Geoarchaeological sampling strategy:

Pudding Mill Lane Portal - Crossrail
Site Code XSK10

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Introduction
A series of visits were made by a MOLA geoarchaeologist to Pudding Mill Lane Portal (PMLP) during November 2011 at the request of the Senior Archaeologist undertaking a targeted archaeological watching brief followed by an evaluation on the site and in conjunction with GLAAS science advisor. The site itself was fairly large, consisting of works and excavations in association with the Crossrail tunnel project. The area targeted for investigation was located centrally upon the floodplain of the River Lea in East London.

The aim of the geoarchaeological site visit was to assess the potential and significance of the natural stratigraphy revealed in a trial trench and to sample the sediments if necessary.

Methodology
The deposits exposed in the trench sections were examined and their characteristics recorded. A preliminary interpretation of their mode of deposition and the environments represented was made. Monoliths samples and accompanying bulk samples were taken throughout.

Results
The north east facing section exposed in the evaluation Trench was dug from a height of approximately 3.5m AOD down to approximately 0.5m AOD. The sediments noted comprised of soft dark brown (occasionally stained black) silty clays at the top of the section becoming increasingly organic with root traces throughout with occasional mollusc shell (about 2.75m AOD), brick fragments and gravel around 2.50m AOD. This gradually gave way to a soft mid grey clay (with frequent rootlets) which became increasingly sandy with gravel and occasional molluscs again between 1.5m AOD and 0.6m AOD. Once more occasional fragments of CBM were noted at approximately 1m AOD. River gravels were encountered at 0.6m AOD and contained organic material. Notably a series of stakes were exposed in the lower part of the section / trench. The gravel was probed and recorded to be dipping off steeply to the east.

Interpretation
The gravels represent deposits associated with the ice-melt, braided river environment of the wider floodplain of the Lea, typical of the Late Devensian Ice Age period of some 15-10,000 years ago. The level of the gravels seems typical of the location as does the nature of the steeply dipping surface (Corcoran *et al* 2011). In this area, a low river terrace (lying at between 4m and 1m AOD) has been found to exist albeit heavily dissected as a result of river scour at the end of Late Devensian leaving a patchwork of high and low ground locally (Corcoran *et al* 2011). Archaeologically this is significant as the local topography would have provided islands of high ground suitable for exploitation of the surrounding wet land probably throughout the prehistoric. Although the level of

the gravels in the section indicates a channel, the steeply dipping gravels perhaps indicate the proximity / interface of a low terrace remnant and consequently prehistoric occupation. Interestingly the organic nature of the gravels is indicative of an exposed land surface and probable slow inundation (see below).

The subsequent silty clays, which were found to lie over the gravels, indicate a significant change in river regime occurring much later in the Holocene. As found across the nearby Olympic site, the alluviation process which deposited the silty clays was probably a slow one with seasonal flooding laying down accretionary deposits although the sand and gravel content occurring periodically through the unit tend to indicate more intense flood events. The deposition of the silty clay over the Pleistocene deposits (and the marshy conditions which will come to dominate the area over time reflected in the fine rooting seen throughout the profile) reflect the 'ponding back' of the Lea, a process probably caused by relative sea-level rise affecting the Thames which would have raised the general level of the groundwater in the lower Lea river system. This ultimately increased flood events leading to the periodic deposition of the silty clays throughout the river channels and across the floodplain. On the other hand, vegetation clearance and agricultural activity occurring from late prehistory would have also increased the erosion of fine sediment into the river catchment (Robinson et al, 1984) but to what degree this had an affect remains unclear.

The presence both of the stakes and occasional CBM / brick fragments are evidence for anthropogenic activity. The wood piles seen in the channel have been found at other areas in the Lea Valley to be Saxon in date at other nearby sites (e.g. Fairman et al, 2008) but could be later. In contrast, the brick fragments seen in the upper part of the profile around 2.50m AOD, seem to be post medieval providing a date for theses deposits (and above) which ties in with the contaminated (black staining) seen in the upper profile indicative of the industrial activities typical of the area in more recent times.

Significance

Given that evidence for the evolving environment of the Lower Lea and its relationship to the archaeology, changing landscape and river regime of the Thames remains still largely unexamined in detail, the potential of the analysis of the sediment accumulation and environment it reflects will add to our understanding of prehistoric / historic activity within this part of the Lea Valley, which is of local and regional significance. Records and samples taken from the alluvial sequence surviving on the site will contribute to our current understanding of the past environment of the site and its surroundings are undoubtedly of local significance.

Recommendations

There is good potential for past landscape reconstruction from the monolith and bulk samples taken on site. Environmental remains preserved within these clays should be suitable to characterise the prehistoric/historic environment of the site through radiocarbon dating, pollen and diatom assessment in particular. In very general terms, it can preliminarily be suggested that research objectives would include gaining a better understanding of:

- the river regime;
- the on-site environment;
- local vegetation change and the surrounding environment;
- indirect evidence for human activity on the site and its surroundings;
- the impact of relative sea level fluctuations in this part of the Lea Valley.

Bibliography

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