.* Kent Archaeological Society Monograph Series No. 317-8

Schweingruber, F,H, 1978 *Microscopic Wood Anatomy*

Straker, V, 1999 "The Carbonised Plant Remains from Shaft E" in Philp, B, *The Roman Villa Site at Keston, Kent – second report (Excavations 1967 and 1978-1990)* The Kent Archaeological Rescue Unit

Table 27: Assessment of Charred Plant Remains & Charcoal

Sample Details							***Flot Details***						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC SSR 99	16	117	28/fill of ditch [014]	RO	3	20	-	-	-	-	-	-	3000/ yes
ARC SSR 99	16	118	30/fill of ditch [029]	PR	5	20	-	-	-	-	-	-	1000/ yes
ARC SSR 99	16	117	12/fill of ditch [014]	RO	6	20	-	-	-	-/+	+	-	5000/ yes
ARC SSR 99	17	116	13/fill of ditch [009]	RO	2	10	-	-	-	-	+	-	1500/ yes
ARC SSR 99	17	116	10/fill of ditch [009]	RO	4	10	-	-	-	-	+	-	1500/ yes
ARC SSR 99	17	116	39/fill of ditch [009]	RO	10	10	-	-	-	-	-	-	2000/ yes
ARC SSR 99	18	114	35/oven feature	RO	7	3	5	++	+	+/+	-	stem frags	500/ yes
ARC SSR 99	18	114	35/oven feature	RO	13	20	-	-	-	-	-	-	?/no

Sample Details							*Flot Details*						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC SSR 99	18	114	40/oven feature	RO	14	20	-	-	-	-	-	-	2000/ yes
ARC SSR 99	18	114	42/oven feature	RO	15	10	-	-	-	-	-	-	4000/ yes
ARC SSR 99	18	115	60/oven feature	RO	16	3	-	+	-	-	-	-	500/ yes
ARC SSR 99	18	115	49/oven feature	RO	17	10	-	+	-	-	-	-	1000/ yes
ARC SSR 99	18	115	59/oven feature	RO	18	10	-	-	-	-	-	-	500/yes
ARC SSR 99	18	115	60/oven feature	RO	19	10	-	+	-	-	+	-	1500/ yes
ARC SSR 99	18	115	62/oven feature-floor	RO	20	10	-	+	-	-	-	-	1000/ yes
ARC SSR 99	18	115	63/chalk floor of oven	RO	21	3	-	+	-	-	-	-	2000/ yes
ARC SSR 99	18	115	64/clay wall of oven	IA/RO	22	10	-	-	-	-	-	-	1000/ yes

Sample Details							***Flot Details***						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC SSR 99	18	115	65/ charcoal floor of oven	IA/RO	23	6	-	+	-	-	-	-	2500/ yes
ARC SSR 99	19	103	24/fill of ditch [25]	RO	12	10	-	-	-	-	-	-	500/yes
ARC SSR 99	22	101	43/fill of ditch [44]	MO	11	10	-	-	-	-	-	-	1000/ yes
ARC SSR 99	23	108	1/fill of ditch [002]	RO	1	10	-	-	-	-	-	-	3000/ yes
ARC SSR 99	26	109	56/ lower fill of pit [32]	PR	9	30	-	-	-	-	-	-	3000/ yes
ARC SSR 99	26	109	31/ fill	RO	8	10	-	+	-	-	-	-	2000/ yes
ARC STP 99	3	2	86/ natural gravel and silt	?PR	24	-	-	-	-	-	-	-	column sample
ARC STP 99	3	2	2/ natural gravel and silt	?PR	26	-	-	-	-	-	-	-	column sample

Sample Details							*Flot Details*						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC STP 99	4	21	46/postho le-possible occup.	NE/EBA	6	2	10	-	-	-/+	++++	root and stem frags	?/no
ARC STP 99	4	22	61/ posthole-possible occup.	NE/EBA	9	2	2	-	-	-	++	root frags	500/yes
ARC STP 99	4	23	63/ posthole-possible occup.	UN	15	5	10	-	-	+/-	++++	root frags	400/yes
ARC STP 99	4	24	65/ posthole-possible occup.	NE/EBA	16	5	10	-	-	-	+++	root & moss frags	?/no
ARC STP 99	4	25	67/fill of post-hole[68]	NE/EBA	17	5	10	-	-	-	+++	root frags	?/no
ARC STP 99	4	26	69/ posthole-possible occup.	NE/EBA	18	2	-	-	-		-	-	?/no

