

**Rothley Lodge Farm, Leicester Road,
Rothley, Leicestershire (SK 592 140).
Assessment Report and Updated Project design.**

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Assessment report and Updated project design

1 Summary

This document provides an assessment of the potential for further analysis and updated project design for the results of fieldwork at Rothley Lodge Farm, Leicester Road, Rothley, Leicestershire undertaken in 2004 and 2005. The deposits and material of Neolithic date (c 3000-2000BC) contain unique elements of national importance which will require proportionately more analyses than less rare archaeological sites. In particular it has unique juxta-positions of artefacts within stratified assemblages and the possible evidence for a sunken featured building.

2 Interim report

A desk-based assessment for the application area had been produced by Countyside Planning and Management (1997). This highlighted the potential for prehistoric remains in view of a scatter of worked flint material within the area (SMR 51 SE AK). A geophysical survey (Butler 1998) identified anomalies with possible archaeological origins including field boundaries and medieval strip field systems. Fieldwalking by ULAS identified further scatters of worked flint material and medieval/post-medieval pottery, which may have derived from manuring scatters (Browning and Butler 1998).

A field evaluation was carried out by ULAS in autumn 2004 at the site of Rothley Lodge Farm, located 300m east of Mountsorrel, just to the east of the A6 between Loughborough and Leicester (Hunt 2004). This work was in advance of the development of new industrial units on the site, which prior to development comprised four agricultural fields. Twenty-six trenches were excavated and archaeology, initially dated to the late Neolithic and early Bronze Age, was discovered in several of the trenches (Hunt 2004).

This work led to a full archaeological excavation in winter 2005, with three large disparate areas stripped at the base of a steep incline. This stripping exposed many pits and post-holes of varying sizes, many containing small amounts of archaeological material and some containing very large amounts of finds, including flint tools, pottery and a unique carved stone.

The geology of the area varied from sand and gravel to Mercia Mudstone group clay and boulder clay. The three excavated areas were located along a similar contour, close to the base of a steep hill. Areas 01 and 02 were on Mercia mudstone and boulder clay whilst Area 03 was located on sand and gravel close to the western bank of the River Soar. Despite many years of heavy ploughing the archaeology was very well preserved, having been buried under a considerable depth of colluvium, which had also preserved the original land surface in some areas.

Although pits containing a small amount of flint and sherds of Grooved Ware pottery were discovered in Area 03, it was Area 01 that yielded the largest concentration of archaeological features and a wealth of Neolithic artefacts. A small circular pit was found to contain Grooved Ware from a single vessel, animal bone, calcined flint tools, a large stone rubber and two ceramic balls, one of which was complete and was the size of a golf ball. The lithics included a flint axe that had been heated to the point of exploding. A larger pit, which appeared to have been recut and refilled several times, contained pottery and flint, including a broken axehead.

Most significant of all the features was a large amorphous, flat-based pit, c.5m diameter that had the suggestion of a sunken-featured building. The fill of this pit produced several thousand finds including decorated pottery sherds, a large lithic assemblage and a remarkable engraved stone plaque displaying figurative art (Cooper and Hunt 2005).

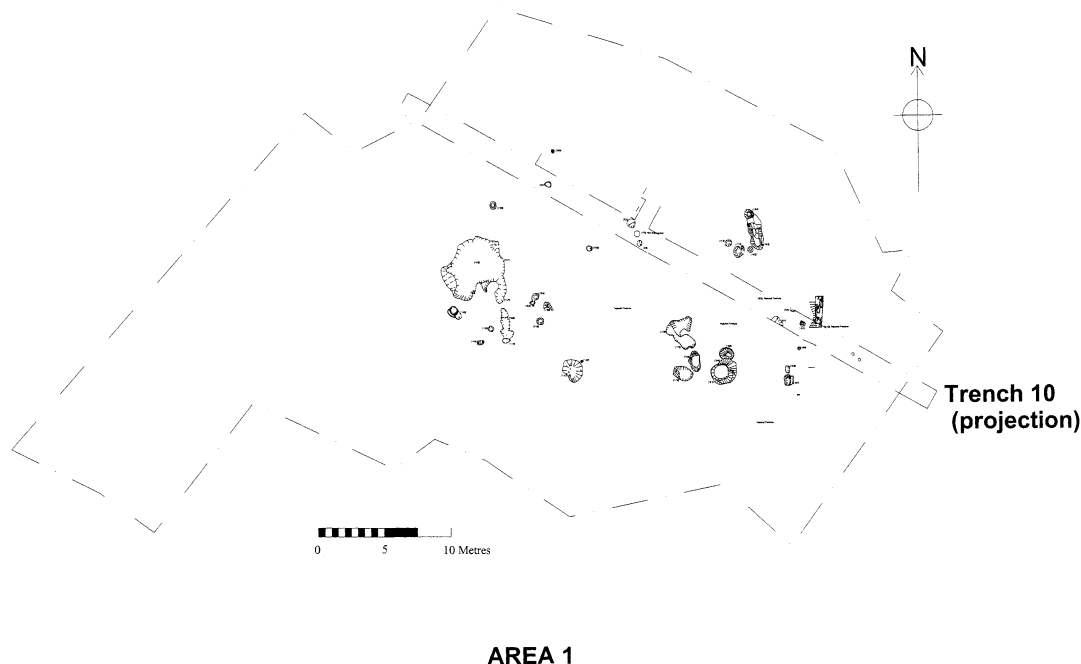


Figure 1 Plan of Area 1

The lithic finds comprise 2978 flint pieces, including 25 flint scrapers, a number of arrowheads and two Group XX (Charnwood) axes, which had been deliberately destroyed. The ceramic finds appear to consist mainly of Grooved Ware of Woodlands style, many of which had been highly decorated.

The stone plaque, most likely part of a larger piece, was roughly triangular in shape and measured *c.* 200mm x 135 mm. It was made of local finely grained sandstone, probably derived from a skerry bed in the Mercia Mudstone deposits. As a complete artefact it would have been symmetrical, and its decoration can be interpreted as containing a stylised face with a rectangular frame. The ‘face’ appears to have been built up from lines of varying thickness and eyes, nose and a mouth can be interpreted. The decoration has affinities with Woodland Style Grooved Ware pottery which was also present in the assemblage.

Parallels for Grooved Ware sites such as this can be drawn from sites such as Aleck Low in Derbyshire (Garton 1991) and Eye Kettleby (Finn 1998) and Braunstone in Leicestershire (Albone 2000), which also appear to contain sunken-featured buildings. Artefacts such as the stone rubber, the ceramic ball and the plaque appear to be unique in this context. Engraved plaques do appear associated with Grooved Ware, for example in Amesbury in Wiltshire, but not with figurative art. The most convincing parallels with the Rothley plaque are the stylised faces carved upon the chalk drums found in 1889 in a barrow on Folkton Wold, East Yorkshire. The finds and archive will be deposited with Leicestershire County Council Heritage Services Accession No. X.A240.2004.

3 Project Aims and Objectives

3.1 An assessment of the site’s importance can be considered against the scheduling criteria for historic monuments.

- 1). *Period:* The site is of Late Neolithic - Early Bronze Age date.

2). *Rarity*: Settlements of this date and with this range of artefact type are very uncommon and are of national importance. Special deposits are of national importance.

3). *Documentation*: There is HER and information for Neolithic-Bronze Age artefact scatters and cropmarks in the area.

