CPAT Report No 971

Excavations at Borras Quarry, Wrexham, 2008

DRAFT INTERIM REPORT

THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

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I Grant & N W Jones
March 2009

Report for Tarmac Ltd

The Clwyd-Powys Archaeological Trust
7a Church Street, Welshpool, Powys, SY21 7DL
tel (01938) 553670, fax (01938) 552179
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The Clwyd-Powys Archaeological Trust
7a Church Street Welshpool Powys SY21 7DL
tel (01938) 553670, fax 552179
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SUMMARY

The discovery of a number of prehistoric features during the soil stripping operations associated with the first phase expansion of Borras Quarry into the Holt Estate in the Spring of 2008 led to the detailed archaeological excavation of a large area, revealing further significant remains. The excavations identified a range of features, many of which were associated with pottery, suggesting some form of settlement dating to the mid or late Neolithic. An initial examination of the pottery has confirmed the presence of a number of distinctive vessels of a style known as Peterborough Ware, which is believed to been in use in the period between 3500 and 2500 BC.

The exact nature of the settlement is uncertain, and unfortunately no definite buildings were identified, although other evidence strongly suggests their presence. The characteristic feature of the site is the high number of pits which were filled with quantities of charcoal and fire-cracked stones, suggesting that they had been used for cooking.

The discoveries have made a significant contribution to our knowledge of human activity in north-east Wales during the Neolithic period. A number of Neolithic artefacts have been found in the past by chance in the Wrexham area, including seven polished stone axes within 10km of Borras, while most of the evidence for Neolithic activity comes from scatters of worked flint, often uncovered after ploughing. However, the excavations at Borras have provided the first evidence for an actual Neolithic settlement in this area.

The recent excavations have clearly demonstrated that there is significant potential for buried archaeological features within the area of the Holt Estate, and there is every possibility that further discoveries will be forthcoming as soil stripping proceeds in the remaining areas.

1 INTRODUCTION

1.1 In April 2008, the Field Services section of the Clwyd-Powys Archaeological Trust (hereafter CPAT) was commissioned by Sloane Mead, acting on behalf of Tarmac Ltd, to undertake a watching brief during soil-stripping operations relating to the first phase extension (area H1) of the Borras Quarry into the Holt Estate (Figs 1-2), near Wrexham (SJ 357533). One watching brief had already been undertaken in 2007 during soil stripping along the route of a new conveyor belt linking the extension area with the main quarry (Hankinson 2008).

1.2 Borras Quarry and its immediate locality has been subject to a number of archaeological assessments relating to planning applications, firstly in 1995 to carry out mineral extraction at the Holt Estate (Hankinson 1995), and then in 2000 to extend the depth of workings and determine new conditions (Jones 2000a; 2000b) at the quarry. An assessment of a proposed quarry extension was carried out in 2003 (Jones and Hankinson 2003), which was subsequently updated owing to a revision of the proposals (Owen and Silvester 2005). The 2005 assessment then formed part of the Environmental Statement submitted by Tarmac Ltd to the local planning authority - Wrexham County Borough Council - in support of their application to extend the quarry. The subsequent grant of planning consent was subject to a number of conditions, one of which was that an archaeological watching brief was to be carried out during all soil stripping operations.

Fig. 1 General view of Area H1 and the area of excavation. Photo CPAT 08-c-0134

1.3 During the monitoring of soil stripping a number of potentially significant archaeological anomalies were revealed and rapidly investigated, revealing several shallow pits, some of which contained charcoal and fire-cracked stones. As work progressed more features came to light, leading Tarmac to halt operations while these were investigated. Following limited excavations it was established that the features were probably associated with Neolithic settlement and a meeting was held between Tarmac, CPAT, and the regional archaeological curator, at which it was agreed that soil stripping would continue under the direction of CPAT

within an area measuring approximately 70m by 80m in the north-east corner of the first phase extension, surrounding the known archaeological remains. A further area to the west was tested by the careful stripping of two transects, but no further archaeological features were identified, and soil stripping was subsequently resumed in this area with only limited archaeological supervision.

1.4 The removal of overburden in the archaeologically sensitive area immediately revealed a significant number of archaeological features, as a result of which negotiations were held between Tarmac and CPAT to allow for the thorough investigation of the area, which was eventually completed over a seven-week period, ending on 1 August 2008. This report provides an interim statement on the results from the excavations, and includes an assessment of the site archive and post-excavation research design.

1.5 Prior to the recent discoveries there were only three recorded prehistoric sites within the vicinity of the quarry: a Mesolithic flint scatter (PRN 101653) that had been discovered adjacent to Borras Farm (SJ 350525), a Neolithic axe head (PRN 101692) from Bryn Gryfydd (SJ 35035235), and a hoard of Bronze Age metalwork (PRN 100386) found just to the west.

2 GEOGRAPHICAL AND GEOLOGICAL BACKGROUND

2.1 Borras Quarry lies 13km south of Chester and, in the more immediate locality some 3.5km north-east of the centre of Wrexham and 2.5km south of Gresford. The quarry lies next to Borras Road, a minor route which mirrors that of the A534 further south between Wrexham and the village of Holt.

2.2 The quarry is situated on a plateau, at a height of approximately 75m OD. Land to the north-west, lying between the quarry and Gresford, is primarily undulating, agricultural land (75-81m OD), containing a number of depressions, known as 'kettle holes'. Mineral extraction has taken place nearby at Caia Farm which, until recently, formed part of Borras Quarry, but this area has recently been reinstated following the completion of quarrying activity.

Geological summary by Dr Jacqui Malpas

2.3 The Wrexham area was affected by several periods of glaciation during the Quaternary Period, but only evidence of the final, Devensian glaciation, around 122,000–10,000 yrs ago, has been preserved.

2.4 During this time ice-sheets encroached on the Wrexham area from two directions, one from west and central Wales (Welsh Ice Sheet), and the other from the Irish Sea to the north (Irish Sea Ice Sheet) (Wedd *et al.* 1928, 238; Hains 1991, 94). These ice-sheets merged in the vicinity of the River Alyn, and west of Wrexham (Ball 1982; Dunkley, 1981; Thomas 1985 & 1989), depositing extensive tills (boulder clays), together with later glacial and fluvio-glacial deposits, to create the landform known as the Wrexham Plateau. This covers an area from north of Caergwrle southwards as far as the River Dee. In the northern part, the surface of the plateau is fairly flat; but in the east and south of the district the landscape is undulating, with numerous mounds and depressions.

2.5 As the ice-sheets retreated, meltwater flowed from the retreating ice margins and laid down a complex series of fluvio-glacial and lake deposits in the Wrexham district. There have been a number of conflicting interpretations of the mode of deposition of these sediments (Peake, 1961; Poole & Whiteman, 1961; Wilson *et al*, 1982; Thomas, 1985, 1989), but it is clear that the extensive sand and gravel deposits around Wrexham, the 'Wrexham Delta Terrace' of

Wedd *et al.* 1928, were formed as a complex outwash fan east and north-east of Wrexham. Minor ice-sheet re-advance is thought to have occurred, resulting in the local interfingering of till and fluvio-glacial sands and gravels.

2.6 The melting ice-sheets left patches of dead ice buried within glacial sediments and the melting of these produced depressions in the sand and gravel deposits known as kettle holes. These depressions are commonly filled with water, peat, sand and/or clay deposits and are part of an undulating, hummocky landscape (Campbell & Bowen 1989, 237). The landscape of the Holt Estate at Borras has numerous kettle holes, all of which are now dry, although a few beyond the eastern boundary of the quarry still retain water.