Sample Details							*Flot Details*						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC STP 99	4	27	71/ posthole-possible occup.	NE/EBA	19	2	5	-	-	-	+++	root, stem & moss frags	?/no
ARC STP 99	5	30	41/natural hollows	UN	5	10	-	-	-	-	-	-	100/yes
ARC STP 99	5	39	78/ natural hollows	UN	21	30	0.5	-	-	-	-	-	?/no
ARC STP 99	5	29	81/gully	?PR	22	20	-	-	-	-	-	-	100/no
ARC STP 99	6	34	50/fill of posthole	UN	8	3	-	-	-	-	-	-	?/no
ARC STP 99	6	35	52/fill of post-hole[	UN	11	10	-	-	-	-	-	-	300/yes
ARC STP 99	6	36	54/fill of post-hole	UN	12	?	-	-	-	-	-	-	?/no
ARC STP 99	7	38	60/pit	UN	7	10	-	-	-	-	-	-	100/no
ARC STP 99	7	37	56/pit	UN	13	10	-	-	-	-	-	-	100/no
ARC STP 99	7	37	57/pit	UN	14	?	-	-	-	-	-	-	?/no

Sample Details							*Flot Details*						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC STP 99	8	18	36/ ?occup. deposit	NE/EBA	4	10	-	+	-	-	-	-	100/yes
ARC STP 99	9	3	4/fill of small pit containin g burnt flint	UN	1	10	-	-	-	-	-	-	2000/ yes
ARC STP 99	9	4	6/pit	UN	2	5	-	+	-	-	+	-	200/yes
ARC STP 99	9	11	20/pit	UN	3	10	-	-	-	-	-	-	100/yes
ARC STP 99	9	32	45/pit	UN	10	10	-	+	-	-	-	-	500/yes
ARC STP 99	9	28	74/pit	UN	20	5	-	-	-	-	-	-	?/no
ARC STP 99	11	1	85/ hillwash, colluvium	?PR	24	-	-	-	-	-	-	-	column sample
ARC STP 99	11	1	84/ hillwash and colluvium	?PR	25	-	-	-	-	-	-	-	column sample

Sample Details							*Flot Details*						**Residue**
Site	Group	Sub-group	Context & type	Period/ Pot-date	Sample no.	Sample size (l)	Flot size (ml)	Grain	Chaff	Weeds Seeds charred/ uncharred	Char-coal	Comments [presence of rootlets, uncharred straw etc.]	Size (ml)/ Proport-ion checked
ARC STP 99	11	1	1/ hillwash and colluvium	?PR	26	-	-	-	-	-	-	-	column sample
ARC STP 99	12	42	87/ subsoil	?PR	24	-	-	-	-	-	-	-	column sample
ARC STP 99	12	42	87/subsoil	?PR	25	-	-	-	-	-	-	-	column sample
ARC STP 99	13	43	88/pit	MO	23	10	10	-	-	-/+	-	root frags	?/no
ARC STP 99	33	2	3/ natural silt	?PR	26	-	-	-	-	-	-	-	column sample
ARC 330 98	?	1049	368/ditch	UN	83	-	-	-	-	-	+++	-	3000/yes
ARC 330 98	?	1051	370/ditch	UN	84	-	-	-	-	-	-	-	1000/ yes
ARC 330 98	2004	2003	304/ditch	MO	78	-	-	-	-	-	-	-	1800/ yes
ARC 330 98	2002	2086	381/ditch	UN	87	-	-	-	-	-	++	-	600/yes

APPENDIX 10: ASSESSMENT OF GEO-ARCHAEOLOGY

Jane Corcoran

1. Introduction

1.1 Monolith samples were recovered from two sections (26 and 23) during excavation works at ARC STP 99 (Figure 5). The sections cut through a sequence of sediments that were provisionally interpreted as soliflucted and colluvial slope deposits, eroded from the higher land to the north and south and accumulated in the northern dry valley floor. The aim of the geo-archaeological assessment is to determine the potential of the samples to provide information with which the changing landscape and geomorphological processes operating on the site might be reconstructed. This would provide a better understanding of the environment of the Late Neolithic, Bronze Age, Iron Age and Roman settlement found in the environs of the site (Area 330 Zone 3).

1.2 The monolith samples form 3 profiles. For each profile, overlapping monolith tins (0.50m x 0.05m x 0.05m) were hammered into the cleaned section face. The sediments and stratigraphy visible in section were described and drawn by the excavators on site. The monolith locations were marked on the section drawing and a level related to ordnance Datum was taken on the top of each tin. Each tin was wrapped in cling film and plastic bags, labelled and stored in the MoLAS fridge prior to assessment.

2. Methodology

2.1 The sediments sampled in each 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.

2.2 For each profile, every distinct unit was given a separate number and the nature of the contacts between each unit noted. Where several units appear to be part of the same depositional phase or event they have been grouped into a larger unit [indicated by a letter]. The units identified during description are related to the contexts described on site in the profile description tables (Table 28, Table 29 and Table 30) and where possible the profiles are discussed in terms of the contexts as opposed to the units identified in the monolith tins.

