Appendix 3.2

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Topic: Geoarchaeological approach to evaluating large land parcels

Background

Finding rapid, cost-effective ways to evaluate large land parcels for archaeological and palaeoenvironmental remains has formed a key challenge for archaeologists since the discipline began. The need for this has come into sharper focus with the advent of commercial archaeology undertaken in advance of development. Various methodologies have been utilised over the years with some – such as aerial photograph transcription and now remote sensing more generally, together with geophysical survey – making huge contributions to the number and location of new sites. For those areas where there is little pre-existing remote sensing data or which have geologies/soils/ground conditions unfavourable to crop or soil mark formation, and/or have restricted scope for geophysical survey, other approaches to drive evaluation of these areas need to be found.

Geoarchaeological methodology

Following an in-depth study in the Till–Tweed basin (Passmore and Waddington 2009; 2012) a geoarchaeological methodology has been devised termed the 'Landform Element' approach, whereby the evaluation of a given land parcel is initially mapped, cored and surveyed in order to partition the landscape parcel into a series of discrete landforms. For each of these landforms the archaeological potential and the types of methods most appropriate to their evaluation are identified and this is then used to drive the subsequent evaluation of the area. The case study from Killerby Quarry, North Yorkshire, was approached in this way. Here, as part of the desk-based assessment for this new quarry a detailed geoarchaeological landform element map for the land parcel was created (Figure 1). This was followed by a phased programme of evaluation that included targeted sediment coring, range finder dating and assessment of palaeoenvironmental proxies on a range of deglaciation features that included enclosed basins and kettle holes as well as paleochannels on the Holocene floodplain. An extensive fieldwalking survey was undertaken at close-spaced intervals to maximise finds recovery, with a particular emphasis on chipped stone artefact recovery. Following on from these studies, targeted geophysical survey and evaluation trenching was undertaken. Once this site received planning permission archaeological mitigation took place based around a scalable watching brief–strip, map and sample condition together with the targeted sample excavation of specific kettle hole- and enclosed wetland basin features (Figure 2).

Figure 1 Killerby Quarry, North Yorkshire, showing Wetland 1 after initial soil stripping
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This approach was selected for use on this project as it provided an appropriate method for rapidly and accurately assessing a large land parcel in advance of large-scale development that required a high level of information to inform the planning decision and to give confidence to the developer of the scale and cost of the post-permission mitigation that might be required. This approach allowed what was considered to be significant about this landscape and the type of archaeological and geoarchaeological information it contained to be targeted from the outset whilst avoiding the need for digging several hundred evaluation trenches across this landscape. This meant that there was virtually no impact on surviving sub-surface archaeology during the evaluation phase; large scars in the field surface were avoided; speed of work and results was high, and the cost of the works was considered excellent value for money. This meant that the approach by which the greater bulk of the financial resource could be spent on creating new and significant information gain during mitigation was achieved, rather than expending large amounts at pre-determination evaluation, which would reduce how much significant information gain could be had during mitigation.

Figure 2 Left: Peat-filled kettle hole after initial stripping. Right: recording the archaeology-bearing sedimentary sequence through the kettle hole (© Archaeological Research Services)

The technique proved highly successful as, during mitigation, a kettle hole and enclosed wetland basins were targeted for their archaeological remains as well as their palaeoenvironmental sequence for one of the first times in British commercial archaeology. The results have been stunning and have added genuinely new knowledge and scientific data to our understanding of the Late Glacial and Early Holocene. This has included the discovery of two Early Mesolithic pond-side camps, with the structural timbers, and even a hearth, of the tepee-like dwellings surviving in remarkable condition despite dating to slightly earlier than c 9000 cal BC (Figure 3), co-eval with the earliest phases at Star Carr. A substantial Late Mesolithic timber platform dating to c 5500 cal BC was discovered extending out into a small pond inside the kettle hole with evidence for cattle teeth, chipped flints and a stone rubbing tool, as well as posts, postholes and other features that have led to its interpretation as a platform for processing animal skins and potentially curing hides in the pond. This site also had successive occupation in the Neolithic and Bronze Age stratified above the Mesolithic remains. In both cases these well-preserved archaeological remains also had preserved alongside them a continuous palaeoenvironmental sequence of deposits rich in environmental proxies that could be linked to landscape development and human activity in the immediate landscape surrounds during the Late

Glacial, as well as during the Windermere Interstadial and the early–mid Holocene. Although other archaeological remains have also been found, these are remarkable discoveries that have been found as a result of the application of a specific geoarchaeologically driven approach to the evaluation and subsequent mitigation works on a large-scale development site, and have therefore not been discovered by chance. It has ground-tested the approach in a real-world setting on a large scale and has proved effective in recovering what was significant about the archaeology of this area, as well as in directing the best use of spend at the right phases in the discharge of the planning system to maximise information gain and contribute to archaeological understanding in the region and beyond.

Figure 3 Left: Excavation of an Early Mesolithic camp site, with stunning preservation of timbers for a c 9000 cal BC tepee and remnants of its hearth emerging from Wetland 1. Right: The Late Mesolithic timber platform found within the kettle hole dated to c 5500 cal BC (© Archaeological Research Services).

References

Passmore, D G and Waddington, C, 2009 *Managing Archaeological Landscapes. Till-Tweed Studies Volume 1*. Oxford: Oxbow Books and English Heritage

Passmore, D G and Waddington, C, 2012 *Archaeology and Environment in Northumberland. Till-Tweed Studies Volume 2*. Oxford: Oxbow Books and English Heritage