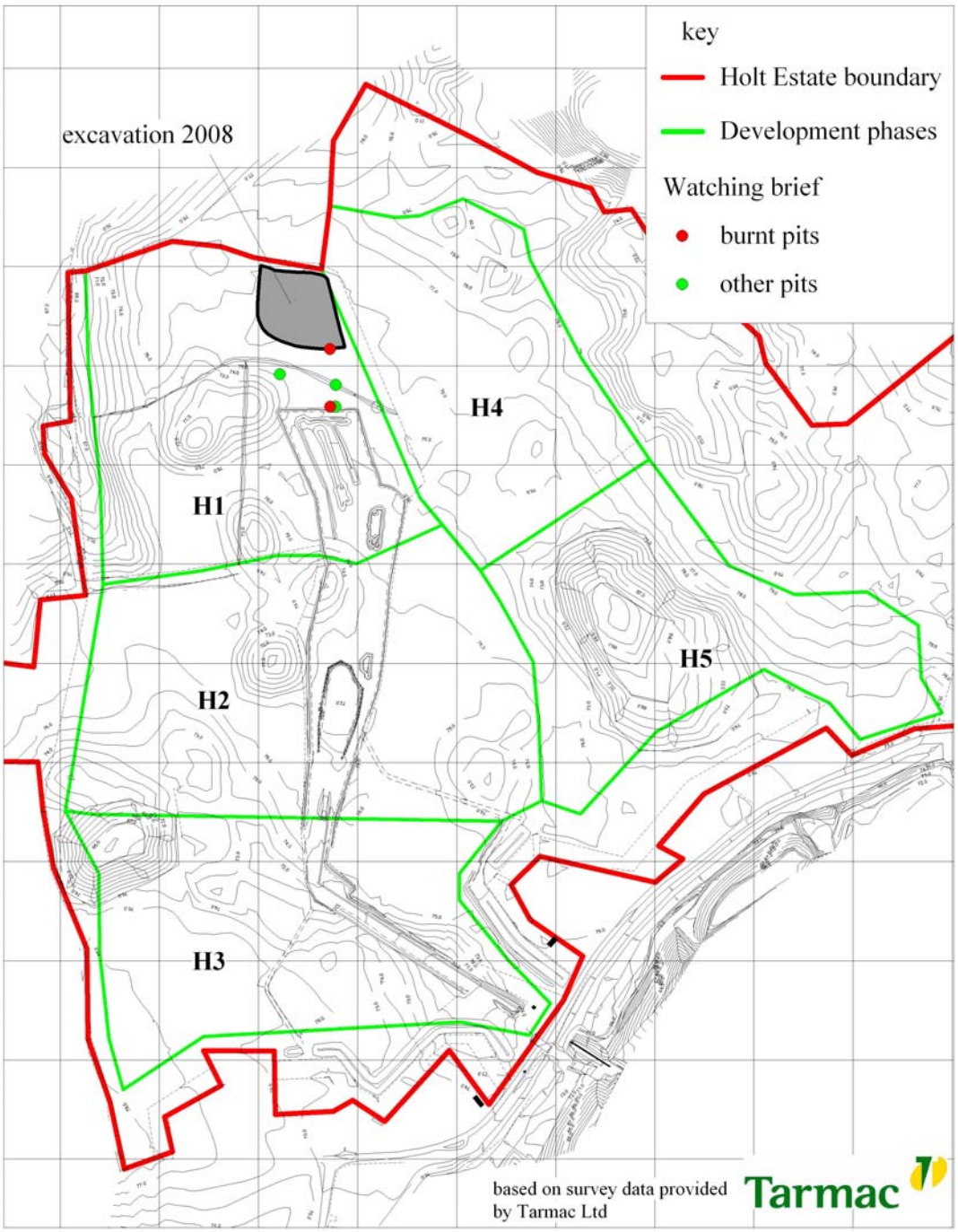

Fig. 2 Plan of the Holt Estate showing proposed development phases, watching brief and area of excavation

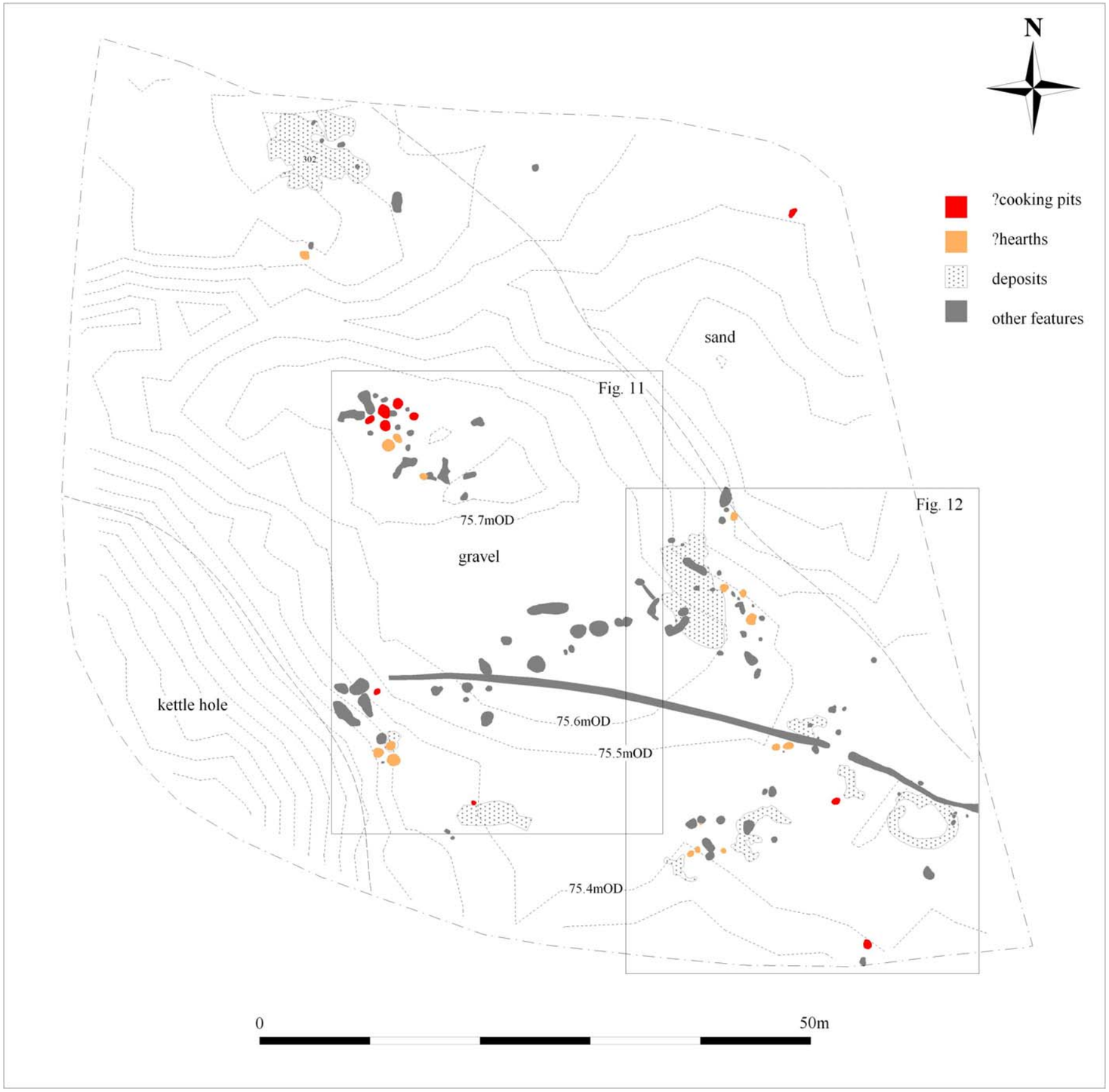

Fig. 3 Overall plan of the excavated area.

