Chapter 11: Concluding comments

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Physical limitations of the investigation

Managing impacts to archaeological deposits within a busy urban environment, alongside a major road construction project, presented numerous logistical challenges, which were addressed by the road engineers through ingenious and innovative ways. For instance, the preservation of the important Neolithic site identified by evaluation trenching at Woolwich Manor Way was achieved by using light-weight polystyrene fill in the road embankment construction, thus substantially reducing the frequency of concrete piles required to support the structure. The nature of the working environment meant that investigations were for the most part limited to relatively small windows where there was a demonstrable below ground impact from construction activity. This can be frustrating for archaeologists who naturally wish to explore the full extent of a site or feature, but is a necessary constraint on developer-funded archaeology. In most cases this should mean that the unexcavated portions of those sites are preserved *in situ* and available for future investigation should the opportunity or need arise. The important Neolithic site at Woolwich Manor Way, for example, was briefly glimpsed in an evaluation trench and subsequently preserved for posterity. On the A13 project some of the key excavation areas were defined by the extents of flyover abutments, which were very small areas indeed, comparable in size with evaluation trenches. The most extensive deep investigation was the coffer dam excavation at Prince Regent Lane (Freemasons Road Underpass) in which a substantial Bronze Age piled structure was found. The extent of the cofferdam was largely dictated by the plan of the new underpass (although informed by evaluation trenching results).

The scope of investigation was also limited to areas where reasonable prospects existed for intact archaeological deposits. Disturbance caused by construction of the existing A13 and the extent of 20th century development on either side of the road meant that these areas often lay in narrow strips of surviving intact deposits, flanked on either side by truncated, disturbed or inaccessible deposits. The relatively undisturbed areas were identified initially on the basis of desk-based studies and geotechnical investigations, and then refined by excavating archaeological test pits and trenches during the Phase I and II evaluation. Geophysical survey methods were not a viable option due the disturbed nature of the ground, the depth of overlying deposits and the often ephemeral character of archaeology in alluvial environments (such as prehistoric waterlogged wooden structures).

A third limiting factor was the physical difficulty in accessing some of the deeper deposit sequences. The most significant waterlogged archaeological deposits were found along the margins of palaeochannels, buried beneath variable depths of alluvium and made ground. The project lies on the periphery of Greater London, in an area which was predominantly undeveloped marshland and agricultural land until the latter part of the 19th century. Nevertheless deep modern made ground was a significant obstacle in some areas (where covered by the existing A13 road embankment, for example). The engineering efforts required to reach the archaeology in these cases meant that the archaeological work was both costly and potentially hazardous. The deposit sequences were not universally deep however; in areas where the terrace gravels lay very close to the present ground surface, the width of the new road was stripped of topsoil to expose quite extensive sections of the terrace surface, in ground conditions comparable in most respects with investigations in rural dry land environments. The least effective interventions proved to be the Watching Brief work. This can be explained both by the inevitable constraints on access and visibility, and the nature of the alluvial deposits, in which it was often difficult to recognise features even when conditions were ideal. The difficulties of creating a coherent archaeological record under general Watching Brief conditions are well-known.

Contribution of the archaeological data to regional research

In spite of the practical limitations the particular topographical niche occupied by the A13 corridor, skirting the northern edge of the Thames flood-plain, offered valuable insights from an archaeological and palaeoenvironmental point of view, which have fully repaid the time, money and effort invested in the archaeological work. The extensive presence of waterlogged sediment sequences offered exceptional potential for the recovery of organic materials of various periods in stratified alluvial and archaeological deposit sequences. The formal excavation areas and evaluation trenches, taken together, provide a rare series of comparatively large scale investigations for the Lower

Thames in the London region, linked by a common project design and geoarchaeological research framework.

The archaeological discoveries range from the Mesolithic through to the post-medieval period, although material from the 2nd millennium BC was most commonly encountered, in the form of timber structures and in particular trackways. This volume therefore marks an outstanding contribution to our understanding of the prehistory of the Lower Thames area, particularly the Bronze Age. Together with other recent large scale investigations within the Thames Floodplain in London, such as High Speed 1 (formerly the Channel Tunnel Rail Link), the Jubilee Line Extension and the Lea Valley Mapping Project, the A13 investigations have helped to clarify the sequence of inundation of the Thames floodplain caused by sea-level rises during the Holocene, shedding particular light on the reactions of Bronze Age communities to these landscape changes. The data is most immediately relevant to the narrow but important topographical zone occupied by the A13 corridor, at the interface between the marshland occupying the valley floor and the gravel terrace to the north. However it also contributes to discussions of contemporary cultural landscape changes beyond the floodplain. As observed throughout the region, there is a widespread change, between the Neolithic and the middle Bronze Age (broadly the late 3rd and early 2nd millennium BC) from a landscape focused on dispersed ceremonial monuments to an agricultural landscape, which in some areas is characterised by a formally delineated environment comprising co-axial field-systems associated with stock management and pastoralism (Pryor 1998; Yates 2001). The different types of archaeological data from the Thames floodplain provide a complementary view of this phase of settlement transformation.