4). *Group value*: There is high group value in view of the proximity of the sites mentioned above.

5). *Survival*: The survival of the archaeological deposits within the site was moderate – good, as although some deposits have been eroded by previous ploughing, others were sealed beneath colluvium. The survival of late Neolithic deposits, especially those relating to settlement, is very rare nationally. The potential for biological information is good with charred plant remains surviving.

6) *Fragility/Vulnerability*: The fragility/vulnerability of the archaeological remains was high in all areas where the topsoil was to be removed as some of the archaeological deposits were present just below the topsoil. Plant tracking, levelling and excavation for services and road foundations would all have a destructive impact on the archaeological remains.

7). *Diversity*: The diversity of period appears to be low being Late Neolithic - Early Bronze Age settlement and its immediate environs. However this may cover activity covering c. 1000 years between c 2800 to c 1800 BC. The diversity of function is high as it includes settlement and ritual deposition evidence. The presence of charred remains in the deposits is likely to provide important land use and environmental information.

8) *Potential*: The site has the potential to contribute to archaeological knowledge at a national and regional level as detailed below.

3.2 The site at Rothley has the potential to address the following research questions identified in national and regional research themes (English Heritage 1998; Clay 2006).

1. The transition to farming during the Neolithic period

Settlement evidence during the Neolithic-Early Bronze Age is very rare nationally. The site has the potential to provide significant information on the environment and economy of such settlements and assess the role of agriculture in the 3rd and early 2nd millennium BC.

2. The character and development of agricultural practices

The site may have the potential to contribute to examining clearance sequences, alluviation/colluviation and the introduction of field systems. The English Heritage Research Agenda includes 'Change and diversification in farming communities 3000-2000BC' as a Process of Change priority (English Heritage 1998 PC2) to which this project may contribute.

3. The study of how different landscape zones were exploited from the 3rd-2nd millennium BC.

The site has the potential to contribute to the examination of how the landscape was adapted for on-site and off-site activities including settlement, arable and pastoral farming, transhumance, hunter gathering and ritual. Refitting of the lithic and ceramic material has the potential to interpret whether the site was occupied for short or long term duration.

4. The nature of Neolithic and Bronze Age societies

The site has the potential to contribute to interpret how the different communities were organized. This will allow an assessment of differences in local and regional character when compared with better known areas like Wessex.

5. Access to resources and trade connections

The site has the potential to contribute to examining trade patterns within the period from the presence of different artefacts with different origins.

6. Deposition patterns on prehistoric sites.

The assemblage presents a rare opportunity to investigate Late Neolithic material culture and its role in depositional practices. Most of the material was associated with highly decorated Grooved Ware pottery and some other curious items of material culture, some of which are unique in the British Neolithic. At the coarse level of observation there were clear episodes of structured deposition, and variations between practices in different features. Some key issues that will be investigated include: Is the assemblage occupation generated or otherwise? Is it living debris that was presented with some formal closure i.e. being deposited in specific ways? Is there knapping as a special activity? Is it curated material that has been brought to the site for deposition? Perhaps there are some elements of each of these behaviours. Integrated typo-technological analysis, spatial analysis, use wear study and re-fitting will investigate these issues.

The closed assemblage also offers a chance to characterise Late Neolithic lithics in the East Midlands. What are the similarities or differences to assemblages where such characterisation has occurred (e.g. Orkneys, Yorkshire, Wessex)? The refitting work will also present opportunities to investigate the temporality of a pit group such has been undertaken in eastern England (M.Knight pers comm.).

7. The study of prehistoric buildings.

The site shows possible evidence of a sunken featured building. This is extremely rare for this period and if confirmed during the analysis stage is potentially of national importance.

4 *Assessment for further analysis: Stratigraphic and Structural data*

Contexts: 224 (about half of these are described- including about 80% of the main area)

Drawings

81 (all labelled, partially archived) All the site has been planned in Turbocad, one or two sections are done.

List Created

Checked and cross referenced

Sorted with their context sheets

All digitised and basically put into post-ex plans etc. (Turbocad)

Photos

500 all listed, labelled and marked (in boxes)

Findings-autocad

All finds are all placed in correct locations

Plans are oriented onto grid & scaled etc.
1 or 2 to be completed (peripheral features)

Tasks (Project aims 1-4; 7)

- | | |
|----------------------------------|---------------------|
| S1 Complete feature descriptions | 10 days (Leon Hunt) |
| S2 Complete plans and sections | 10 days (Leon Hunt) |