3 EXCAVATIONS

3.1 Following the initial discoveries, an area of around 5,500m^2 was mechanically stripped down to the surface of the natural subsoil and under close archaeological supervision. Within most of this area the underlying drift consisted of glacial gravels, although there was an area of sand in the north-eastern corner, and in the south-western corner the overlying deposits were only partly removed where they lay within a small kettle hole. Thereafter, all excavation was conducted by hand. Numbers in brackets in the following text refer to individual contexts whether features, layers or deposits, recorded in the site archive.

3.2 A site grid was established and located using total station surveying equipment, the base stations for which were located to coincide with the Ordnance Survey national grid by surveyors from Tarmac Ltd. On-site recording was undertaken by a combination of total station survey and hand-drawn planning, with all levels related to Ordnance Datum. Site photography was in digital format.

3.3 Those features which were identified and investigated during the earlier stages of the watching brief were located by means of a hand-held global positioning system (GPS).

3.4 The majority of the features revealed during the excavation were pits, some of which contained evidence for in-situ burning, although the majority did not. There was limited evidence of structures, comprising several obvious post-holes with associated gullies and areas of trampled earth or hard-standing, although no definite buildings were identified. The distribution of features does, however, seem to be significant, with over 130 features located across a slight ridge of gravel and sand orientated on a north-west to south-east axis. It is perhaps also significant that only two small isolated pits (18 and 21) were located on the sandy-clay subsoil to the north-east, possibly demonstrating a preference for firm, well-drained gravels upon which to establish a settlement. Furthermore, the distribution of the features can be sub-divided into six areas of significant activity, predominantly focussed on the central part of the site (see Fig. 3).

Fig. 4 Aerial view of the excavation in progress. Photo CPAT 08-c-0128

Structural evidence

3.5 The excavations revealed a number of small pits or hearths with evidence for burning, which were associated with clusters of sub-oval pits, potential post-holes and shallow gullies. Although, as already noted, no obvious building plans could be identified, these features clearly suggest the presence of several prehistoric structures. The density of the archaeological features in the central part of the site (see Figs 11 and 12) was particularly significant, with a number of pits and post-holes concentrated around several gullies (316, 362 and 381; see Fig. 5). On the periphery of the group were areas of burning and possible hearths (191, 193, 226 and 232). A large quantity of decorated Neolithic pottery was recovered from this group of features, most notably from pits 220 (see Fig. 6), 226 and 318, implying increased domestic activity within the area. In addition to the pottery a possible saddle quern (Find no. 635), used for grinding small quantities of grain and other food-stuffs, was recovered from the base of pit 318.

Fig. 5. Neolithic gullies and pits 362, 316 and 318. Photo CPAT 2656-376

3.6 This area of activity was surrounded by a deposit of compressed clay and small pebbles (203) such as might be associated with internal occupation deposits within a structure.

Fig. 6. Excavation of Neolithic pottery from pit 220. Photo CPAT 2656-232

3.7 Immediately west of this group of features were two pits (117 and 119) which were noticeably larger than any of the other pits excavated on the site, measuring up to 1.9m in diameter and 0.5m deep (see Fig. 7). The nature of the fills suggested that they may have been used for the deposition of rubbish. To the south-west of the pits were a number of possible post-holes (see Fig. 14), the largest of which was feature 170, measuring 1.8m in diameter, which contained a large post-pipe, 0.7m in diameter and 0.5m deep, again suggesting the possible existence of structures within the immediate area.

3.8 In the south-eastern quadrant of the site a cluster of post-holes/pits in association with large amorphous deposits of silty sand also pointed to the existence of a possible structure (see Fig. 12). Three of the features (266, 270 and 272) appeared to be either small hearths or were possibly the remains of posts which had been burnt in-situ. To the east was another group of post-holes set around a sub-circular feature (336) containing a sandy silt fill, and two linear gullies 30 and 358. The linear gullies are part of a larger interrupted ditch (383), 0.96m wide and 0.11m deep, which extended beyond the limits of the excavation to the east, terminating just short of the kettle-hole in the south-western corner of the site. The gullies are likely to have formed a boundary, or may be part of an enclosure, the majority of which lies to the south of the excavation.

Fig. 7. South-facing section through 'rubbish' pit 117. Photo CPAT 2656-166

Evidence for cooking activities

3.9 In total 28 pits were identified which contained evidence for either in-situ burning and/or quantities of charcoal and fire-cracked stones. These 'fired' pits were widely distributed across the site, usually in association with other groups of pits, post-holes and possible structures (see Fig. 12). Each of these features was half-sectioned, with bulk soil samples retained for analysis. The results from the excavation, and a preliminary examination of selected soil samples, have enabled the pits to be categorised into two main types; cooking pits and hearths.

3.10 The cooking pits, of which ten were identified, were larger than the hearths and had an average diameter of 1m and a depth of up to 0.3m (see Fig. 8). The deposits within the cooking pits were characterised by distinct layers of dense charcoal covered in fire-cracked stones and occasionally sealed by a heat-affected silty sand (see Fig. 9). The characteristics of the undisturbed deposits, which contained very little in the way of large wood charcoal, imply a very slow burning, continuous firing process generally referred to as 'clamp' firing. The material for the clamp, which would have consisted of sand, gravel and turf, may have been excavated from an area adjacent to the pits and this would probably explain the existence of a number of sub-oval 'quarry' pits, as for example features 75 and 77 located next to the northern group of cooking pits and 43, 45, 47 and 49 adjacent to the south-western group (see Fig. 14).

Fig. 8. Concentration of cooking pits (contexts 13, 19, 57, 71 and 73). Photo CPAT 2656-070

Fig. 9. Pit 13 during excavation. Photo CPAT 2656-011

3.11 A total of 18 features have been identified as possible hearths, of varying size. Generally, these consisted of pits with evidence for burning, but did not contain the dense layers of charcoal and heat-fractured stone, typical of the larger cooking pits. The deposits of charcoal and fire-cracked stones within the possible hearths showed evidence of disturbance or re-use. In some instances, notably the larger pit 226, a significant quantity of Neolithic pottery was recovered from the fill. This particular feature, together with 191, 193 and 232 (see Fig. 12), was located in an area of intensified 'domestic' activity. Similarly, we found another group of

shallow hearths or possible posts burnt in-situ (266, 270, 272 and 315) located within a larger group of features in the southern part of the site.

3.12 One particular group of pits (34, 36 and 129), located in the south-western part of the site (see Fig. 11), were comparable in size with the cooking pits, but they contained significant quantities of pottery which implies another function. Although there is evidence for possible re-use as cooking pits, it is possible that at least one of the pits (context 34) could be a 'clamp kiln' used for the manufacturing of a single pottery vessel (see Fig. 10).

Fig. 10. Decorated Neolithic pottery (Find no. 517/522) in-situ within pit 34.
Photo CPAT 2656-051

Miscellaneous features

3.14 Towards the north-western corner of the site a group of features were identified which included a metalled surface of small pebbles and compressed silty clay (302) together with a group of post-holes (see Fig. 3). This surface was comparable with context 203, located at the centre of the site. From the initial artefactual evidence, a small fragment of post-medieval pottery recovered from below the surface of 302, it might be inferred that these features date from the 19th century. However, the sherd was small and may be intrusive. It is also notable that a small number of flint and chert lithics were also recovered from across this general area. The group of features could, therefore, be on the periphery of another possible Neolithic hut site.