2.3 In order to characterise the contexts sampled, in terms of composition and texture, a small measured sub-sample from various locations down each profile was washed over a 63um and 500um mesh and the residues air dried and re-weighed. Rapid scanning of the dried residues under a binocular microscope (at x16-x64) magnification attempted to assess the component characteristics of each sample. The object of this part of the assessment was to determine the potential for more sophisticated particle size or mineral grain analysis to identify different sediment sources, transport mechanisms, depositional and post-depositional processes operating during the time the sediments accumulated.

3. Quantifications

3.1 This section gives the results of the monolith assessment. In Table 28, Table 29 and Table 30 the sequences sampled are described. Table 31 sets out the results of wet sieving in terms of texture and composition.

Sample <24>: section 26

3.2 This sample consisted of 4 overlapping monolith tins taken from the south-west part of section 26, through contexts ([87], [85] and [86]). This sample was at a slightly higher elevation than sample <25>, which was also taken from section <26>, but closer to the valley axis.

Table 28: Assessment of Geo-Archaeology: Sample <24> section 26

Context	Zone & unit	elevation of contact (m OD)	description and contacts	tin	sub-samples (see Table 31)
		14.79	Top of sequence sampled		
87	A	[0.16m thick]	Dark yellowish brown 10YR4/6 slightly sandy silt, with possibly some clay. Moderately abundant chalk and flint inclusion of granular to 10mm diameter. Massive (the chalk and gravel clasts are distributed throughout the unit with no apparent orientation or structure). Compact.	A	24A
		14.63	Distinct		
85	B	[0.48m thick]	Dark yellowish brown 10YR4/6 slightly sandy silt, with possibly some clay. No chalk or flint clasts within the matrix, but very occasional grit-sized chalk within root channels. Occasional root channels are visible as humic stained voids c.5mm thick and as carbonate precipitated veins (1mm thick) that occur towards the base of the unit and extend across the contact with unit C. Compact	A B	24B
		14.15	Distinct sub-horizontal		
86	C1	[0.35m thick]	Yellowish brown 10YR5/8. Soft and compact slightly sandy silt. Holey porous structure. Very occasional granular flint. Frequent carbonate precipitations as threads and flecks, especially towards top of unit.	B C	24C1
	C2	[0.40m thick]	As above but slight decrease in carbonate precipitations	C D	24C2
	C3	[0.20m thick]	As above but faint bedding structures visible as slightly clayey lenses and a sand lens or bed about 20mm thick occurs at about 13.4m OD.	D	24C3
		13.20	Base of profile sampled		

Sample <25> Section 26

3.3 This sample consisted of 3 overlapping monolith tins taken from the north-east part of section 26, through contexts ([87] and [84]). Sample <25> was at a lower elevation and closer to the axis of the dry valley than <24>, which was taken at the south-western end of the same section face.

Table 29: Assessment of Geo-Archaeology: Sample <25> section 26

Context	Zone & unit	elevation of contact (m OD)	description and contacts	tin	sub-samples (see Table 31)
		13.56	Top of sequence sampled		
87	A	[0.25m thick]	Dark yellowish brown 10YR4/4 slightly sandy silt, with possibly some clay. Compact & smooth. Chalk granules associated with root channels. Occasional flint inclusions of granular to 10mm diameter.	A	25A
		13.31	Possible contact		
84	B	[0.65m thick]	Dark yellowish brown 10YR4/4 slightly sandy silt, with possibly some clay. Softer and slightly darker than unit A. This unit is also possibly slightly more humic, slightly more clayey and has a rougher & looser structure. Occasional faint carbonate precipitations, which decrease with depth, picking out root channels. Occasional gravel and chalk inclusions within matrix as opposed to within root channels. Very occasional manganese flecks.	A B C	25B
		12.66	Distinct sub-horizontal		
84	C	[0.35m thick]	Dark yellowish brown 10YR4/4 slightly sandy silt, with possibly some clay. Compact and smooth. Manganese flecks and some iron-staining occurs throughout unit. Very infrequent carbonate precipitations. Very occasional root channels, containing chalk and (a single) brick granules.	C	25C
		12.41	Base of profile sampled		

Sample <26>: section 23

3.4 This sample consisted of 6 overlapping monolith tins taken from the north-east part of section 23, through contexts ([1], [2] and [3]).

