PN 1516

WARWICK DIGITAL LABORATORY SITE, UNIVERSITY OF WARWICK, COVENTRY: AN ARCHAEOLOGICAL EVALUATION 2006

REVISED 2007

Checked by

Supervisor……………………………………... date…………………

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Project No. 1516

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WARWICK DIGITAL LABORATORY, UNIVERSITY OF WARWICK, COVENTRY

AN ARCHAEOLOGICAL EVALUATION, 2006 REVISED 2007

CONTENTS

SUMMARY

An archaeological evaluation of land at Warwick University, University Road, Coventry (centred on SP 30087620) was commissioned by Warwick University. The work was undertaken by Birmingham Archaeology in October 2006. Five trenches were excavated to locate and identify any archaeological remains that could be affected by the proposed development.

No previous archaeological work had been undertaken in the area, however, a desk-based assessment undertaken in 1996 had highlighted the potential for Iron Age and medieval remains to be present within the site boundaries.

The evaluation identified the former course of a watercourse now present at the south of the site. Tile from the uppermost deposits of this feature suggests that the latest phase of silting up of the palaeochannel occurred during the medieval period.

A ditch was identified aligned parallel to the former watercourse, the upper fills of which contained post-medieval pottery and clay pipe.

Four contexts were sampled for waterlogged environmental remains, two of which were identified as having assemblages suitable for further analysis. These samples were from the upper fill of the palaeochannel and the lower fill of the ditch. Radiocarbon dating was undertaken for three contexts; the upper and lower fills of the palaeochannel and the lower fill of the ditch. The basal fills of both features were dated to the Iron Age period, with an anomalous result returned for the upper fill of the palaeochannel.

The environmental evidence showed that the area was prone to seasonal flooding and that the land around the palaeochannel during the medieval period had been utilised for the grazing of cattle. This corroborates the evidence from the documentary research previously conducted, which also noted the area had a tendency to flood and that local farms had a particular interest in cheese manufacturing.

Environmental evidence from the ditch suggests that while the surrounding landscape was similar in nature, there was no evidence of human or pastoral activity in the area during the Iron Age period.

The evaluation also confirmed that alluvial deposits were present, as well as subsequent modern levelling deposits associated with the land use as a sports pitch. No other archaeological features or deposits were identified during this work.

WARWICK DIGITAL LABORATORY SITE, UNIVERSITY OF WARWICK, COVENTRY

AN ARCHAEOLOGICAL EVALUATION, 2006.

1 INTRODUCTION

1.1 Background to the project

Birmingham Archaeology was commissioned by Warwick University to undertake a programme of trial trenching ahead of an educational building development at Warwick University (hereinafter referred to as the site, Planning Application Number 53458).

This report outlines the results of a field evaluation carried out during October 2006 and integrates the full analysis of the environmental samples that was subsequently conducted in 2007 (Appendix 1). The report has been prepared in accordance with the Institute of Field Archaeologists Standards and Guidance for Archaeological Evaluations (IFA 2001).

No previous work has been undertaken in the area, however, a desk-based assessment summarises archaeological work undertaken in the vicinity (Hill and Smith 1996).

The evaluation conformed to a brief produced by Coventry City Council, and a Written Scheme of Investigation (Birmingham Archaeology 2006), which was approved by the Local Planning Authority prior to implementation, in accordance with guidelines laid down in Planning Policy Guidance Note 16 (DoE 1990).

1.2 Location and geology

The site is located off University Road, on the campus of Warwick University, approximately 2 miles from the centre of Coventry (centred on SP 30087620, Fig. 1). The development area is irregular in shape and measures 195m by 55m (10,725m²). The site is predominantly grassland bordered by university buildings to the northwest, further parkland to the north and east, and a stream to the south (Fig. 2).

The underlying geology consists of Tile Hill Mudstone with alluvial deposits present in areas.

2 ARCHAEOLOGICAL BACKGROUND

An archaeological desk-based assessment of the entirety of Warwick University Campus was carried out in 1996 (Hill and Smith 1996). This assessment concluded that while no archaeological sites were identified within the present development area, a significant amount of archaeological and historical activity was present in the vicinity. It was highlighted that alluvial deposits, known to exist in the area, may have masked archaeological features extending into the development area.

Activity dating to the Iron Age period is attested to by the presence of a 'banjo' enclosure 600m to the northwest of the development area partially excavated in 2002 (Hill 2002), and Iron Age/Romano-British occupation is also evident from the upstanding enclosure in Tocil Wood to the southeast. Excavation of this enclosure was undertaken in 1985/86 and revealed a defensive system consisting of ditch, berm and bank. Surface finds from the Romano-British period have also been recovered from this area, including a waster fragment, indicative of pottery production in the vicinity.

The assessment identified no definitive evidence for activity during the Anglo-Saxon period, though within the campus as a whole there is a significant amount of medieval activity, especially for pottery and brick production which would have utilised the areas natural water, wood, and clay resources.