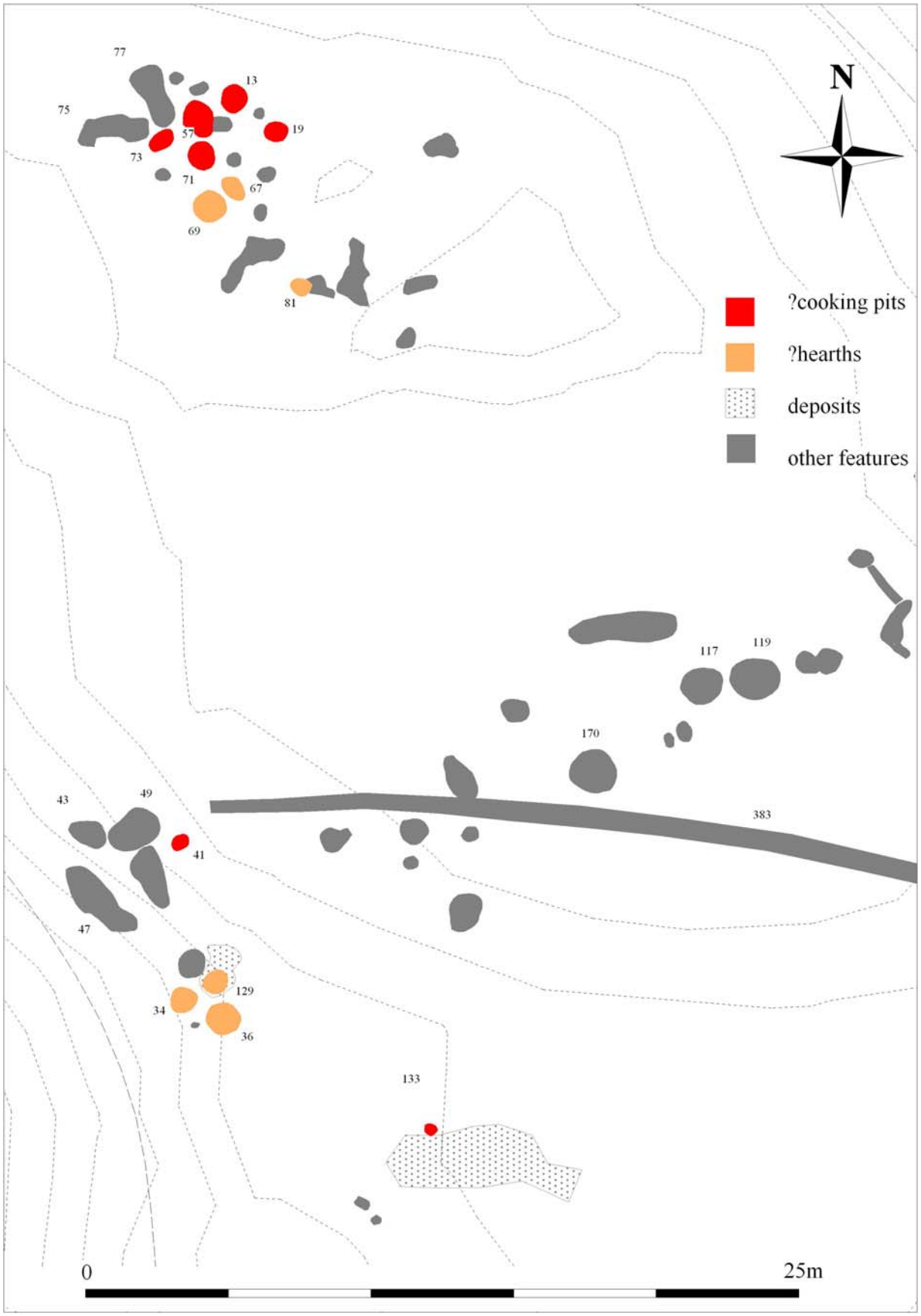

Fig. 11. The western section of the main area of Neolithic occupation

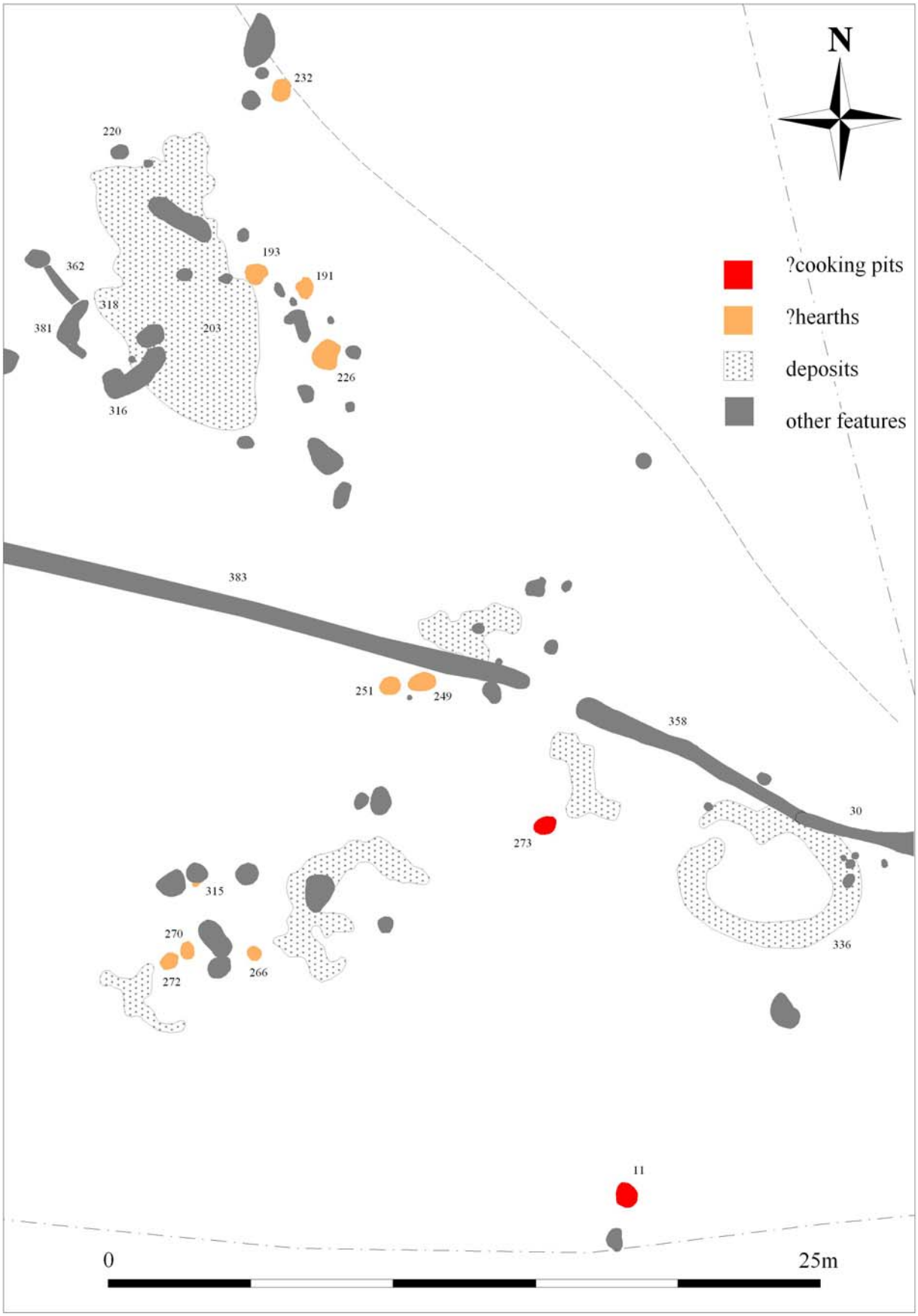

Fig. 12. The eastern section of the main area of Neolithic occupation

4 PREHISTORIC POTTERY

4.1 The more diagnostic sherds of pottery from three contexts were the subject of a preliminary examination and are reported on below. The remaining pottery will be the subject of a further report as part of the overall post-excavation analysis. The form and decoration of the pottery places it within the broad group of mid to late Neolithic pottery (3,400 – 2,500 cal BC) known as Peterborough Ware, the Welsh distribution of which, a few years ago, is shown in Fig. 13. Within this group there are a number of sub-types; variations in the style of the pottery from Borras indicate that two of the vessels belong to the Mortlake tradition, while the third is so-called Fengate Ware.