Table 30: Assessment of Geo-Archaeology: Sample <26> section 23

Context	Zone & unit	elevation of contact (m OD)	description and contacts	tin	sub-samples (see Table 31)
		18.19	Top of sequence sampled		
1	A	[0.87m thick]	Strong brown 7.5YR5/6 slightly sandy silt. Very compact & hard. Decalcified (does not fizz with HCL). Angular blocky structure. Occasional flint grit and granules. Very occasional chalk granules. Occasional greenish grey 'soily' clasts / disrupted root tubules. Humic stained roots, some followed by fine white modern rooting. Occasional manganese flecks.	A B	26A
		17.32	Sharp irregular contact		
2	B	[0.94m thick]	Yellowish brown 10YR5/6 slightly sandy silt. Compact but moderately soft. Occasional large tufa-like clasts. Frequent carbonate concretions as flecks, threads and lumps. Very occasional faint root channels visible as slightly darker (more clayey or humic) stains. Holey porous structure. Possible increase in sand and decrease in carbonate concretions downwards.	B C D E	26B1 26B2 26B3
		16.39	Gradual / indistinct		
3	C1	[0.40m thick]	Yellowish brown 10YR5/6. Compact sandy silt. Occasional carbonate precipitations. Occasional more clayey lenses and traces of sub-horizontal bedding.	E F	26C1
	C2	[0.30m thick]	Yellowish brown 10YR5/6. Wavy, intermittent beds / laminae of sand, silty sand and very fine chalk & flint grit.	F	26C2
		15.71	Base of profile sampled		

3.5 Results of wet sieving:

Table 31: Assessment of Geo-archaeology: Texture and Composition - Sample 24

Context	Sub-sample	Weight (g)	>500um (%) coarse sand and grit	63-500um (%) fine-medium sand	<63um (%) silt + clay	Composition characteristics
Sample	**24**					
87	24A	34.00	2.0	10.3	87.7	Mostly quartz + mod. chalk (in fine gravel + sand fractions); iron-stained quartz + iron concreted sand grains, but fewer than <24B>; occ. charcoal
85	24B	17.33	0.6	10.9	88.5	Increase in iron stained quartz, otherwise similar to <24A> but with less chalk. Occ.shell; occ. Iron + manganese concretions; occ. Iron concreted carbonate precipitations.
86	24C1	24.28	0.8	14.3	84.9	Mostly quartz., less iron stained than <24B> but more iron stained carbonate concretions / agglomerations than the samples above. Very occasional shell and chalk.
86	24C2	20.28	0.5	23.6	75.9	Similar to <24C1>
86	24C3	16.86	0.6	17.8	81.6	Mostly quartz. Frequent carbonate concretions / precipitations and many are white ie: (not iron-stained)

Table 32: Assessment of Geo-archaeology: Texture and Composition - Sample 25

Context	Sub-sample	Weight (g)	>500um (%) coarse sand and grit	63-500um (%) fine-medium sand	<63um (%) silt + clay	Composition characteristics
Sample	**25**					
87	25A	20.66	1.7	10.7	87.6	Mostly quartz: occasionally iron-stained. Occasional shell frags. Occ. chalk + flint gravel clasts - slightly iron stained. More iron-staining than <24A>. Occ. Iron concreted carbonate concretions.
84	25B	20.58	3.5	9.5	87.0	Mostly quartz, frequently iron-stained. Moderate carbonate concretions / precipitations, mostly iron-stained. Moderate manganese and iron concretions.
84	25C	12.92	0.5	7.9	91.6	Mostly quartz, frequently iron-stained. Occasional carbonate concretions / precipitations, mostly iron-stained. Frequent manganese and iron concretions.

Table 33: Assessment of Geo-archaeology: Texture and Composition - Sample 26

Context	Sub-sample	Weight (g)	>500um (%) coarse sand and grit	63-500um (%) fine-medium sand	<63um (%) silt + clay	Composition characteristics
Sample	**26**					
1	26A	16.99	0.1	15.5	84.4	Mostly quartz, occasionally iron-stained. Very occ. chalk fine gravel and sand. No carbonate concretions.
2	26B1	22.77	1.0	7.9	91.1	Mostly quartz and occ sand sized chalk. V. occ. Shell frags. Abundant white carbonate concretions.
2	26B2	18.40	1.7	12.9	85.4	Mostly quartz low iron-staining. Moderate chalk grains and carbonate concretions
2	26B3	31.49	2.1	24.5	73.4	Mostly quartz low iron-staining. Occasional chalk. Fewer carbonate concretions than above + some manganese
3	26C1	20.48	6.0	27.6	66.4	Very few carbonate concretions in fine fraction. Occasional manganese grains. Possibly wider mineral diversity than other samples.
3	26C2	17.07	3.6	34.3	62.1	As <26C1>
loess	(Dines *et al* 1954)		0.5	9.5	90.0	10% carbonate, 15% clay minerals, 75% quartz (Langhor, pers. comm.) other minerals include glauconite

4. Provenance

4.1 The samples will be discussed together, as the sequence of sediments observed in each profile have lateral relationships to one another. The deposits have also been related to the sediment sequence described in the ARC STP 97 evaluation report (URL 1997).