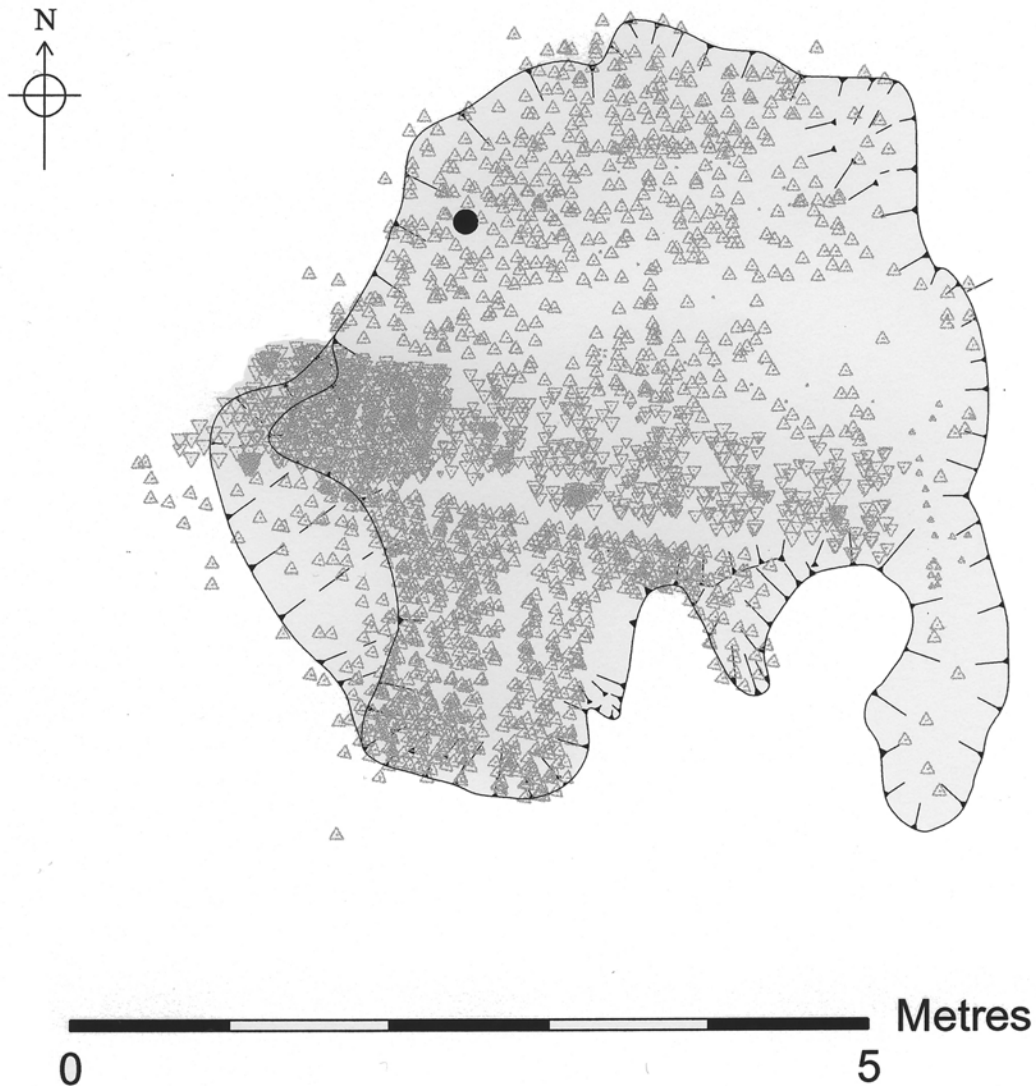


Figure 2 Plan of feature [148] showing finds locations

5 Assessment of the potential for Scientific dating

5.1 A successful dating programme will contribute towards a better understanding of the sites origins and development. This could potentially include a more detailed understanding of the deposition patterns within the Neolithic features in particular [148]. A series of six accelerator dates are proposed targeting organic material and if there are suitable residues from the pottery. If charred residues are found on internal surfaces of pottery it is possible to date the material by AMS method of radiocarbon analysis. A small patch c.5mm across can

be sufficient to date the period of use of the pottery. Results have been obtained from Neolithic pottery from Willington Derbyshire recently for comparison.

Tasks (Project aims 1- 7)

- SD 1 Select deposits for analysis (A Monckton) 1 day
- SD 2 C14 dating. (Radiocarbon Laboratory, University of Waikato, New Zealand)
Up to 10 dates

6 Assessment of the potential for finds analysis

6.1 The assemblage presents a rare opportunity to investigate Late Neolithic material culture and its role in depositional practices. Most of the material was associated with highly decorated Grooved Ware pottery and some other curious items of material culture, some of which are unique in the British Neolithic. At the coarse level of observation there were clear episodes of structured deposition, and variations between practices in different features. Some key issues that will be investigated. Is the assemblage occupation generated or otherwise? Is it living debris that was presented with some formal closure i.e. being deposited in specific ways? Is there knapping as a special activity? Is it curated material that has been brought to the site for deposition? Perhaps there are some elements of each of these behaviours. Integrated typo-technological analysis, spatial analysis, use wear study and re-fitting will investigate these issues.

6.2 A total of 3450 artefacts are recorded and 3D located. All of finds in [148] are 3D recorded on AutoCad. All finds have been washed & labelled. The value of the finds assemblages is in their inter-relationship within the features. In view of this the analysis will include their spatial relationships.

Tasks (Project aims 4- 7)

- F1 Complete AutoCad locations for remaining features (LH): 5 days
- F2 Analysis of spatial distribution of finds
(Matthew Beamish) 5 days



Figure 3 Feature [116] half section showing stone ‘rubber’ in situ.

6.1 Pottery

6.1.1 A total of 762 sherds of Neolithic pottery weighing 3853 gms was recovered from Area 1, 4 sherds weighing 15gms from Area 2 and 30 sherds weighing 684 gms from the evaluation stage. An estimated 33 vessels, with possibly 25-30 being illustrated, plus 2 clay balls). Sixty-two fragments of burnt clay weighing 484 gms were also recovered.

6.1.2 The ceramic finds appear to consist mainly of Grooved Ware of Woodlands style, many of which had been highly decorated. Parallels for Grooved Ware sites such as this can be drawn from sites such as Aleck Low in Derbyshire and Eye Kettleby and Braunstone in Leicestershire. Pottery analysis to be undertaken by Carol Allen

6.1.3 Tasks (Project aims 4-6)

C1	Layout ceramics and liaise for information	0.5 days
C2	Examine sherds for joins within and across contexts	0.5 days
C3	Examine sherds with microscope for fabric types, sort into fabric groups, select sherds for thin section analysis, 6 thin sections, liaise with petrologist, and send off samples	1.25 days
C4	Catalogue pottery, by context, number of sherds, weight, abrasion level, fabric type, form and decoration	2.25 days
C5	Select sherds for illustration, mark, rebag, send to illustrator with sketches for guidance, check drawings	0.5 days
C6	Catalogue and report on fired clay, 0.25, clay balls 0.25	0.5 days

C7	Report for publication, with comparative material and sites, incorporating thin section report and information on associated finds, providing indication of regional and national significance with bibliography	2.25 days
C8	Select material for Lipid analysis	0.5 days
C9	Repack and return material	0.25 days
Total		8.5 days
C10	6 thin sections and summary (Alan Vince)	1 day
C11	Illustrations (Dave Hopkins)	5 days

6.2 *Lithics*

6.2.1 The lithic finds totalled 2978 and included, 25 flint scrapers, a number of arrowheads and two Group XX (Charnwood) axes, which had been deliberately destroyed.

6.2.2 The most significant find from the excavation was a stone plaque, most likely part of a larger piece, roughly triangular in shape and measuring *c.*200 x 135 mm. It was made of local finely grained sandstone, probably derived from a skerry bed in the Mercia Mudstone deposits. As a complete artefact it would have been symmetrical, and its decoration can be interpreted as containing a stylised face with a rectangular frame. The ‘face’ appears to have been built up from lines of varying thickness and eyes, nose and a mouth can be interpreted. The decoration has affinities with Woodland Style Grooved Ware pottery which was also present in the assemblage. Engraved plaques do appear associated with Grooved Ware, for example in Amesbury in Wiltshire, but not with figurative art. The most convincing parallels with the Rothley plaque are the stylised faces carved upon the chalk drums found in 1889 in a barrow on Folkton Wold, East Yorkshire.

6.2.3 The closed assemblage also offer the opportunity to characterise Late Neolithic lithics in the East Midlands. What are the similarities or differences to assemblages where such characterisation has occurred (e.g. Orkneys, Yorkshire, Wessex)? The refitting work will also present opportunities to investigate the temporality of a pit group such has been undertaken by Mark Knight of the Cambridge Archaeological Unit.

6.2.4 *Methodology* The lithic assemblage will be identified measured and entered on to a database. The assemblage in [148] will be subject to metrical analysis. Where appropriate e.g the destroyed axes refitting will be attempted.

6.2.5 *Tasks (Project Aims 3-7)*

L1	Data entry average 75 items/ day	40 days
L2	Metrical analysis [148]	5 days
L3	Refitting	10 days
L4	Illustrations	10 days
L5	Report preparation	15 days



Fig 4 Stone plaque with stylised face from [148].

6.3 Lithic Microwear Analysis

Randolph E. Donahue and Adrian A. Evans

University of Bradford

6.3.1 Lithic microwear analysis is the microscopic examination of surface wear and fracture scars that form along the edges of fine-grained siliceous stone artefacts such as those of flint and chert. Experimental studies demonstrate that microscopic wear and fracture scar characteristics resulting from tool use vary systematically according to the worked material (e.g., hide, wood, meat, bone) and according to the applied forces and motions such as cutting, scraping, and wedging. Understanding these principles and relationships permits microwear analysts to infer past uses of lithic artefacts with a greater degree of precision and accuracy than achieved through reliance on either macroscopic attribute analysis or ethnographic analogues of tool form. Following deposition, natural processes also produce systematic wear features that may make inferences about tool use more difficult, but can aid in understanding site formation processes (Donahue and Burroni 2004; Burroni et al. 2002).