Regional sea-level and climate studies

This volume also presents multi-proxy palaeoenvironmental evidence from a series of radiocarbon dated sediment sequences from the margins of the Thames floodplain. Apart from the important information that these provide for the landscape context of the associated prehistoric archaeological finds (discussed in detail in this volume) these represent valuable additions to the Holocene palaeoenvironmental record for southern Britain, particularly given their close association with significant, radiocarbon dated, *in situ* archaeological structures. The relationship between sea-level rise, climate change and cultural change are complex and multi-factorial, and the subject of current debates which lie largely beyond the scope of this study. Suffice it to say, the changes in landscape during the Neolithic and Bronze Age, as noted in the A13 environmental sequences and other projects in the Thames Estuary, are likely to be related to more widely observed fluctuations in climate across Britain and north-west Europe, which have yet to be satisfactorily resolved (Brown 2008, 1-18).

Prehistoric archaeology in the Lower Thames floodplain

Until the explosion of development-led archaeology in the 1990s, knowledge of prehistoric human activity in the floodplain of the Lower Thames and its tributaries in the London area was limited, comprising occasional tantalising glimpses, such as the discovery of significant quantities of metalwork, mostly weaponry from the river itself, and occasional other finds such as the Dagenham idol unearthed in 1922 (Coles 1990, 326). In addition there were references to wooden structures, interpreted as crannogs or pile dwellings of uncertain date which had been found in the later 19th century on the River Lea, during the excavations of the Maynard (Smith 1907), Warwick (Needham and Longley 1980), Banbury and William Girling reservoirs. The extent and nature of the peat beds found in the floodplain alluvium had been remarked upon at least as early as 1721 by John Perry in his account of the stopping of the Dagenham Breach. In this work Perry not only refers to the extensive presence of brushwood in the peats, he also mentions widespread finds of hazelnuts and yew trees and occasional finds of deer antlers in these deposits. He also describes the basic sequence of clays overlying peats, which in turn lay on top of blue clays over gravels and sand (Perry 1721).

The A13 project has contributed some new data to add to models of Mesolithic and Neolithic landscape evolution in the Lower Thames Valley, but has produced relatively limited archaeological evidence from these periods. Other recent projects in the region, such as High Speed 1, have been more forthcoming in this respect (Bates and Stafford forthcoming). Nevertheless the identification of elements of a buried Neolithic landscape, including artefacts and components of carbonised wood in a varied range of woods, charred hazelnut shells and the cereal crop remains at Woolwich Manor Way offer rare glimpses of Mesolithic and Neolithic human activity within the floodplain. When set alongside other contemporary evidence in the vicinity (summarised in Chapters 1 and 9) it is clear that the A13 Neolithic finds contribute significantly to regional discussions of this period. The Neolithic evidence, such as it is, appears generally compatible with patterns in south-east England more generally, in supporting suggestions of low density, moderately mobile, seasonally based activities, with a preference for ecotonal locations along channel margins. The cereal crop remains from Woolwich Manor Way contribute evidence to current debates concerning the chronology, extent and context of arable cultivation in the Neolithic. The jet belt slider from Movers Lane contributes to debates concerning long-distance movement of individuals and groups, and exchange mechanisms.

As the edges of the Thames floodplain have been periodically pushed inland and upwards by rising sea levels, areas of earlier prehistoric dry-land or terrace edge activity have been inundated, sealing archaeological sites beneath layers of alluvium. The line followed by the A13 appears to correspond broadly with the edge of the floodplain as it was in the Bronze Age. More extensive Mesolithic and Neolithic remains may well be preserved in equivalent former terrace edge situations in the Thames floodplain to the south of the A13 corridor or along the margins of tributary channels, masked by thick layers of later alluvium. Locating ephemeral Mesolithic and Neolithic sites by currently available survey methods in such deep sequences is notoriously challenging. Physical access is logistically difficult and extremely costly due to the depth of overlying deposits. In general only exceptionally large construction projects offer opportunities for archaeological excavation in this environment. Exceptionally dense concentrations of artefactual materials are likely to be preferentially detected in these situations (for example Tank Hill Road on High Speed 1, Bates and Stafford forthcoming).