Evidence for medieval pottery production was identified in 1976 at Lychgate Road, where the waste products from one or more pottery kilns were found during works associated with the construction of the supermarket. Further evidence for pottery production is present to the southeast of the site, as what is now known as Tocil Wood was originally known as Potters Field Coppice on the 1638 Estate Survey (Hill and Smith 1996). In the northern part of Tocil Wood there are extensive traces of clay extraction and puddling pits, and during the excavation of the earthwork, medieval pottery was recovered from overlying layers (*ibid*.).

The desk-based assessment notes that 'historical documentation in the manorial rolls attests to the fact that the [central campus] area was formerly water meadow and was subject to regular flooding. These conditions survived into living memory. Tocil Lane used to run beside the brook beside the university ring road, and this too was subject to flooding, whilst its ditches needed constant scouring.' (Hill and Smith 1996, 26).

The land use within the campus as a whole appears to have been predominantly farmland, and while it is unclear as to which particular farm the development site may have belonged to, it is likely that it was also used for agricultural purposes. Although most of the university lies on the Stoneleigh Estate, the development area is just outside the area covered by the Stoneleigh Estate Map of 1766 (Hill and Smith 1996, not illustrated). However, the Leigh family acquired a lot of the land at the university during the 17th century including Cryfield Grange (1639), Tocil Farm (1678) and Sanders Wright Meadow (1684), and the early inventories show they had a particular interest in cheese at this time, with mixed farming being practiced well into the 20th century (*ibid*. 11).

The closest of these farms, to the southwest of the development site, is the site of Tocil Farm, which is now the location of Tocil Residences. The desk-based assessment dates this farm to 1454, when the Abbot of Stoneleigh granted it to Robert and Elen Thornall. In the 16th and 17th centuries, the farm was often called Sokeman's Tossall.

The farm continued to run well into the 20th century. In the 1930's the old farmhouse was apparently pulled down and replaced, and the newer building was also demolished around 1970 to make way for the student residences.

3 AIMS AND OBJECTIVES

The principle aim of the evaluation was to determine the character, state of preservation and the potential significance of any buried remains.

More specific aims were to:

- To recover evidence relating to prehistoric and Roman occupation of the area.
- To recover evidence for medieval pottery production in the area.
- To recover environmental evidence from any buried former water courses.

The specific aims of the environmental analysis were to:

- Establish the environment surrounding the features.
- Define the nature of land use and aquatic regime.
- Facilitate further landscape reconstruction and visualisation.

4 METHODOLOGY

4.1 Fieldwork

The proposed development area covers approximately 1.0725 hectares. A total of 5 trenches were excavated across the site totalling 320m², which provided a 3% sample of the total area (Fig. 2).

Trenches were regularly spaced over the whole area, with the trenches closest to the present watercourse aligned at right angles to it in order to identify any changes in course.

All topsoil and modern overburden was removed using a 360° tracked mechanical excavator with a toothless ditching bucket, under direct archaeological supervision, down to the to the top of the uppermost archaeological horizon or the subsoil. Subsequent cleaning and excavation was by hand.

All stratigraphic sequences were recorded, even where no archaeology was present. Features were planned at a scale of 1:20 or 1:50, and sections were drawn through all cut features and significant vertical stratigraphy at a scale of 1:20 or 1.50. A comprehensive written record was maintained using a continuous numbered context system on *pro-forma* context and feature cards. Written records and scale plans were supplemented by photographs using colour print and colour slide photography.

Twenty litre soil samples were taken from datable archaeological features for the recovery of waterlogged remains. The environmental sampling policy followed the guidelines contained in the Birmingham Archaeology Guide to On-Site Environmental Sampling. After an initial assessment two samples were recommended for further analysis and three radiocarbon dates were obtained. The methodology for this is reported on in full in Appendix 1.

Recovered finds were cleaned, marked and remedial conservation work was undertaken as necessary. Treatment of all finds conformed to guidance contained within 'A strategy for the care and investigation of finds' published by English Heritage.

The full site archive includes all artefactual and/or ecofactual remains recovered from the site. The site archive will be prepared according to guidelines set down in Appendix 3 of the Management of Archaeology Projects (English Heritage, 1991), the Guidelines for the Preparation of Excavation Archives for Long-term Storage (UKIC, 1990) and Standards in the Museum Care of Archaeological collections (Museum and Art Galleries Commission, 1992). Finds and the paper archive will be deposited with an appropriate repository subject to permission from the landowner.

5 RESULTS

5.1 Introduction

Detailed summaries of the individual trenches are presented in Appendix 2 and full details are available in the project archive. In the following sections both feature (cut) and context numbers are highlighted in bold.