6.3.3 Objectives

The lithic microwear analysis is expected to contribute towards five objectives of the overall research programme:

- To identify lithic artefact use at the site
- To measure the duration of use of the tools
- To examine the implications of activities at the site regarding the season of occupation
- To improve understanding of site formation processes including post-depositional disturbance and modification
- To identify the range and spatial location of the activities undertaken at the site (if we sample beyond the pit).

6.3.4 *Method*

A sample of 120 microcrystalline stone (primarily flint and chert) artefacts will be examined for microwear analysis. The artefacts will include 60 retouched tool forms of various types, “good” blades and flakes, and small debris flakes (as controls). The context or contexts from where the sample will be drawn will be determined following the pilot study, but it will be representative of the types of artefacts found at the site. It was determined that 120 artefacts are required for this study for producing results that will permit discussion of site seasonality.

If not previously done, the sampled artefacts will be gently washed in water with a soft nylon brush to remove adhering sediment. This will be followed by photographing the artefacts in preparation for cleaning. Cleaning will be carried out by soaking in water for 10 minutes followed by brushing with a soft bristled brush under running water. This step will be followed by mild caustic cleaning through soaking in 10% HCl and rinsing by soaking in water for a further 10 minutes. Ethanol will be used to degrease artefacts as necessary.

The artefacts will be viewed principally at 200x magnification with an Olympus KL-BH2-UMA metallurgical microscope with incident-light and long working-distance objectives. Microscopic characteristics of edge fracture scars, striations, pitting, and surface polishing will be recorded and interpreted (following Donahue, 2002; Burrioni et al. 2002).

In addition to traditional microwear variables that are recorded for assessing the causal mechanism for wear phenomena, measurements quantifying the post-depositional modifications will also be collected. These data provide the means to further evaluate use-wear interpretations and to understand better the variation of post-depositional processes within and between contexts (Donahue 2002; Donahue and Burrioni 2004; Burrioni et al. 2002). They also improve the comparability of use-wear results between sites. Major disturbance events and processes will produce various kinds and degrees of edge fracture scarring, striations and other surface modification. Severe thermal alterations will produce microcracking, potlidding, and crazing of surfaces (Donahue 1999). A principal concern is to identify and measure the effects of processes causing the gradual loss of material through abrasion or attrition. One technique for achieving this is by measuring the amount of dorsal ridge rounding. Most kinds of use-wear will be obliterated on most surfaces when natural wear has rounded ridges to a value of 14 µm.

6.3.5 *Report Structure*

The report will include a summary of the research undertaken within a length of approximately 4000-6000 words and include the following subheadings: Abstract, Introduction, Background, Method, Results, Discussion and Conclusion (i.e., as in the form of a monograph chapter). In addition there will be appendices containing detailed information of the results, figures showing the location of use-wear on the artefacts and photomicrographs of

the wear traces. Changes to this structure for purposes of publication are acceptable and may be requested by the client.

6.3.6 *Staffing*

The study will be undertaken under the management of Dr Randolph Donahue. Analyses will be performed by Dr Donahue and Mr Adrian Evans who will co-author the final report. Each task has been allotted an amount of time and a designated individual to carry out the work. The costing contains a task list that has differentiation rates of pay that reflect the expertise of the individuals involved.

6.3.7 *Storage*

While under study, the artefact sample will be stored in the Lithic Microwear Research Laboratory of the **Department of Archaeological Sciences** in accordance with the University of Bradford Health & Safety protocols and MGC 1993 guidelines.

6.3.8 *Timetable*

Yet to be determined, but the report should be submitted to the client within 6 months of the arrival of the artefacts to the laboratory.

6.3.9 *Tasks (Project Aims 3-7)*

- U 1 Preliminary assessment
- U 2 Sample selection
- U 3 Sample preparation; recording & cleaning 120 artefacts @ 0.2 hours per item
- U 4 Stage 1 Lithic microwear analysis 120 artefacts @ 0.5 hours per item
- U 5 Stage 2 Lithic microwear analysis 60 artefacts @ 1.0 hours per item (Includes residue analyses as appropriate)
- U 6 Report preparation, writing and editing 30 hours
- U 7 Project meetings

6.4 *Other Finds*

6.4.1 Two very small fragments of jet inlay were found in context (153), the lower deposit of [148].

6.4.3 *Tasks (Project Aims 4-7)*

- OF1 Analysis of other finds 1 days
- OF2 Illustrations of finds David Hopkins 0.5 days

7 *Assessment of the potential for Environmental sample analysis*

7.1 *Introduction*

7.1.1 During excavations carried out ULAS directed by Leon Hunt samples were taken for the recovery of charred plant remains which can give evidence of agriculture, diet and activities of people on the site in the past. The features sampled included a large Neolithic feature and pits, and other possible Bronze Age features. Evidence from early prehistoric charred plant remains is accumulating for the region but it is rarely found in quantity. The

chance to recover this evidence should be maximized because the beginnings of cereal cultivation occur in this period, and dating this major change is a regional and national priority. In addition one context contained a small quantity of burnt animal bone.

7.2 *Quantity of samples*

7.2.1 A total of 85 bulk samples were taken to recover charred plant remains and charcoal for identification and as material for radiocarbon analysis to date the site. The samples were taken in one to four parts of around 10 litres in each part. Multiple samples were taken from extensive layers in the main feature excavated, cut 148. One to three parts of each sample was processed.

7.2.2 Other samples included three bone samples (21, 34 and 107), five charcoal samples (22, 72, 73, 74, and 92), two pit fills (48 and 66) and a sample of possible vegetable matter (93). These unprocessed samples will be investigated by appropriate methods during post-excavation analysis.

7.2.3 Soil samples for phosphate analysis were taken to accompany the soil monoliths taken for soil micromorphology, for additional investigation of soil chemistry. Five soil monoliths for micromorphology with 14 phosphate samples were taken by Richard Macphail (see below), and a further 12 phosphate samples from the main feature, cut 148, are available for analysis if required.

7.3 *Methods*

7.3.1 Samples were processed by wet sieving in a York tank using a 0.5mm mesh with flotation into a 0.3mm mesh sieve. The residues were air dried and the fraction over 4mm sorted for all finds and the residue was then discarded. The fraction of the residue below 4mm was reserved for analysis required. The flotation fractions (flots) were carefully transferred to plastic boxes, air dried and submitted for examination. This work was carried out by Alex Beacock at ULAS.

7.3.2 The flots were inspected by eye and were packed in self-seal polythene bags. During analysis they will be sorted with a x10 to x30 stereo microscope, and any plant remains were removed to glass specimen tubes for identification by comparison with modern reference material. The residues below 4mm will also be examined to recover the plant remains which may not have floated. The plant remains will be counted and listed with the botanical names (Stace 1991).

7.4 *Results*

7.4.1 Most of the bulk samples contained charcoal fragments, and hazel nutshell was recovered from the residues of eleven of the samples (3, 4, 7, 8, 9, 12, 17, 27, 30, 53 and 54) being particularly abundant in sample 8 context (301). The flotation fractions (flots) contained abundant charcoal and nutshell was also found in the flot of sample 8. The samples therefore have the potential to contain evidence from charred plant remains and further sorting is required to recover any cereal remains and evidence of cultivated crops, and evidence of any other gathered foods.