Because of these difficulties, development-led investigations have increasingly focussed on modelling the alluvial deposit sequences by various geoarchaeological methods. Current approaches emphasise modelling the inundation of the Thames floodplain in the early Holocene and attempting to identify the shifting ecotonal locations that seem to have been favoured by prehistoric communities. The most likely locations for prehistoric occupation sites in particular periods can be suggested by identifying areas of what would have been higher drier ground in terrace edge situations in the Mesolithic and Neolithic. (Bates and Stafford forthcoming). Buried landscape features such as palaeochannels can also be identified and investigated by such methods; such features may have attracted prehistoric activity and acted as sediment 'sumps' which provide optimum conditions for the preservation of organic artefacts, structures and palaeoenvironmental evidence.

The A13 investigations have produced a remarkable record of the efforts of communities of the 2nd millennium BC to adapt to landscape change as the terrace edge migrated northwards and became wetter during the Bronze Age. The appearance of trackways at numerous locations was presumably driven by a need for continued or increased access through the alder carr wetlands. The structure at Freemasons Road, comprising a double row of substantial timber piles, undoubtedly constitutes the most significant Bronze Age structure uncovered in the A13 work and represents one of the largest structures of its kind in the London region. The distribution of Bronze Age trackway discoveries in the East London marshes, including a high concentration of wooden trackways and platforms in the Beckton area and a limited number of other apparent focal points, suggests that the need for access was not evenly distributed across the floodplain.

Taken together the evidence suggests a phase of intensive but unevenly distributed exploitation of the Thames marshes throughout the Bronze Age. The main period of trackway construction appears to begin in the late 3rd millennium BC and continue to the late 2nd millennium. The dating of individual structures is often very broad, but it is possible to discern a peak in trackway related radiocarbon dates from the A13 project in the middle period of the 2nd millennium. 1500 BC coincides broadly with a period of cultural transformation across the region in the middle and late Bronze Age, seen as the point of transition to a later prehistoric world of sedentary communities, field systems and hillforts, large scale polities within complex social hierarchies and increasingly intensive agricultural and craft production (Bradley 2007, 178-202). The extent to which this transformation reflects a peak in population levels is unclear. Part of the explanation for the appearance and distribution of the trackways may be increasing population pressure in certain ecotonal localities during the first half of the 2nd millennium BC, leading to increased exploitation of the marshland environments in their immediate vicinity.

A number of key questions surrounding the trackways remain unanswered, as investigations have tended to be focused in the relatively shallow alluvial sequences near the terrace edge. Why are more trackways found in some areas than others? Proximity to a major settlement focus on the gravel terrace is one possibility. There may be as yet unknown factors which made this part of the river valley particularly attractive to Bronze Age communities. We know that the trackways ran from the terrace edge deep into the marshes, but as yet we have little notion of where they ended. Did they terminate in the marsh, or continue as far as the Bronze Age foreshore of the Thames?

Further work is also needed to relate the trackway evidence to contemporary settlement and economic exploitation on the adjacent gravel terraces. Even in this period, which is the richest in terms of archaeological evidence, no certain evidence for settlement was found in the A13 sites. However the density of remains at certain locations, particularly at Prince Regent Lane (Freemasons Road Underpass) is particularly striking when compared with the typically ephemeral and dispersed nature of Bronze Age settlement remains in dry-land contexts in south-east England. The range of features encountered, including wooden trackways and platforms, a piled timber structure, post and stake holes, pits and ditches, animal bone, pottery, struck and burnt flint, suggests that these sites are likely to have been located in close proximity to settlement sites, probably located on the adjacent gravel terrace. The varied character of the wooden trackways, and the inclusion of burnt material in their construction at both Woolwich

Manor Way and Movers Lane, point to significant, possibly seasonal habitation in the immediate vicinity of these sites in the Bronze Age. The investment in substantial timber structures, such as that at Freemasons Road, surely implies a need for frequent passage through the terrace edge landscape and may suggest more permanent settlement in the near vicinity. Unfortunately the impact of 19th century and later development along the line of the A13 is likely to have severely damaged or removed much of the evidence for these postulated terrace edge sites. In particular the construction of the Great Northern Outfall Sewer is likely to have had a significant adverse effect on the survival of archaeology along the inferred line of the Bronze Age terrace edge, although bands of relatively undisturbed deposits are likely to survive, as discovered in the A13 corridor. The areas of high potential indicated by the A13 project suggest priority targets for any future development-led investigations that may be required in the area.