4.2 Both sections 23 and 26 were located on the north-north-east facing slope of the dry valley.

- Section 23, from which sample <26> was taken, was located further up the slope and close to the depression of a tributary channel, joining the dry valley from the south-east.
- Section 26 was located about 40m north-west (ie: both down-valley and down-slope) of section 23.
- Sample <24> taken from the south-west end of section 26
- Sample <25> was taken from the north-east end of the section (at a lower elevation and about 30m closer to the valley axis).

4.3 The sediments sampled correspond to those observed in the ARC STP 97 evaluation trenches. The lowest parts of sample <26> (context 002 and 003) and <24> (context [86]) appear to cut through the 'loessic sand'. This was shown (URL 1997, fig.4) to form a wedge of sediment mantling the south-west dry valley side. It thickened into the valley from the higher land to the south-east, thinning towards the foot of the slope where it interfingered between the overlying colluvium and underlying 'head gravels'. Although these gravels were observed at the very base of both sections they were not sampled owing to their coarse nature.

4.4 The overlying colluvium was recorded in the 1997 evaluation report as comprising 3 contexts, infilling the valley floor and lower valley side. Each colluvial deposit became thicker downslope, towards the foot of the valley side and across the valley floor. These colluvial deposits have also been identified in ARC STP 99 as contexts [85] (and possibly [1]), [84] and [87]. Although all 3 colluvial contexts were yellowish brown clay silts and difficult to differentiate, the differences recorded during the 1997 evaluation were on the whole representative of the sequence of colluvial sediments observed in section 26. The lowest ('primary colluvium') had occasional gravel and may correspond with ARC STP 99 context [85], and also possibly [1], in sample <26>. The middle ('secondary colluvium') was more clayey with very few inclusions and probably corresponds to context [84]. The upper ('chalk flecked colluvium') was characterised by frequent chalk fragments and is likely to correspond to context [87].

4.5 Assessment of the monolith samples taken through these deposits has allowed some refinements to be made of the original interpretations and has provided material with potential for more detailed analysis.

4.6 Although contexts [2]=[86] and [3] are likely to have a loessic component, the evidence for bedding seen in [3] (sample <26> unit C2) is more indicative of a waterlain deposit. However gravel stringers do occur locally in loess, such as can be observed in the exposures at Pegwell Bay (Murton *et al* 1998, 36-37). The high sand content (Table 31) of context [3] also suggests it is derived from sandy beds within the Thanet sands, or from reworking of the underlying sandy valley gravels. This latter is more likely, owing to the more diverse mineral assemblage in the sand grains of context [3] than in any other samples. Loess is essentially windblown silt (Lowe & Walker 1999, 121).

4.7 Recent micromorphological examination of inter-laminated silt and sand in part of a loess / brickearth profile at Heathrow airport, has shown that wind blown sedimentation was likely to have occurred in winter and surface wash during the summer months (Rose *et al* 2000) in some episodes of loess deposition. Similar laminations are common in loess profiles within the Belgium Loess.

4.8 The gradual transition from context [3] to context [2] in section 23 was represented in the monolith sample <26> (Table 30) by unit C1, which had occasional faint laminations. The transition between the two contexts was also seen in the gradual increase in silt and clay and decrease in sand from [3] to [2] indicated by the wet sieving results (Table 31). This might suggest that a loessic input was increasingly being incorporated into the accumulating sediment, perhaps as a result of increasingly cold and dry conditions.

4.9 The Thanet Beds in this area were described as silt (URL 1997) and may have contributed to contexts [2] and [86]. However, the calcareous nature of these contexts suggest that their silt content was more likely to be derived from loess. Loess is typically 10% carbonate, 15% clay minerals and 75% quartz (R. Langhor, pers. comm.). Although the 'loessic sand' was described as mostly decalcified in the evaluation report, contexts [2] and [86] had a calcareous matrix and were enriched with carbonate precipitations, particularly as root pseudomorphs. The calcareous matrix suggests that these contexts have been at sufficient depth since they were deposited, to not become decalcified. This is echoed by the carbonate precipitations, which also imply that carbonate has been leached from the formerly calcareous upper horizons of the deposit and percolated down the profile. The precipitation around root channels suggests that plants were growing in the deposit, implying that it formed the lower horizons of a soil. It is therefore likely that contexts [2] and [86] represent the lower part of a former loess derived deposit in which weathering and soil formation has taken place.

4.10 The non-calcareous upper parts of sections 23 and 26 (contexts [1], [85] and [87] may therefore be the *in situ* decalcified upper horizons of the originally calcareous 'loessic sand'. However, when decalcified, loess becomes highly erodible. It is thus likely that the upper contexts are colluvial and represent decalcified soil material derived from loess and Thanet Sands, transported downslope by water and gravity-aided slope processes during the Holocene. Other evidence for downslope movement of these deposits, such as their morphology (thickening towards the slope foot and valley floor) and the inclusion of apparently rolled and compacted soil clasts in context [1] would support this interpretation. If samples for soil micromorphology were taken, which has potential to identify characteristics such as rolled soil clasts, small scale structure and matrix composition may be seen (Macphail 1992; Allen 1992; Rose *et al* 2000).