7.4.2 Other sites in the region have produced Neolithic charred plant remains. Some isolated Late Neolithic pits contained food remains including abundant hazel nutshell with a fruitstone fragment such as at Syston (Jarvis 1998), and Castle Donington which included glume wheat and barley with numerous crab apples and some hazel nutshell (Monckton 2004). Others in the region contained small numbers of cereal grains with charcoal; single cereal grains were recovered with charcoal from isolated prehistoric pits at Catthorpe, and

Oak Lodge Farm at Husbands Bosworth, the cereals represented being emmer and barley respectively, both found together with burnt stones (Monckton 1999). At Dunton Bassett a few grains of wheat and barley were found with fire cracked pebbles as remains of a possible hearth in a pit (Monckton 2005). In addition occasional nutshell and sloe stone fragments have been recovered from Late Neolithic burnt mounds at Watermead, Birstall and Willington, Derbyshire, with the addition of occasional cereal grains at Willow Farm, Castle Donington which is of Bronze Age date (Monckton 2004). Plant remains tend to be at a low density in many prehistoric deposits, probably because they represent the food product to be consumed rather than waste for disposal. Although cereals remains may be in small numbers, they are recognised as a usual part of the Neolithic and Earlier Bronze Age economy, because they are found on many of the sites sampled (Moffett et al 1989). These remains are helping to build a picture of the early prehistoric economy and may help to interpret activities on this site as well as providing material for radiocarbon analysis.

7.4.3 Tasks (Project Aims 1-3)

Charred Plant Remains

Task E1 Sorting flots from 85 samples in 142 sample parts for charred plant remains; 9 days

Task E2 Processing remaining samples; 3 days

Task E3 Analysis of charred plant remains; 6 days

Task E4 Report with summary of the evidence; 3 days

Charcoal

Task E5 Identification of charcoal and report; 3 days (Graham Morgan)

Animal Bone

Task E6 Identification of animal bone and report. 2 days (Jennifer Browning)

8 *Assessment of potential for soil analysis*

Richard I Macphail, Institute of Archaeology, University College London,

8.1 *Introduction*

Late Neolithic and Early Bronze Age sites at Rothley, Leicestershire were visited (1-02-2005/8-02-2005) and discussed with Patrick Clay, Leon Hunt and Angela Monkton (University of Leicester Archaeological Service). A river side (River Soar)/base of slope Late Neolithic, and a lower slope Early Bronze Age site were examined and sampled. The chief questions to be addressed were:

- Is the stone-free soil at the base of the slope and into which Late Neolithic pits are cut, an early colluvium?
- What is the nature of EBA feature fill 148? Is it simply a pit, or scoop used for occupation/ritual activities; are the burned clay deposits *in situ* hearths or have they been placed/dumped? What other activities may be found in this fill?

It was suggested that these questions could be addressed through soil micromorphology and bulk sample studies (English Heritage, 2004).

8.2 Soils and samples

The soils and samples collected are listed in Table 1. The soils present are composed of a mixture of typical brown sand soils developed in glaciofluvial or river terrace drift (Newport soil series of Wick 1 soil association) on the upper slopes – which probably supplied contemporary sandy colluvium that seals much of the site and appears to be present at the Late Neolithic site – and stagnogleyic argillic brown earths formed in drift over Permo-Triassic mudstone – Mercian Mudstone (Dunnington heath soil association; Ragg. et al., 1983). Pleistocene drift deposition is probably responsible for some subsoil features such as sandy ‘channel’ fills and grey and red clayey patches.

A 200 mm long column sample (M1) and 4 associated bulk samples were collected from the Late Neolithic site in order to examine context 325, a soil containing Late Neolithic artefacts and pit. These samples (M1=3 thin sections) and 4 bulk samples will supply information so that the following can be addressed:

1. Is 325 an early colluvium (Macphail, 1992)?
2. Is there evidence of Late Neolithic (occupation, animal herding, cultivation, etc.) and later activities, and how can these be differentiated through soil micromorphology and chemistry including fractionated phosphate analyses (Courty et al., 1989; Macphail and Linderholm, 2004).

At the EBA site, the fill of 148 was sampled at 4 locations (6 thin sections – M2=3 thin sections; M3, M4 and M5; 10 bulk samples) in order to be able to answer the following questions:

1. What was the character of the original soil and how did humans impact upon it before the feature formed?
2. Does the fill vary spatially?; are there *in situ* hearths?; were deposits simply dumped or were they placed?; what is the evidence of ashes, bone and other anthropogenic deposit deposition?; are there other indicators of human activities that can be discerned (analogue studies of Neolithic Ecsegfalva, Hungary where burned deposits were studied; occupation at EBA/EIA Potterne, Wiltshire; herding at EBA Raunds, on the Nene, Northamptonshire; Courty *et al.*, 1994; Crowther, 2003; Macphail, 2000; Macphail, Forthcoming; Whittle, in preparation).

8.3 Methods to be employed

It is suggested that *full* bulk analyses should accompany soil micromorphology, with spatial analysis of some 12 bulk samples for total P and magnetic susceptibility. (‘Full’ bulk analyses comprises LOI, the measurement of fractionated (inorganic and organic P) and magnetic susceptibility (including χ_{\max}), in order that phosphate from dung can be differentiated from phosphate from ash and bone, for example, and the magnetic signal of burning and parent material origin can be more clearly elucidated.)

8.4 Tasks (Project Aims 1-3)

SA1 Manufacture of a further 7 thin sections

SA2 Soil micromorphology of 9 thin sections (systematic description, counts, digital scans, photomicrographs, possible X-ray analyses as necessary)

SA3 Integrated reporting (including digital archive) of soil micromorphology and bulk studies 2.5 days

SA4 Full bulk analysis 9 samples

SA5 Restricted analyses (Total P and MS) a putative 12 samples SA6 Bulk analyses sub-total

9. *Assessment for Potential for Residue Analysis*

Ben Stern University of Bradford

9.1 *Lipids*

9.1.1 The assemblage of Grooved ware and Peterborough ware pottery have the potential to be examined for residue analysis. This involves examining the surfaces for *lipids* which can identify how the vessels were used prior to their deposition.

9.1.2 Lipids are a heterogeneous group of molecules which includes fats, oils and waxes. Lipids are soluble in common organic solvents and are more resistant to water leaching and degradation than proteins, DNA etc. We can identify materials such as resins to the level of Pinacea = pines and firs (also frankincense, myrrh, pistacia - but unlikely in N Europe!), bitumen, waxes (such as beeswax) and fats and oils (sometimes separating animal from plant) also processed materials such as pine pitches and birch bark tar. And of course mixtures of the above. We identify samples by comparing the abundance and distribution of individual components with our experience of authentic modern samples. One problem however is degradation, and although lipids are more resistant than other materials, the yields can be low and some samples can be so degraded that it is difficult to distinguish the exact source - e.g. plant oils are rich in oleic acid, but this degrades to give a fatty acid distribution similar to animal fats.

9.1.3 Characterisation of organic residues generally relies upon the principles of chemotaxonomy, where the presence of a specific compound or distribution of compounds in an unknown sample is matched with its presence in a contemporary natural substance. The use of such molecular markers (biomarkers) is not without its problems since many compounds are widely distributed in a range of natural substances, and the composition of an ancient residue may have changed significantly during burial.