Some evidence has been recovered for economic exploitation of the marshes in the Bronze Age. The A13 data, especially the worked wooden structures, provide evidence for woodland management (such as coppicing for firewood and building materials). The pollen evidence indicates increasingly open conditions and a decline in alder carr woodland in the late 3rd and early 2nd millennium, which could result either from increasingly wet conditions or impacts from livestock grazing (or a combination of the two). There is a small but gradually accumulating body of evidence for the presence of livestock, particularly cattle, in the former Thames marshes from the Neolithic into the Iron Age (see for example Carew *et al.* 2010; Jarrett 1996; Crockett *et al*. 2002). From the A13 sites, fragments of cattle and sheep/goat bone of late Bronze Age date came from ditch fills at Prince Regent Lane. Butchered cattle and sheep bones, part of a pig skull and a piece of a cattle skull came from a flood deposit at the same site. There was also a buried surface of late Bronze Age / early Iron Age date present here which included possible poaching by cattle hooves, and a possible hoof print was identified at the Movers Lane site (this volume). The small Bronze Age wattle fenced enclosure at the Bridge Road site in Rainham is likely to have been for stock management (Meddens and Beasley 1990, 243). Many sites in the area have occasional evidence for the presence of dung beetles from Bronze Age contexts, but their numbers in each instance are so low that they cannot be used as evidence for domesticated herd animals in the marshes. The Bronze Age ditches on the gravel terrace margin at the Prince Regent Lane site may have had a purpose similar to the enclosed fields found at Fengate in Lincolnshire, close to the former dryland margin of the fen (Pryor 1998). These are interpreted as the enclosed winter pastures for cattle, which, during the summer months would have been fattened up on the marshes. A gap in the record for cereal pollen in the later Bronze Age at the Golf Drivers Range has been interpreted as evidence that stock management became increasingly important at this time, as flooding increased and trackways were constructed to maintain or improve access to the marshland (Carew *et al*. 2010), although cereal-type pollen is present further up the profile, when conditions were at least as wet. Cereal-type pollen was, however, present in later Bronze Age samples from Woolwich Manor Way, although there are known difficulties in identifying cereal type pollen as opposed to wild grasses in coastal wetlands, as discussed in Chapter 8. As is generally the case during this period in the British Isles, there is no evidence for the exploitation of wild wetland resources such as fish and birds (Carew *et al*. 2010).

The recovery of several tiny human long bone fragments, from alluvial layers which contained Bronze Age material, is of interest, although the evidence is clearly very slight and reworking of earlier material is a clear possibility. The evidence for relocation and redistribution of skeletal remains has been noted elsewhere and it has been suggested that veneration of the skeletal remains of ancestors may have played an important part in the lives of Bronze Age communities (Brück 1995; Halstead *et al*. 2001; Owoc 2001; Parker Pearson 1999). Prehistoric human long bones and skulls, whole as well as fragmented, have been noted as selectively occurring in placed deposits, practises which are also found in Iron Age and Roman contexts (Butler 2006, 38-44; Harding 1985; Merrifield 1987) as well as in the case of skulls found in the river Thames (Bradley and Gordon 1988; Edward, Weisskops and Hamilton 2010).

Many of the research questions posed in advance of the project, particularly those related to the historic periods, from Roman times on, have not been addressed to any great extent, as significant remains and datable palaeoenvironmental evidence from these periods were rarely encountered in the A13 sites and did not represent clear settlement or other focii. Rising sea-level in the Thames Estuary in later prehistory is likely to have shifted the line of the terrace edge in a northerly direction, beyond the limits of the A13 investigations. The traces of Roman and later activity encountered along the A13 are largely confined to elements of field systems found on spurs projecting from the gravel terrace into the floodplain. The relative scarcity of Roman, medieval or post-medieval archaeological sites within the A13 sites is somewhat surprising as the archaeological sites at Prince Regent Lane/Freemasons Road Underpass, Woolwich Manor Way and Movers Lane lie along local historic routeways and at natural river crossing points.