4.11 The iron stained quartz grains that were common in <24B> might support the suggestion (URL 1997) that evidence for pedogenesis (soil formation) may exist at the surface of the 'primary colluvium' (context [85]). This was tentatively interpreted as a possible Bronze Age landsurface. Although this was not seen in ARC STP 99 due to contractors works, further micro-morphological analysis would be the best way for its identification.

4.12 Context [84] in ARC STP 99 was described as secondary colluvium in the 1997 evaluation. It is more clay-rich, with manganese flecks and occasional iron staining, and it is possible that it has resulted from the damper and possibly episodically wet or flooded conditions in the lowest parts of the valley floor. Past hillwash events are likely to have deposited coarser sandy sediment at the valley edge but carried finer particles into the axis of the valley. The identification of possible channel features in both the present investigation and during the 1997 evaluation (URL 1997) within the valley axis suggests that seasonal bournes were likely to have existed in the valley in the past. However, the lack of coarser

material implies that during these episodes the valley floor may have been flooded or soggy as opposed to containing flowing water.

4.13 The name and location of 'Springhead' Roman settlement, down-valley from the site indicates that springs are likely to have existed in the valley in the past. The water table oscillates rapidly in chalk in response to winter rains and summer drought (Sumbler 1996, 148). As a result, spring heads of seasonal streams move up and down the valley depending on the water level in the chalk aquifer. Thus springs may have seeped from a number of places at the contact of the alluvium / colluvium and chalk after heavy rains.

4.14 It has been suggested that the many shallow sub-rounded features excavated below the colluvium (generally cut into [2]/[86] and sealed by [1]/[85] were springs. The features in ARC STP 99 appear to be located on the valley floor and some are certainly archaeological. It is likely that springs would have emerged where chalk exists close to the surface and the group of bowl-shaped features recorded in ARC 330 98 to the south-west of ARC STP 99 appear to conform to this view. The ARC 330 98 features were all very similar, were associated with a possible stream area, and contained no finds. In addition they cut through the lower colluvium and appear to represent a spring line during the colluviation.

4.15 It is possible that all the features have been truncated by downslope soil movement. The 'cuts' in ARC STP 99 are only visible in the carbonate concreted parts of the profile [2] and [86]. These contexts are more cohesive and less susceptible to erosion than the overlying sandier decalcified sediments. Valley side sediments are only 'in transit'. The valley sides are likely to have been both a source and a zone of accumulation of sediment (Allen 1992). Therefore it is very likely that features originally cut through decalcified soil material mantling the slope and into the *in situ* loess-derived calcareous subsoil, will eventually be reworked and eroded, leaving only the lower part, cut into the less erodible subsoil, surviving.

4.16 The generally well-sorted fine texture and lack of flint and chalk gravel within the colluvial deposits differs from the poorly sorted calcareous valley sediments seen in many downland dry valleys (eg: ARC CXT 97 Area 330 Zone 6). This is probably due to the finer grained source material available, but may also be caused by different types of colluvial processes operating. It would appear that on the present site a continuous process of surface wash has operated, together with soil creep, as there is no evidence for the coarser sediments that accumulate at the foot of rills or gulleys.

4.17 A distinct change in colluviation is indicated by the inclusions of chalk fragments in the uppermost deposit [87]. This might suggest that at this time activity was focused on the chalk slope to the sides of the valley, as opposed to the south-west slope, which is capped with Thanet Sand and mantled in loessic material and which was probably the source of the earlier erosion events (and activity). It is possible that this later erosion may have been associated with the use of the Roman land surrounding Springhead Roman Town. Although marling (chalk added to the soil to increase its fertility) and deeper ploughing in the medieval and later periods is another possibility.

4.18 Assessment of the monolith samples has suggested that the bedded sand, silt and chalk-flint granules (context [3]), immediately overlying valley gravels, probably accumulated as a result of seasonal meltwater in the Devensian period. On the south-west slopes of the dry valley, loess or locally redeposited loess then

accumulated, probably in dry periglacial conditions. It would seem that the earliest loess deposition was contemporary with the same processes that deposited the underlying waterlain deposit, as the transition between contexts [3] and [2] appears to be gradual. Loess deposition has been dated from about 10ka to 25ka BP in this area (Bateman 1998).