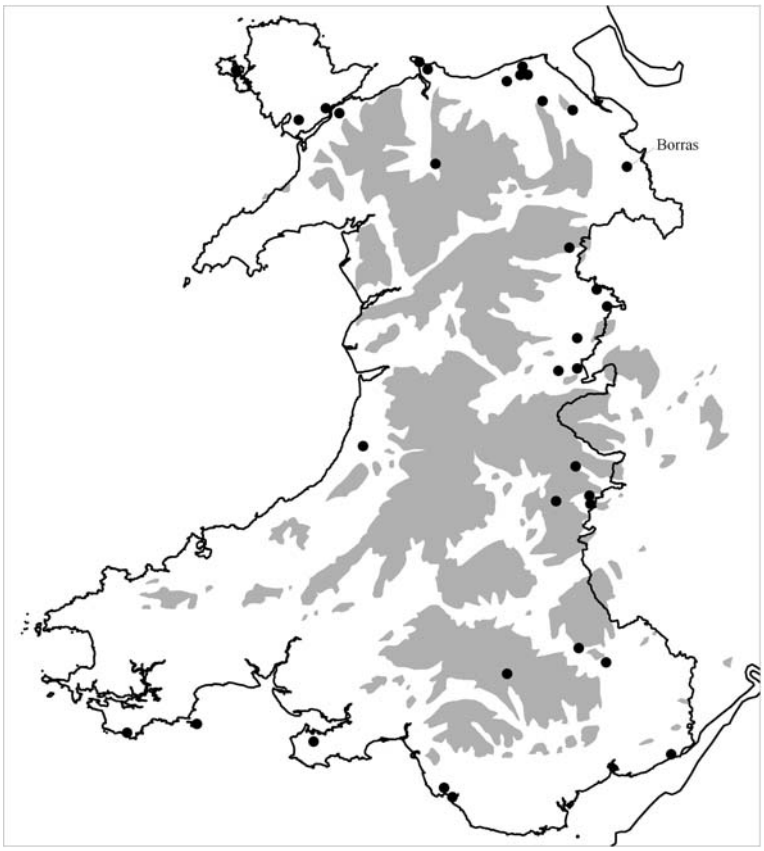

Fig. 13 Distribution of Peterborough Ware in Wales (after Gibson 1995)

4.2 Over 303 sherds and fragments of prehistoric pottery, weighing a total of 2098g, were recovered from across the site. These figures include the pottery recovered from features recorded during the watching brief exercise that lay outside the area of excavation. A high percentage of this assemblage consisted of intricately decorated rims and body sherds. The majority of the pottery came from 13 separate pits, with the remainder from an isolated small scoop and a number of post-holes and gullies. Almost half of the pottery (48% by weight) was collected from pit 34 (89+ sherds, 997g), an example of which is illustrated in Fig. 11 nos 517/522.

4.3 The distribution of the pottery across the site (Fig. 15) is primarily focussed upon the slightly raised area at the centre of the site. This is an area with a high density of pits, post-holes and gullies, suggesting possible association with domestic structures. Pottery was also recovered from similar, but smaller, areas to the south and south-west. It is noteworthy that none of the large ‘cooking pits’ contained pottery, a fact that will no doubt aid further research into the

understanding of the nature of these enigmatic features. The only exception was one group of fired pits (34, 36 and 129) on the edge of a kettle-hole in the south-west corner of the site. Although as yet unproven, these features may be associated with the possible manufacture of pottery vessels on site (see section 3.12, above). A full catalogue of the pottery is provided in Appendix 1.

Peterborough Ware by Frances Lynch (see Fig. 14)

Finds no. 517 and 522, Context 39 (fill of pit 34)

4.4 These sherds (and many more not examined in detail) form part of a Mortlake bowl, 288mm in diameter at the shoulder and possibly 205mm deep. About 25% of the rim survives in three joining pieces. One sherd showing a concave neck and angled shoulder fits to the rim. No other pieces of shoulder appear to be present and it is unlikely that many of the body sherds will join. Body sherds with a maximum thickness of 20mm suggest that the body was decorated all over with horizontal lines of bird-bone impressions.

4.5 The rim is decorated on the inside with sloping lines deeply impressed by a fine comb or possibly twisted cord, creating a ridged surface. The outer side of the rim is decorated with amorphous impressions, probably made with a stick. There is a hint that the arrangement may be panelled.

4.6 The concave neck is undecorated and the body from the shoulder downwards is covered with lines of bird-bone impressions, the jointed end being quite clear in the more deeply impressed lines close to the shoulder.

4.7 The exterior is grey/brown in colour with a black interior. The clay is heavily gritted with angular pieces of quartz and another rock. It is reasonably well-fired in the upper parts but sherds towards the base are poorly fired and crumbly. The decoration is fainter there and more widely spaced. Three or four pinker sherds in a similar heavily gritted fabric come from the same context. They are featureless, but decorated with sharp, incised ?horizontal lines and probably represent a different vessel.

Find no. 549, Context 115 (fill of pit 129)

4.8 Two joining sherds forming about 20% of the rim and shoulder of a small Mortlake bowl 157mm in diameter and perhaps 100mm deep. Another decorated sherd from the body of this pot exists but cannot be joined to this segment. All the outer surfaces are abraded and the interior is damaged, suggesting that the pot had seen considerable use and wear before it was deposited.

4.9 The rim is decorated with impressed lines of twisted cord, running along the top of the sloping rim and along its outer edge in shot lengths. The concave neck is undecorated and the rounded shoulder is marked by two horizontal lines of fingernail marks. Below this the body has lightly impressed lines of twisted cord set at varying angles.

4.10 The outer surface is red/brown and the damaged inner surface is darker. The clay contains well-crushed grit, including quartz, and is well fired.

Find 620, Context 319 (fill of pit/posthole 318)

4.11 A single rimsherd from a carefully decorated pot which was approximately 240mm in diameter. The collared rim has an internal slope decorated with a line of herring bone marks, probably but not certainly made with a fingernail; on the outer slope there is a broader herring bone arrangement. Here, the lines on the upper band are impressed with twisted cord but the lower band appears to be smoothly grooved without any sign of twists. The upper curve of a

concave neck survives. The lower edge of the collar is abraded, suggesting a well-used vessel. The fabric is dark and hard with well-crushed grits.

4.12 The collared rim with its inner slope decorated with a very characteristic band of herring bone fingernail marks suggests that this vessel should be classified as Fengate Ware. The date may be slightly later than the Mortlake bowls but their use is likely to have overlapped.