9.2 *Techniques of analysis*

9.2.1 Gas chromatography (GC): A sensitive separation technique in which the components of a volatile sample are partitioned between two phases; a mobile gaseous phase, and a stationary liquid phase bonded onto the inside of a column. The 'chromatogram' shows a trace of the variation in component concentration against time and may be used to obtain qualitative and quantitative information.

9.2.2 Combined gas chromatography - mass spectrometry (GC-MS): Coupling a mass spectrometer to the effluent of a GC combines the powerful analytical capability of mass spectrometry with the high degree of separation possible with GC. At the simplest level, the mass spectrometer ionises molecules, then identifies the ions according to their mass-to-charge (m/z) ratio resulting in the generation of a mass spectrum (ion abundance against the m/z value). In many cases, mass spectra allow the individual compounds present to be detected with some certainty. GC/MS has been used widely in the identification of ancient lipid residues, resins, waxes and so on.

9.2.3 Pyrolysis-GC-MS (Py-GC-MS): Analytical pyrolysis is often combined with GC-MS. Pyrolysis is the preferred method for breaking up the insoluble or polymeric fraction of organic residues that are not themselves volatile enough for conventional analysis, thereby allowing separation and identification of the fragments. Pyrolysis-GC-MS has been applied

successfully to the study of fossil and recent higher plant resins and to the macromolecular debris remaining from the burning of food in pottery vessels.

9.2.4 GC-combustion-isotope ratio mass spectrometry (GC-C-IRMS): The recent introduction of gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS) allows the ratios of abundances of stable isotopes of elements such as carbon and nitrogen to be determined for individual compounds introduced via a gas chromatograph. Stable isotope ratios are of particular importance to studies of foodwebs due to the characteristic isotope signatures of plants utilising different photosynthetic pathways. These distinctive ratios are passed along the food chain to herbivores and carnivores. There is evidence that there may be differences in $\delta^{13}\text{C}$ values between ruminants and non-ruminants. The method requires very small samples and is being applied to trace organic residues in pottery vessels to establish their origin with a high degree of precision.

9.2.5 Tasks (Project Aims 1-3)

Lp 1 Lipid analysis and report for 10 samples

10. Interpretation and Report Preparation

The final stage of the analysis will involve incorporating the specialists data, researching parallels for the evidence from other Neolithic sites and writing the report. Following refereeing the comments of the referee will be incorporated in to the text. Copy editing and proof reading for publication make up the final stage.

Tasks (Project Aims 1-7)

R1	Incorporate specialist data	5 days
R2	Research parallels	5 days
R3	Prepare report	5 days
R4	Incorporate referees comments	5 days
R5	Edit report	5 days

11. Publication and Archive

It is envisaged that the final report will be published as an article in a leading national journal for example the *Proceedings of the Prehistoric Society*. The archive will be deposited with Leicestershire County Council Museums Service under Accession number X.A 240.2004.

Tasks (Project Aims 1-7)

P1 Publication 40 pages

A1 Deposition of archive (12 boxes)

12. Health and Safety

11.1. ULAS is covered by and adheres to the University of Leicester Statement of Safety Policy and uses the ULAS Health and Safety Manual (revised 2005) with appropriate risks assessments for all archaeological work. The relevant Health and Safety Executive guidelines will be adhered to as appropriate.

13. Insurance

12.1 All ULAS work is covered by the University of Leicester's Public Liability and Professional Indemnity Insurance. The Public Liability Insurance is with Gerling Insurance Services Policy No. 62/99094/D, Risk Reference LT 35101 while the Professional Indemnity Insurance is with Sun Alliance Insurance Policy No. 03A/5A 001 05978, Risk Reference LT 27229.

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Appendix 1

Feature descriptions

Feature [148] and related:

This feature is very amorphous in plan and has little in the way of definite shape. Parts of it are curved and ill-defined, however in its SW and NE corners it appears slightly rectangular. It is 1.6m wide in the SW corner and then broadens out into a larger main area measuring approximately 5m X 4m. This main area is shallow and flat-based, and fairly uniform with small patches that are marginally deeper. The edges of the feature vary in steepness from fairly smooth to around a 45 degree angle. The lower part of the western side is very shallow at the top of the feature and then becomes steeper, creating a mild two level effect. This is almost mirrored by the NE corner, which is also shallower at its upper edge.

It is difficult to understand why the feature has such an ambiguous shape, perhaps the feature was constantly being enlarged and broadened, although it is impossible to prove this from the evidence on the ground. If it does represent some kind of structure, the rectangular SW corner may be evidence on a narrow entrance of some kind.

The entire feature, along with some of its neighbours, is cut into a loamy deposit, particularly in its northern side, which lies on top of the Mercia mudstone group substratum. This may represent remnants of a buried soil. This may suggest that the feature had been cut into a natural depression.

It appears that the feature would have become waterlogged at some point, as there is evidence that the feature had silted up in some areas and had remained this for some time. Mid-brownish grey silt fills such as (185), (179) and (159) seem to represent this water logging, and fill the lowest parts of the feature. Fill (158) also appears to represent silting along the NW edge.

Above these silty areas were patches of clay and burnt clay concentrated in isolated areas throughout the feature. One burnt patch, which was only visible in plan lay in the southern edge of the feature, although this fill partially overlay silty area (185) along the silt's SE edge, it was mainly contained within the main lower dark grey, charcoal rich, clayey sand fill (153)/(177), which filled the whole of the lower horizon of [148]. Other patches of burnt clay, (176) and (160), both around 0.3m in diameter, were to be found close to the centre of the feature, but also close to the feature's eastern edge in the case of (160). A less substantial patch of unburnt clay (152) lay close to the NW edge. For the most part these patches of clay lay under the dark lower fill (177)/(153).

Few finds were recovered from these clay and burnt clay fills compared to the surrounding fills, although finds that were recovered from them were not damaged by heat themselves, which may be evidence that the clay areas were not burnt *in situ*.

Throughout the larger area of the feature lay a fairly compacted but weak dark grey clayey sand fill (153)/(177), with occasional sub-angular and sub-rounded stones, including fire cracked pebbles, which was between 0.07m and 0.16m deep. Charcoal flecks were also very common throughout the fill, which in some parts were very dense and concentrated. This may represent material that has accumulated during activities taking place within the feature itself rather than being an element of backfilled material. The fill rises to the top of the feature on its northern and western edges, but for the most part it clearly lies underneath (134)/(135) and except in the places where it overlies the silty areas, lies directly on top of the natural Mercia mudstone group clay substratum.

Fill (153)/(177) contains substantial quantities of flint including a petit derivative tranchet arrowhead and many scrapers and serrated blades. There was also substantially more pottery in this layer than (134)/(135), especially in the NE corner and a lot of this was located directly on the base of the feature. The broken polished stone axe head was also found close to the base in this context, as was the carved stone. The fill also contains traces of burnt bone and burnt bone.

Above (153)/(177) was a dark brownish grey clayey sand with grey mottles and high levels of biological action (134)/(135). The fill contained a few charcoal flecks and fire cracked pebbles with rare medium and large sub-rounded stones. The fill contained high densities of flint, including a number of retouched implements such as arrowheads, blades and scrapers. The fill also contained pottery and traces of burnt clay. The finds area broadly distributed and the pottery sherds are smaller than those in the lower fill (153)/(177), which may suggest that the fill is a backfill rather than a surface. This fill was around between 0.1m and 0.2m deep.