4.19 Subsequently, probably during the early Holocene, weathering and soil formation took place, which decalcified the surface of the loess. The decalcified loess will have been susceptible to soil erosion. Human activity, especially deforestation and clearance on the plateau and slopes of the dry valley may have triggered hillwash processes, which have eroded the upper decalcified loess and soil from the valley sides and redeposited it further downslope (as contexts [1] and [85]). This seems to have been a continual and gradual process for no evidence for more catastrophic erosion was found (such as the flint and chalk gravel typically found at the foot of rills and gulleys). Material found during the 1997 evaluation dated this colluvial episode to the Bronze Age. Wetter conditions seem to have existed on the floor of the dry valley (as seen by context [84]), perhaps as a result of the seepage of springs from the valley side (as seen in the ARC 330 98 features).

4.20 Evidence for a watercourses (though probably temporary) was found directly cutting the valley gravels in 1997, cut into the Late Devensian deposits in ARC STP 99 and cut into the lower colluvium during ARC 330 98. However the more clayey [84], which may correspond to the (undated) secondary colluvium observed in the evaluation ARC STP 97, may represent increasingly wet climatic conditions. During this period a higher water table may have led springs to seep more regularly across a wetter valley floor (as seen in ARC 330 98). The upper 'chalk flecked' colluvium described in the ARC STP 97 evaluation report corresponds with context [87]. This may be derived from more intensive activity on the valley sides, which cut into the chalk, or it may result from marling to improve the fertility of the soil at any time from the Iron Age onwards, but probably during the medieval and post-medieval periods.

4.21 The monoliths have sampled all the colluvial contexts identified during fieldwork. However in order to reconstruct the sequence of events and provide information regarding the evolving landscape, environment and soils available to be exploited by the prehistoric and historic communities who occupied the environs of the site, further work on these samples is required. The most useful technique would be to examine the sediments in thin section. As no blocks for soil micromorphology were taken during the excavation, it would be necessary to make thin sections from the monolith samples, if possible. In addition, the fine waterlogged sediment in sample <25> is likely to preserve pollen, which could provide information on the changing ecology and possible human activities within the catchment of the valley. If these colluvial sediments remain undated, pollen might also be able to provide a rough age estimate for their accumulation (in terms of established Holocene pollen zones for the Kent area).

5. Conservation

5.1 If thin sections are made of the monolith blocks 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 the 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.

5.2 In the same way, processed sub-samples taken from the monoliths will be easier to store and less likely to deteriorate than the original soil material.

5.3 Long term storage as monolith samples is likely to be costly and is not an efficient use of space or archive material.

6. Comparative material

6.1 Much geo-archaeological research has been undertaken on the slope deposits in the dry valleys of south-east England. This has focussed on identifying periods of instability (sediment accumulation) and stability (soil formation) and attempting to correlate these events with evidence for human activity (Burleigh & Kerney 1982; Bell 1983, Allen 1992).

6.2 The colluvial and soliflucted sediments infilling dry valleys have also been investigated by Quaternary Scientists, with the aim of reconstructing Late Glacial environments. Evidence for buried interstadial soils have sometimes been found within these deposits (Preece 1994). Recent work on brickearth, with similar characteristics to the 'loessic sand' (contexts [2] and [86]) on the present site has shown that periods of Late Glacial and early Holocene soil formation can also be detected by soil micromorphology (Rose *et al* 2000).

6.3 Examination of deeply stratified colluvial profiles have shown that, as a result of accelerated soil erosion, the deep brown earth soils that developed in the early Holocene below woodland have been removed (Bell and Boardman 1992). Where the colluvial deposits have been well dated (mostly by pottery inclusions or the burial of dated features) the periods of accelerated erosion and stability have been directly correlated with episodes of human occupation and activity upslope (Macphail *et al* 1990; Bell & Walker 1992, 193, Allen 1992).

6.4 Valley sediments have been recorded and sampled from several of the CTRL sites (for example Area 330 Zones 3, 4 and 6). As such they record sequences and chronologies for periods of landscape stability and instability that might be compared with each other and to other evidence for human settlement and activity across the North Downs landscape.

6.5 In addition, CTRL work being to the north of the A2 and A2-M2 widening scheme works should provide further comparative material.

7. Potential for further work

7.1 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 (2000 BC-100 BC): to consider environmental change resulting from landscape organisation and re-organisation.*

7.2 In addition, sample <26> has potential to provide information about the Late Glacial environment.

7.3 The achievement of these aims requires a well-dated framework within which to place the geo-archaeological data. The main sequence of colluviation in ARC STP 99 appears to be cut by Late Bronze Age features (and a Bronze Age horizon was identified in the evaluation ARC STP 97) and material seals Neolithic occupation deposits. It is therefore considered that sufficient dating evidence for deposits exist for soil micromorphological examination of thin sections made from the monoliths. This work might enable the sequence of events that record the changing landscape and environment of the valley to be reconstructed. Combined with pollen analysis of the finer sediment towards the valley floor (sample <25>) this could provide information about past ecology and landuse and human–landscape interactions.