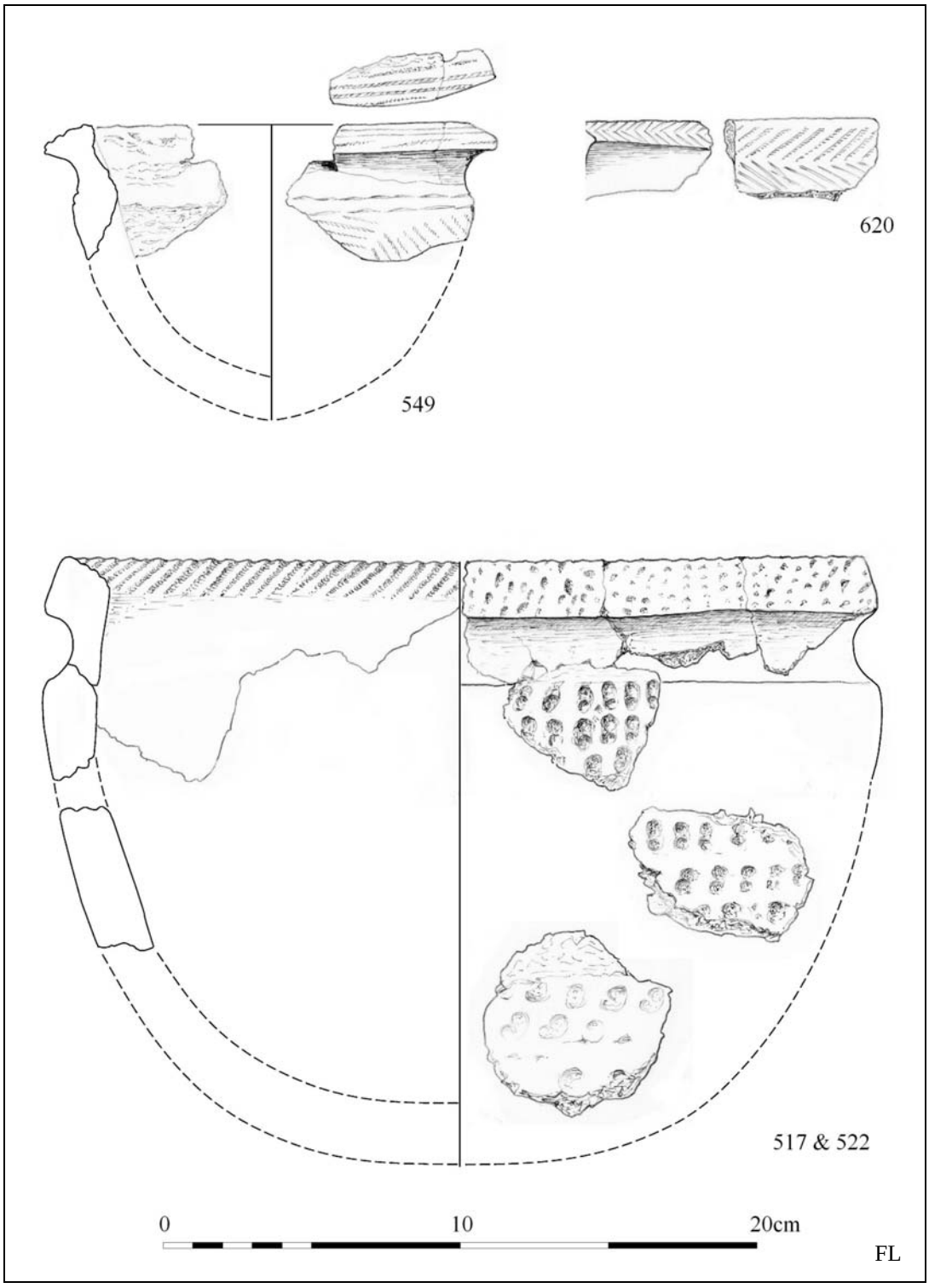

Fig. 14. Peterborough Ware from Borras

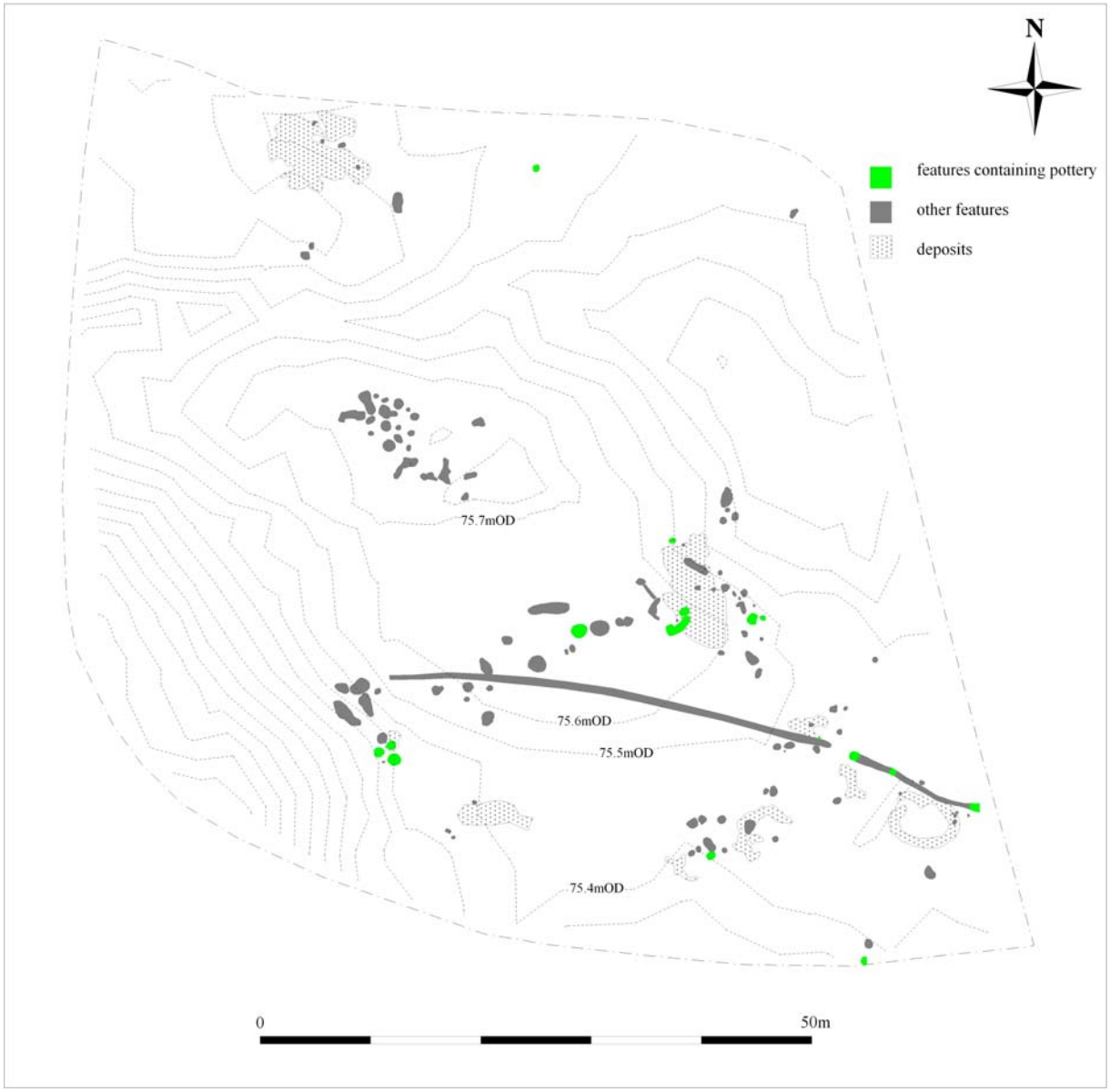

Fig. 15. Distribution of pottery across the site

5 LITHICS AND STONE ARTEFACTS

5.1 The excavations produced a small collection of worked lithics, which included only three flint objects, a thumbnail scraper (Find no. 501), a possible core (Find no. 618), and a possible scraper (Find no. 648). Several pieces of banded chert were recovered, including a possible scraper (Find no. 505), and what may be part of a Mesolithic blade (Find no. 506). There are also a number of pieces of a chert-like material, several of which appear to have been struck from a core, but show no obvious sign of secondary working. The small collection will need to be examined by a specialist in order provide definitive identifications.

5.2 The only potentially worked stone is a possible saddle quern (Find no. 635) from pit 318. The block of coarse-grained sandstone measures 330 by 200 by 110mm maximum, with one noticeably concave surface which has the appearance of having been worn by rubbing with another stone.

6 PALAEOENVIRONMENTAL ASSESSMENT by Dr Fiona Grant

6.1 Seven bulk samples (Nos 511, 518, 567, 569, 621, 653 and 654) were submitted for palaeoenvironmental assessment, which initially comprised a rapid visual scan in order to isolate three samples for further assessment, based upon the quantity of visible organic material (macrofossils) present.