Methodological issues

The adoption of a geoarchaeological approach has benefited the project in two distinct areas:

1. Through the implementation of a seamless strategy of investigation from desktop assessment through field evaluation to excavation and analysis
2. As an aid to interpretation in the field during assessment and excavation and to contextualise the archaeology of the route corridor within the framework of the local and regional environment.

There is little doubt that the adoption of a geoarchaeological framework for the project aided progress by providing a common theme for all stages of the investigation. The identification of sediment bodies likely to contain archaeological remains and the location of that archaeology was in part a function of following this approach. The complex interaction of different organisations at various stages of the project required a common thread to keep the investigations focussed on defined objectives, particularly at times when switching between excavators with differing levels of expertise and familiarity with the archaeology of East London, which might otherwise have impacted detrimentally on the project. A similar approach was adopted within the High Speed 1 project (Bates and Stafford forthcoming).

Secondly the geoarchaeological framework provided a basis for training and informing field staff during the excavation process. This was particularly important given the complex nature of the primary stratigraphy, which was largely controlled by natural sedimentation processes. Such conditions are familiar to the minority of field archaeologists who are accustomed to working routinely in alluvial environments, but are unfamiliar territory for many. In these circumstances it is often common practice for field archaeologists to resort to semi-interpretative 'descriptions' of deposits or to simply cease excavation when 'natural' is reached. Clearly within the context of the floodplain such an approach is flawed and limits the excavators ability to interpret the sequence.

A third avenue of geoarcheological benefit was available to the project but, for a variety of reasons, was not adopted. Although much important information about the sediments and sequences was obtained during the field and laboratory investigations, these investigations were not always conducted at a scale commensurate with the original questions posed by the excavators and archaeological analysts. The reasons for this are in part a function of cost rather than absence of evidence, as well as difficulties in pinpointing those parts of the sequences that could address the questions.

An important characteristic of this project is the extent to which it has proved possible to compare directly palaeoenvironmental evidence for landscape change with archaeological evidence at both a site-specific and a landscape level. The intention of the authors in writing this volume has been to write a report which is relevant to field archaeologists who find themselves working in alluvial environments, as well as to palaeoenvironmental and geoarchaeological specialists. Some of the decisions made in presenting the data, such as the use of interpretative graphics, and inclusion of common species names in the main report text, are intended to make the data more accessible to non-specialists.

Lessons learned

It is worth highlighting key areas where lessons can be learned for the benefit of future projects, particular those in alluvial environments:

With regard to the waterlogged wood, the usual problems of wetland archaeology had to be faced in an urban setting where the zone of construction impact on archaeological deposits was linear and restricted. Many of the excavation areas were relatively small, which caused problems in interpreting some of the timber and roundwood structures. Chief amongst these was the probable corner of a substantial artificial timber platform at Woolwich Manor Way (Str. 61).

Although specialists attended on-site as required, in certain respects unfamiliarity of many of the field staff in some of the special features of prehistoric wetland archaeology, such as the distinguishing of wood chips from bark fragments, inevitably caused some waste of resources. At the initial post-excavation stage time was spent cleaning and checking many kilograms of bark fragments for worked material. This highlights the importance of regular site visits by specialists and targeted staff training.

The most successful method of wrapping lifted woodwork for recording and sampling off-site was to place all but the smallest items in doubled zip-lock bags, were first wetted and then tightly wrapped in light, black rubbish bin liners of fine plastic which clings to the wet wood. Then the worked wood was wrapped in heavier duty rubble sacks and double labelled. The inner membrane was thus protected by the tough outer covering. Material wrapped in cling film was the least well-protected and the extra handling required to unwrap this material both tended to damage the material, and was very time-consuming time. It is strongly recommended that wrapping with cling film is not used in future similar projects.

As with waterlogged wood, wherever possible, assessment and analysis of waterlogged bulk and monolith samples should proceed swiftly, since once removed from the ground delicate waterlogged material is prone to degradation and decay. Experience from palaeoenvironmental analyses in connection with this project and others with long delays between collection and final analysis, has demonstrated significant reduction in the range of pollen and plant remains present after a delay of a year or more. In some cases on the A13 project, alternative monolith sample sequences had to be selected for detailed analysis due to the deterioration or loss of key samples between the assessment and analysis phases. Any sampling undertaken should be in accordance with a written site-specific sampling strategy, with clearly stated aims, formulated within the context of the overarching project design and based on specialist advice. The responsibility for collecting, documenting, sub-sampling and curating sample material needs to be clearly set out and managed at each stage. Samples should be kept cool and dark, and stored following the latest English Heritage guidelines.