7.4 In order to extract the most reliable information from the thin sections, it is recommended that prior to resin impregnation for thin section manufacture the monolith inserts should first be x-rayed and subject to loop-sensor magnetic susceptibility determination. In addition, closer-spaced sub-samples than those taken for assessment should also be taken from the tins in case background particle size, loss-on-ignition and phosphate analysis is also needed to provide a suite of data with which trends through the profiles can be reconstructed. Such information is very important when interpreting thin section characteristics.

7.5 This data should be examined in conjunction with the archaeological and dating evidence from the site. As a result of these new data the monolith assessment presented here should be refined in order to make the most reliable interpretations about past landuse and environmental change for the environs of the site.

7.6 In order to achieve this potential it is suggested that the following further works are attempted:

Table 34: Recommendations for further work on the monolith samples

	Task	staff / technology
1	** a) X-ray and b) magnetic susceptibility determination of 12 monolith inserts. c) Loss on ignition and d) particle size analysis at 30mm intervals through the profiles (30 sub-samples)	Geoarchaeologist (no report at this stage)
2	* Preparation and analysis of 12 pollen samples	Pollen specialist
3	* a) Impregnation of the monolith samples, manufacture of 6 thin sections of c.110 x 70mm and b) analysis / interpretation of the depositional and post-depositional characteristics recorded in these samples	Likely to take 3 months to prepare the thin sections.
4	Comparison of the sequence and chronology of events at ARC STP 99 with the archaeological evidence on-site and with valley sediment profiles from other CTRL sites and from the published literature for the area.	Geoarchaeologist
	NOTES;	
	* 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.	
	**The results of task 1 analysis will need to be made available to whoever does task 3b. The task 1 analysis will in turn need task 3 information to enable the task 1 data to be interpreted. It is suggested that the task 1 data are sent as uninterpreted data to the task 3 specialist, who will prepare his / her report. The results of task 1 and 3 will then be available, together with the task 2 report for geoarchaeological interpretation. This will form task 4, in which the results of the various geoarchaeological analysis will be integrated.	

5. Bibliography

Allen, MJ, 1992 products of erosion and the Prehistoric land-use of the Wessex chalk in *Past and Present Soil Erosion: Archaeological and Geographical Perspectives* Oxbow Monograph 22, 37-51 Eds. Bell & Boardman

Bateman, M, 1998 'Geochronology' in *The Quaternary of Kent and Sussex.* Quaternary Research Association Field Guide, Eds. Murton *et al*, 30

Bell, M, & Boardman, J, 1992 *Past and Present Soil Erosion: Archaeological and Geographical Perspectives* Oxbow Monograph 22

Bell, M, & Walker, MJC, 1992 *Late Quaternary Environmental Change: Physical and Human Perspectives* Longman Scientific and Technical

Bell, M, 1983 'Valley sediments as evidence of prehistoric land-use on the South Downs' *Proceedings of the Prehistoric Society 49,* 119-150

Burleigh, R, & Kerney, MP, 1982 'Some chronological implications for a fossil molluscan assemblage from a Neolithic site at Brook, Kent, England' *Journal of Archaeological Science,* 9, 29-38

Dines, HG, Holmes, SCA & Robbie, JA, 1954 Geology of the country around Chatham. *Memoir of the Geological Survey of Great Britain,* Sheet 272 (England & Wales)

Macphail, RI, 1992 'Soil micromorphological evidence of ancient soil erosion' in *Past and Present Soil Erosion: Archaeological and Geographical Perspectives* Oxbow Monograph 22, 197-215 Eds. Bell & Boardman

Macphail, RI, Courty, MA, & Gebhardt, A 1990 'Soil micromorphological evidence for early agriculture in north-west Europe. *World Archaeology* 22(1) 53-69

Murton, J, Baker, C, Bateman, M & Whiteman, C, 1998 'Pegwell Bay, Cliffsend (TR 354644-362642)' in *The Quaternary of Kent and Sussex.* Quaternary Research Association Field Guide, Eds. Murton *et al*, 35-38

Preece, RC, 1994 'Radiocarbon dates from the Allerod Soil in Kent' *Proceedings of the Geologists' Association* 105, 111-123

Rose, J, Lee, JA, Kemp, R and Harding, PA, 2000 'Palaeoclimate, sedimentation and soil development during the Last Glacial Stage (Devensian), Heathrow Airport, London, UK' *Quaternary Science Reviews* 19, 827-847

Sumbler, MG, 1996, *British regional geology: London and the Thames Valley* (4th edition) HMSO for the British Geological Survey

URL 1997 *Archaeological evaluation at Temple East of Springhead (ARC-STP97), Gravesend, Kent* unpublished evaluation report (CTRL /URL)