Materials and Methods

6.2 A one litre sub-sample of each of the three bulk samples was removed for assessment. The sub-samples were then disaggregated by hand, and any visible organic and/or artefactual elements isolated. Characterisation of the samples in order to describe their lithologies and determine their potential for macrofossil and pollen analysis was carried out using standard physical characterisation tests (MOLAS 1994): Munsell soil colour characterisation; texture; and composition.

6.3 In accordance with the Association of Environmental Archaeology guidelines (1995) the one litre sub-sample was subjected to flotation and wet-sieved through a nest of sieves in the mesh size range 5mm to 0.5mm for the isolation of the various organic and inorganic components. The residues and flots were dried before being hand-sorted by eye and using a binocular microscope.

Results

6.4 Of the seven bulk samples which were submitted, three were prioritised for further assessment (nos 569, 653 and 654), together with sample 568, which consisted of the fragments of charcoal extracted on site from the same context as sample 569. The detail of the samples assessed is shown below.

Sample 569 (and 568)

Sample No.	569 (& 568)
Context	Fill (149) of Neolithic pit 117
Quantity & Packing	4 x 10 litre buckets (sub-sample extracted from bucket 4/4) 1 foil-wrapped and bagged sample of wood charcoal fragments
Colour	5YR 2.5/2 dark reddish brown
Texture & Composition (inorganic component)	Sandy loam: Occasional large rounded and sub-rounded stones up to 0.2m diameter, *c.*40% generally rounded but

	occasional angular (?heat fractured) pebbles >20mm diameter, *c.*2% rounded gravel<20mm
Hand-sorted large inclusions	Wood charcoal fragments
Wet sieving & flotation	Wood charcoal fragments
Palynological Potential	Low

Organic Component	Wood charcoal
Weight	10g
Suitability for C^{14} dating	Y
Suitability for species identification	Y
Comment	Largest fragment: 20mm

6.4 The sample originated from a lower, but not primary fill of pit 117, interpreted by the excavators as a possible rubbish pit, which contained sherds of Neolithic pottery in the upper fills. Assessment of the sub-sample revealed a relatively large quantity (*c.*10g) of wood charcoal, in addition to the fragments extracted by the excavators on site. Although the majority of the charcoal fragments were relatively small, certain single fragments would be of sufficient size to allow species identification, and there is more than a sufficient quantity (50mg) to obtain an Accelerator Mass Spectometry (AMS) radiocarbon date should this be required. Further extraction of charcoal from the bulk sample could provide more fragments suitable for species identification.

Sample 653

Context	Fill (14) of Neolithic cooking pit 13
Quantity & Packing	2 x 10 litre buckets + 1 bag (sub-sample extracted from 3/3)
Colour	7.5YR 2.5/0 black
Texture & Composition (inorganic component)	Sand: *c.*50% rounded pebbles >20mm diameter, <1% gravel <20mm diameter
Hand-sorted large inclusions	Wood charcoal fragments
Wet sieving & flotation	Wood charcoal fragments
Palynological Potential	Low

Organic Component	Wood charcoal
Weight	12g
Suitability for C^{14} dating	Y
Suitability for species identification	Y
Comment	Largest fragment: 10mm diameter

6.5 The sample originated from the upper fill of cooking pit 13. Assessment of the sub-sample revealed a relatively large quantity (*c.*12g) of wood charcoal fragments, of which several individual fragments would be of sufficient size (50mg) to obtain an AMS radiocarbon date should this be required. In addition, further extraction of charcoal from the bulk sample should provide more fragments suitable for species identification.

Sample 654

Context	Fill (16) of Neolithic cooking pit 13
Quantity & Packing	3 x 10 litre buckets (sub-sample extracted from bucket 1/3)
Colour	7.5YR 2.5/0 black
Texture & Composition (inorganic component)	Sandy loam: *c.*30% rounded pebbles >20mm diameter, *c.*2% rounded gravel<20mm
Hand-sorted large inclusions	Wood charcoal fragments
Wet sieving & flotation	Wood charcoal fragments, burnt bone fragment
Palynological Potential	Low

Organic Component	Wood charcoal
Weight	43g
Suitability for C^{14} dating	Y
Suitability for species identification	Y
Comment	Largest fragment: 20mm x 30mm

Organic Component	Burnt bone
Weight	<1g
Suitability for C^{14} dating	Y
Suitability for species identification	?Y (?bird)
Comment	6mm (length) x 5mm (diameter) tubular fragment

6.6 The sample consisted of the lower fill of cooking pit 13. Assessment of the sub-sample revealed a very large (*c.* 43g) quantity of wood charcoal and a single fragment of burnt bone (tentatively identified as bird). Of the wood charcoal, several individual fragments would be of sufficient quantity (50mg) to obtain an AMS radiocarbon date should this be required. Further extraction of charcoal from the bulk sample could provide additional fragments suitable for species identification. Unfortunately, as *c.*4g of burnt bone is required for an AMS date there is presently insufficient material available, although wet sieving and flotation of the remainder of the sample may reveal further fragments of bone. Specialist advice should then be sought in order to attempt to identify the species present.

Conclusions and recommendations

6.7 Sample numbers 653 and 654, from cooking pit 13, proved to be the most suitable for palaeoenvironmental examination, based primarily upon the quantity and size of wood charcoal fragments they contained. The only other macrofossil identified in the samples was that of a small fragment of burnt bone. No seeds or other plant parts were identified, and the microfossil potential was considered low. The assessment therefore suggests that the most profitable features in terms of palaeoenvironmental information are those identified as cooking pits, which contain obvious quantities of charcoal. Those features with no apparent burning or with little charcoal content should be considered of low potential.

6.8 It is recommended that the remainder of Sample 654 be wet sieved and floated in order to extract any further potential burnt bone, as well as additional charcoal fragments. Examination of the wood charcoal should be carried out in order to identify the species of wood utilised. The bone should also be examined by a specialist in order to allow refinement of the species identification. This would allow conclusions to be proposed regarding the function of the pits, the resource exploitation of the settlement, and further illuminate the landscape and environmental setting of the site as a whole. The analysis of any further samples from similar

features interpreted as cooking pits would allow a useful dataset to be collected and comparative analysis to highlight continuity/change in practice and resource, to be carried out.

6.9 Although none of the samples provided material suitable for palynological or other microfossil analysis, it is likely that suitable deposits may be located off-site in the narrow valley immediately to the west of the excavation, or at the meres further to the east and west. It is recommended that an assessment of such deposits should be carried out in order to identify any such potential sources of important environmental information regarding the vegetational development and environmental context of the site. Such an assessment would involve the identification of a suitable deposit through field assessment, followed by the extraction of a core. Palaeoenvironmental analysis of the core would include investigation of the peat stratigraphy, degree of decomposition, and the identification of any pollen. A spot radiocarbon date from the base of the core would allow the date of initiation of the peat to be determined. This would therefore allow an assessment of the potential of the core to yield information covering the period of Neolithic activity at Borras. Any further potential work would be based upon the results of this assessment.

7 CHARCOAL IDENTIFICATION AND RADIOCARBON DATING

7.1 Charcoal samples from three contexts were examined by Dr Charlotte O'Brien, Archaeological Services, Durham University, prior to submission for radiocarbon dating.

7.2 The transverse, radial and tangential sections were examined at up to x600 magnification using a Leica DMLM microscope. A single entity of hazel charcoal was selected from each of contexts (511) and (569). In the absence of charcoal from a short-lived tree species, a fragment of oak was picked from context (654). Details of the selected radiocarbon material are presented in Table 1.

Table 1: Charcoal identifications

Context	Species of single entity	Weight of single entity (mg)	Notes
511	Hazel	68	Fragment too small to identify maturity
569	Hazel	272	Roundwood fragment of 5 year old twig. Bark absent. Pith to outer ring 5mm.
654	Oak	230	All charcoal in this context is oak heartwood. Tyloses present.