Apart from the high density of charcoal within (153)/(177) the two main fills (153)/(177) and (134)/(135) are very similar. The upper fill (134)/(135) is very heavily disturbed by roots and worms and this may account for the lower fill containing the larger heavier artefacts and coarse components, which may have been taken down to the lower horizon by this biological action.

[141], [137]

What is clearer is that the feature has been changed or adapted at some point by the insertion of another element to the feature along its eastern side. This feature represented by the cuts [141] and [137], appears to have been cut into [148] at a later date, as if a gully or trench had been added to the eastern side. This feature may continue away southwards from the feature as cuts [150] and [143].

Prior to excavation these features appeared as distinct features, but during the excavation of [148] and [141] it became clear that they were related in some way. These features were also cut into the buried soil along some of their length, and to some extent it was this that made them appear as distinct features prior to excavation.

Cut [141] is 0.7m wide and has been dug into the eastern side of [148]. Its sides are at a 45 degree angle and appear to have been cut through [148] after the fills had been deposited. [137] is very similar and was most likely dug at the same time and may represent the same episode that resulted in the main feature being expanded. This feature [137] does not cut into [148] but continues the line of [141] southwards for another 1.8m. There is then a small gap of 0.45m until the line of this gully is picked up by feature [150], another narrow, but much shallower gully like feature. This feature is not so well defined as [141] or [137], but this is most likely because it has been truncated, possibly due to a slight rise in the land surface at this point.

Aspects of features [141] and [137] were revealed by half sections that were not evident in plan. The north facing section of [148] and [141] showed the western cut of [141], cutting through fills (135), (159) and (160). The east facing section of [141] and [137] revealed differential filling of the features most likely representing distinct fills, which may point to the features being structural in nature, possibly palisade trenches. Fills (139) and (140) may represent the fill of a post-hole and evidence of a post pipe. Fills (147) and (104) seemed to be separated by a patch of natural, although this may simply be re-deposited material. Broadly speaking all the fills within [137] and [141] are similar and contain similar finds to those within the main feature [148] (do they?). Fills (104),(147),(138) and (139) are reddish brown clayey silt with small stones, (140), which may be post-pipe fill is slightly different and is a

dark pinkish grey mottled with charcoal. The cuts [141] and [137] may be separated by a patch of pinkish brown clayey silt mottled with grey silt and small pieces of charcoal.

These subtle differences in the fills of [141] and [137] may represent the features filling up in separate phases due to the trench containing a structure of some kind, such as a fence or palisade. Further evidence of this can be evidenced from fill (146), which is a soft dark orangey brown clayey silt somewhat different to the surrounding fills and caused some confusion during the excavation of [141] and [148] as it seemed to separate the features, but it was unclear what it represented. Although excavation did not fully clarify these deposits, it would appear that fill (146) is an infill into [141] from its western side, overlaying the primary fill (151), suggesting that the cut may have filled in from its eastern and western sides separately, thus strengthening the possibility that [141] and [137] contained some kind of structural element.

[150] [143]

Features [150] and [143] also appear to be related to [148] and may be the continuation of the structure represented by features [141] and [137]. [150] and [143] are both shallow and rather badly defined features containing dark brown and reddish brown clayey silt fills (110) and (112). Both features contained a small quantity of flint.

Feature [145]:

Lies approximately 2 metres to the SW of [148], and is shaped like the body of a guitar, oriented NW-SE with the broader end facing NW and is 1.1m long and between 0.4m and 0.82m wide. The NW end contains the main and deepest part of the feature, which is circular with steep sides and a bowl shaped base. The feature is around 0.2m deep at its deepest part (it was truncated slightly during machining). The fill (105) is a dark brown clayey silt with rare medium stones with flecks of charcoal evident throughout the feature, but mostly concentrated around the edges of the main circular part of the feature. Contains a number of flint flakes and a scraper.

Feature [136]:

Lies 4m south of [148] and less than 2m from the western side of [150]. This is a small (0.45m), sub-circular but poorly defined feature. It is very diffuse along its northern side, with smooth shallow sides and an almost flat base. Contains a reddish brown clayey silt fill (111) with very few small stones and small traces of charcoal. Contained a few pieces of flint.

Feature [144]:

Lies five metres to the south of [148] and just to the SW of [136]. Small roughly sub-oval in shape, measuring 0.5m by 0.3m with sharp sides and a flat and uneven base. It was 0.05m deep with a fill (113) of reddish brown silty sand with stones, a small quantity of charcoal flakes and some small flint flakes.

Feature [155]:

Lies three metres to the north of [148] and is cut into the loamy buried soil, as are the upper horizons of [148]. Sub-circular pit of around 0.5-0.6 in diameter. Smooth 45-degree sides with a curved base. The fill is very uniform and is a pale reddish brown silty sand mottled with patches of lighter brown sand and one or two charcoal flecks, with very few small stones and one fire cracked pebble. Three flint flakes in the upper part of the fill; otherwise barren.

Features [149],[164],[165], [166]:

Small group of features to the east of [148],[141] & [137]. [149] is the most coherent of the group. This is a circular post-hole 0.5m in diameter with curved sides and base, containing a very dark brown silty sand fill (109) with mottles of yellowish brown. The pit contained few small stones, but was packed with medium and large pebbles, some of which had been heavily scorched or burnt, mainly on the east side of the post-hole. The fill also contained charcoal, pottery and flint. The largest stones may be packing material for a post, and the scorching may suggest that the pole burnt down *in situ*. This is one of the best examples for evidence of a post-hole on the site, but [164],[165] and [166] do not appear to be post-holes, so it is difficult to relate these features to any kind of structure.

[164] and [165] may well be the same feature, or it maybe that [164] has been damaged by animal burrowing, and [165] represents this damage. The finds contained within [164] are concentrated in the lower part of the fill (163), and do not appear in the fill (107) of [165]. [164] is almost circular in plan except along its eastern edge, where it joins into the amorphous shape of [165]. Both features are shallow sided and [164] has a fairly flat base, whereas [165] is uneven. The fills of both features (107) and (163) consist of reddish brown silty sand with small sub-rounded stones and few flecks of charcoal.

[166] is also amorphous in shape and measures between 0.4m and 0.6m with irregular sides and base. The central part of the feature is around 0.15m deep and is small and slightly circular, which may suggest that this is the main part of the feature and the rest is disturbance. The fill (108) is a reddish brown silty sand with small and medium sub-rounded and sub-angular stones and a line of charcoal flecks within. Flint flakes were recovered from the feature, which were mainly concentrated in the upper parts of the fill.

Feature [157]:

An isolated and irregular sub-oval feature around 7 metres from [148]. It has shallow and smooth sides and a flat base and is around 0.2m deep. The fill (114) is a reddish brown silty sand/ sandy silt with around 10% stones of various grades and types, including medium sized fire cracked pebbles. There were some flecks of charcoal, mainly on the northern side of the pit. Prior to excavation the pit seemed quite large and possibly deep, but excavation revealed it as shallow rather spread out. Pottery and flint flakes were in evidence throughout the fill. A tiny circular feature [162] was revealed to the NE of [157] during the excavation with a similar fill (161) and two small flint flakes.

Feature [168]:

Very small circular feature in northern part of excavated area. Circular in plan and 0.25m in diameter, and 0.07m deep. With even sides and a rounded base. Fill (167) was a loose yellowish brown sand/silty sand with no stones. Two small pieces of flint.