7.3 All three samples have been submitted to Beta Analytical for radiocarbon dating, the results of which are expected in April 2009.

8 CONCLUSIONS

8.1 The discovery of a number of prehistoric features during soil stripping operations associated with the first phase of the expansion of Borras Quarry into the Holt Estate led to the detailed archaeological excavation of a large area, revealing further significant discoveries. The excavations identified a significant number of features, many of which were associated with pottery, suggesting some form of settlement dating to the mid or late Neolithic.

8.2 The exact nature of the settlement remains uncertain, and unfortunately no definite buildings were recognised, although other evidence strongly suggests their presence. Evidence from excavations across Britain has revealed that houses of the mid and late Neolithic were generally circular, whereas early Neolithic structures tended to be rectangular. Any structures are likely to have been slightly built, constructed of wooden stakes and timber, traces of which would be extremely difficult to identify in the loose glacial gravels which predominate at Borras. Smaller working shelters, windbreaks and enclosures would be even more difficult to detect.

8.3 The characteristic feature of the site is the number of cooking pits, which were readily apparent, having been infilled with quantities of charcoal and fire-cracked stones. Although it has been assumed that these features were used for cooking, analysis of samples from one cooking pit isolated only a small fragment of burnt bird bone, and no other evidence of food remains. One possible explanation might be that the level at which the food would have been placed, and any resultant debris deposited, was above the fire-heated stones, an archaeological horizon that has been lost through centuries of ploughing. This would have been the heart of the fire and the food may have been either wrapped in an appropriate cover or placed in a ceramic pot, before the whole feature was sealed, or clamped, with sand, gravel and turf. This form of cooking process creates a slow-burning effect which provides the constant heat best suited for this type of food preparation. The stones used in the cooking pits do not appear to have been specially selected for their 'pot boiling' qualities, hence the fractured and angular shaped stones to be found overlying the dense layers of charcoal. They appear to have been randomly gathered from the surrounding area, and this may explain the existence nearby of a number of sub-oval pits which acted as small quarries.

8.4 Clamped fires on this scale would almost certainly have created intense heat and smoke, a possible implication being that the cooking pits were external features. There are no obvious associated structures apart from a series of shallow post-holes and post-pads. Some of these features pre-date and others post-date the fire-pits, demonstrated by the survival of post-pipes within at least one fire-pit. In addition, the total absence of artefactual evidence from within and around the main cooking pit group also signifies the unlikelihood of an associated dwelling.

8.5 The discoveries have made an important contribution to our knowledge of human activity in north-east Wales during the Neolithic period. A number of Neolithic artefacts have been found by chance in the Wrexham area, including seven polished stone axes within 10km of Borras, but most of the evidence for Neolithic activity comes from scatters of worked flint, often found after ploughing. However, the excavations at Borras have provided the first evidence for an actual Neolithic settlement in this area.

8.6 The recent excavations have clearly demonstrated that there is a realistic potential for buried archaeological features within the area of the Holt Estate, and there is every possibility that further discoveries will be forthcoming as soil stripping proceeds in the remaining areas. The position of the recent discoveries, close to a number of kettle holes, could suggest that similar locations elsewhere within the area may contain further evidence of prehistoric occupation. In

addition, the kettle holes themselves may contain significant buried deposits, preserving evidence relating to the faunal and flora record extending from the end of the last ice age into the prehistoric period.

8.7 The excavations have produced a wealth of information and further, more detailed research will be required to realise the potential of the site archive. Appendix 1 contains a post-excavation research design which outlines the work and specialist services which will be required to complete the post-excavation analysis and prepare a report for publication.

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APPENDIX 1

POST-EXCAVATION RESEARCH DESIGN

Summary of proposals

The preliminary assessment of the site archive has now been completed according to the *Management of Archaeological Projects* (English Heritage, 1991), and an interim report has been produced summarising the results from the excavation (see main report).

Assessment of archaeological potential

The results from the preliminary assessment have demonstrated that the site archive has considerable potential for revealing significant information which could aid the interpretation of the site and further advance the understanding of occupation in the region during the prehistoric, medieval and post-medieval periods. The research potential is summarised below:

Site archive

The drawn and written record contains the primary data relating to the site and further analysis will be required to integrate these data with information from the artefactual record in order to produce a phased model of the archive. The general lack of stratagraphic sequences means that the dating and relationship of features will depend to a large extent on radiocarbon dating and artefactual evidence, and the integration of this information with the drawn and written record is crucial to the understanding of the site as a whole.

Artefactual record

The excavations produced a significant assemblage of Neolithic pottery, much of which is very diagnostic, and a specialist report will be required, possibly including detailed analysis of the fabrics through thin sectioning. There is also the potential for cooking residues adhering to the inner surfaces of some of the sherds and lipid analysis will be considered in the hope of identifying specific food groups.

Radiocarbon dating

Bulk soil samples were taken from all of the excavated features, many of which contain charcoal. Radiocarbon dating is proposed for a number of samples from key contexts, which has the potential for complementing the artefactual evidence and assisting with phasing the site. The charcoal will be identified by a specialist before submission for dating.

Palaeoenvironmental record

The bulk samples are likely to preserve palaeoenvironmental evidence in the form of carbonised plant macro remains. Specialist analysis has the potential for providing information on the fauna and flora of the site and its environs which will be of regional importance.

Conservation

The Neolithic pottery will require conservation to stabilise the fabric and ensure its future survival.

Proposed work programme

The anticipated work programme includes the following elements:

1 *Administration*

Project management, the production of a summary report for *Archaeology in Wales 2008*, and the updating of the CPAT website.

2 *Site Archive*
More detailed studies of the drawn and written records, integrating dating and artefactual evidence, to produce a phased interpretation of the archaeology.

3 *Artefact analysis*
The Neolithic pottery will be studied by Frances Lynch-Llewellyn who will also arrange for the analysis of lipids. Thin sectioning of a selection of fabrics will be undertaken by Dr David Jenkins and John Llewelyn. Residue analysis mat also be considered appropriate

4 *Radiocarbon dating*
The submission of up to 0000 samples for radiocarbon dating at Beta Analytic Ltd. The charcoal will identified by Dr Charlotte O'Brien, prior to submission for dating. Further radiocarbon dates may be required as part of the post-excavation programme, depending on the results of various specialist analyses.

5 *Palaeoenvironmental analysis*
Bulk soil samples were taken from all of the excavated features which may provide palaeoenvironmental data relating to the site and its environs. A preliminary assessment of the samples has been undertaken by Dr Fiona Grant, which included recommendations for further analysis (see main report).

6 *Conservation*
The more diagnostic sherds of Neolithic pottery will need to be conserved to ensure its future survival and allow for display in an appropriate museum. Conservation will be undertaken by Phil Parkes, Department of History and Archaeology, University of Wales College Cardiff.

7 *Publication*
Production of final excavation report, written by the excavator, Ian Grant, together with Nigel Jones, CPAT, for publication in an appropriate regional or national journal following the completion of on-site operations. The final publication may be deferred until all soil stripping operations have been completed within the Holt Estate in order to include any future discoveries which may come to light.

8 *Archive*
Deposition of site archive with the regional HER maintained by CPAT in Welshpool, and finds with Wrexham Museum.

Proposed timing

The post-excavation analysis is scheduled to be completed by the end of March 2010, subject to negotiations with Tarmac. The expansion of the quarry is still on-going and the remaining areas will be subject to an archaeological watching brief during soil stripping. It is anticipated that further archaeological discoveries may well be forthcoming and the decision has therefore been taken to postpone the full publication of the recent excavation until all on-site work has been completed.

End products

1 Publication in an appropriate regional or national journal.

2 Summary report for *Archaeology in Wales 2008*

3 Summary report on CPAT website

4 Site archive deposited with HER

5 Artefacts deposited with Wrexham Museum

6 Final report for 0000000