Features [170], [172]:

Oddly shaped feature, most likely two adjoining pits, with [170] cutting into [172] along its northwestern edge. Varies a lot in shape and size, but broadly speaking both components are 1m wide and 2m long. The slope of the sides varies throughout the features, but they appear shallower in [170] and the features are flat bottomed, with [170] slightly deeper, at 0.3m, than [172] at 0.2m. Both features had similar fills (171) and (169), which were dark brown/grey brown silty sand with few small pebbles. Both the fills contained flints. Close to where [170] appears to cut into [172], there was a sub-oval darker patch of fill, which showed up very clearly before the features were excavated. This fill (122) was a dark grey/ black patch of silty, with a high charcoal content. This fill also contained flint, and possibly pottery (?).

Although larger than their companions, features [170] and [172] are similar to features [186] and [179], and may have been excavated around the same time.

Feature [186]:

is a slightly elongated, sub-oval pit, aligned north-south and cut into a natural glacial feature along its eastern edge. It measures 1.6m by 1m, with irregular gently sloping sides, slightly steeper on the eastern side, and an almost flat base. The fill (123) is a firm greyish brown sandy silt with small pebbles. The fill contained a few flint flakes.

Feature [179]:

Sub-oval feature, similar to [186] but aligned east-west. Irregular but gently sloping sides and uneven but flattish base. The feature is 1.6m long and 1.1m wide and has a slight step or ridge on its western side. The fill (124) is a firm greyish brown silt with occasional medium sized pebbles and a number of flint artefacts, which are mainly clustered in the centre of the feature in a small area with a high charcoal content: similar to [170] in this respect.

Feature [156]:

Circular feature around 0.45m in diameter, with fairly steep, sloping sides and a curved base. Eastern side is slightly steeper. Very similar to features such as [155] and [149], but is some distance away from them and contains many artefacts and a considerable amount of burnt bone. The fill (116) is a dark brown clayey sand with a large amount of charcoal and common pebbles. The pit contains a large amount of burnt flint, some of which is most likely the remains of a polished flint axe head that had been super heated until it shattered. A large pot was also within the pit, along with large amounts of small burnt bones, most likely goat. The pottery, was mostly concentrated in the southern side of the pit, as was the bone, whilst the burnt flint, for the most part was under the pottery towards the bottom of the pit.

The northern side of the pit contained a very well preserved pinky grey stone rubber, which appeared to have been placed in the side of the pit, outside of the pot. The bone remains were situated in and around and underneath the pottery, which may suggest that the bone was not necessarily in the pot body when it was deposited.

Under the pottery in the western side of the pit there was an unusual ball of orange clay, perfectly spherical and measuring 0.1m in diameter.

The fill was very dark from the large amount of charcoal flakes contained within it. Although it has all the characteristics of a cremation, the bone contained within [156] does not appear to be human. Also the pottery and bone are mixed together somewhat, which may suggest that the pot was not placed carefully within the pit.

Appendix 2***Rothley Ceramics. XA. 240 2004.******Pottery******Area 1***

Context	Weight (g)	Sherds	Notes
195	81	19	
196	17	6	
100	181	31	
127	511	91	
153	780	135	
101	2	1	
U/S	7	2	
152	18	2	
102	35	4	
103	43	12	
138	46	12	
134	688	235	
105	18	7	
135	531	56	
119	8	3	
139	32	2	
154	25	6	
104	45	20	
177	351	39	
116	434	79	
Sub-total	3853	762	

Area 2

Context	Weight	Sherds	Notes
200	11	3	
201	4	1	
Sub-total	15	4	

Evaluation

Context	Weight (g)	Sherds	Small find/notes
8	4	1	Vssl 1
20	120	36	Vssls 1, 2, 3
56	14	7	Incl shallow bowl
39	14	3	1 vessel
42	6	1	
41	664	26	6 vessels
Sub-total	684	30	

Burnt Clay

Context	Weight (g)	fragments	Small find/notes
102	24	1	1534 burnt clay
127	66	2	2001 burnt clay
134	146	40	

135	1	1	417 burnt clay
153	86	11	
177	6	1	2610 burnt clay
178	50	1	1983 burnt clay
195	50	4	
196	55	1	3436 burnt clay
	484	62	

*Appendix 3***Table 1: Rothley, Leicestershire – soil samples February 2005**

<i>Monolith</i>	Depth	Bulk samples	Context
			Late Neolithic site (Nail 518.01)
<i>Control profile</i>			
			0-300 mm (plough topsoil): Very dark greyish brown (10YR3/2) moderately humic, finely rooted fine and medium sand, with few medium and large rounded stones; massive with clods; diffuse horizontal boundary.
			300-650 mm (arable colluvium): strong brown (5YR5/6) moderately weak loamy sand; massive with some poorly developed prisms; few coarse vertical earthworm channels; rare charcoal; clear, horizontal boundary.
<i>M1</i>	1.00-1.20 m	x1a (0.70-0.80 m)	0.65-1.05 m (lower colluvium and buried soil): heterogeneous dark brown to strong brown (7.5YR4/6-4/4) sandy loam with humic patches; massive; rare charcoal; diffuse horizontal boundary.
<i>M1</i>	1.00-1.20 m	x1b (1.05-1.15 m) x1c (1.10-1.20 m)	1.05-1.35 m (buried soil – context 325; contains flints; 1.05 is level pits found at): strong brown (5YR4/6) possibly weakly humic sandy loam to occasional charcoal; few stones; diffuse horizontal boundary
<i>M1</i>	1.00-1.20 m	x1d (1.30-1.40 m)	1.35-1.70 m (natural sands): heterogeneous brown (5YR5/4) weak medium sands with patches of pale brown (10.YR6/2) clay loam; clear horizontal boundary.
			1.70+ m: (coarse river terrace gravel): medium sand and abundant medium and coarse stones.
			<i>Early Bronze Age site</i>
<i>Large pit - 148</i>			<i>Section 43.01</i>
<i>M2</i>	60-260 mm	x2a- 135 x2b-159 x2c-160 x2d- subsoil/ natural	0-120 mm (135): heterogeneous reddish brown (5YR5/3) and yellowish brown (5YR5/6) sandy loam, with scatter of charcoal and likely burrows; sharp horizontal boundary. 120-160 mm (159 – burned clay layer): heterogeneous light red (10R6/8) and reddish brown (2.5YR5/4) clay. 160-210 mm (160): heterogeneous mainly weak red (2.5YR4/2) with light red (2.5YR6/8) clay and clay loams; patches of abundant charcoal; clear horizontal boundary. 210-280 mm (natural): reddish brown (2.5YR4/4) clayey weathered Mercian Mudstone (?) with included fine and coarse gravel and patches of

			large stones.
<i>M3</i>	130-230 mm	x3a-153 x3b-natural	153: as 160 with common charcoal natural: pale gleyed variant of above?
<i>M4</i>	190-290 mm	x4a-176 x4b-175	176: burned clay layer 175: charcoal-rich clay loam and sands
<i>Large pit - 148</i>			<i>Section ?</i>
<i>M5</i>	80-160 mm	x5a (80-100 mm) x5b (100-160 mm)	0-100 mm (uppermost pitfill): dark reddish grey (5YR4/2) sandy loam with red burned soil and charcoal; clear to sharp horizontal boundary. 100-170+ mm (natural): red (2.5YR4/6) clay loam subsoil.