5.2 Subsoil (natural)

The natural subsoil was proven to be variable across the site. To the north of the site in Trenches 1 and 2, the natural subsoil was predominantly yellow and orange sandy silts with pockets of blue/green clay. Further to the south, towards the present water course, the natural subsoil was predominantly clay. In Trench 3, this was pink and blue/grey, and in Trench 4, the natural was all blue and grey, with hexagonal patterns in orange sand indicative of waterlogging (Plate 1). The natural subsoil changed again in Trench 5, predominantly comprising sand and gravels (Plate 2).

Plate 1 – Section Trench 4

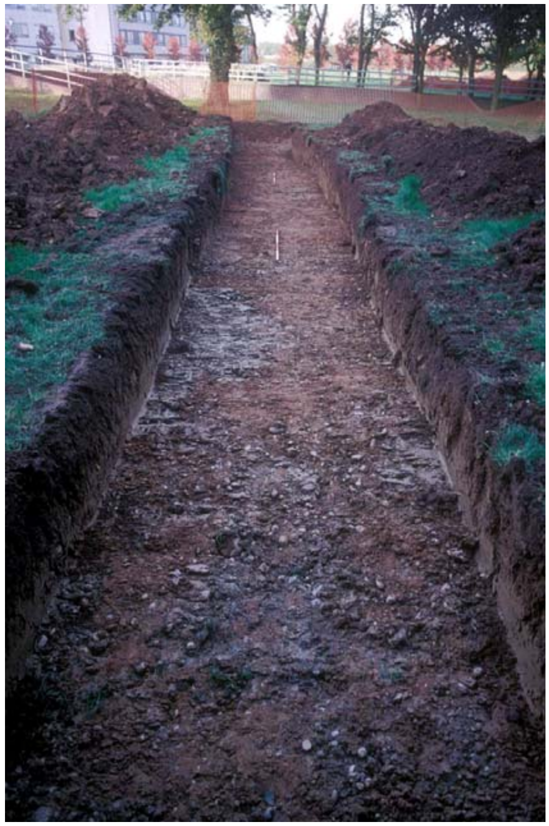

Plate 2 – Trench 5

5.3 Summary of archaeological features and deposits.

The former course of the stream was identified in Trench 3, with a ditch aligned parallel to it on its northern edge. Layers attesting to alluvial deposits, and modern levelling deposits were also present in areas. No other archaeological features were present in any of the trenches. Other possible features tested during the evaluation proved to be of natural origin.

5.4 The water course and ditch

The former course of the stream (**3007**, Plate 3) was identified at the southern end of Trench 3. It was approximately 10.5m wide and 0.7m deep, with gently sloping sides and a rounded base. There were three distinct fills, **3008, 3009,** and **3010**, all of which contained waterlogged organic material. A discrete deposit of medieval tile was recovered from the upper fill **3008.**

Adjacent to the former watercourse an east-west aligned ditch was identified (**3004**). The lower fill of this ditch, **3006**, was mixed, though mostly similar to the fills of the watercourse, and appeared to contain waterlogged material. The upper fill **3005** produced post-medieval pottery and clay pipe. The relationship between the two features was obscured by truncation by a modern land drain.

Plate 3 - **3007**

5.5 Alluvial deposits

Alluvial deposits were identified in the trenches furthest away from the former water course (Trenches 1, 2 and 5), though the depth varied across the site. In all trenches the alluvial layer was a mid-orange brown clay silt.

5.6 Modern Levelling and Land Drains

Modern levelling deposits comprising layers of re-deposited natural were present in some of the trenches, most likely being deposited prior to the area being utilised as a sports pitch. They were deepest in Trench 3 (Plate 3), though were also present in Trenches 1, 2 and 4 (Plate 1). Ceramic land drains were also present throughout the area.

5.7 Overburden and topsoil

Overlying all the features was a 0.1m to 0.5m deep build up of topsoil. In all trenches this comprised a mid-brown silty sand with occasional pebbles and root activity.

6 THE FINDS *BY ERICA MACEY-BRACKEN*

A small quantity of finds was recovered from Trench 3. Material recovered included ceramic tile, post-medieval pottery, clay pipe and nails. The assemblage was quantified by count and weight, and examined macroscopically for the purposes of this report.

Seven pieces of ceramic tile were recovered from the site (**3005** x 1, **3008** x 6). The pieces recovered from the upper fill of the filled in watercourse **3008** retained the flange and curved shape characteristic of 14^{th} – 15^{th} century tiles (Plates 4 and 5). Tiles of similar date have been found at other sites in Warwickshire, including Exhall (? Forthcoming?), and are probably of local manufacture.

Plate 4 – Tile from **3008**

Plate 5 – Tile from **3008**

The remainder of the assemblage consisted of two handmade iron nails (**3002**, **3005**), post medieval pottery including four fragments of creamware (**3005**), a sherd of manganese mottled ware (**3005**), and a base sherd from a blackware vessel (**3002**), a fragment of green bottle glass (**3005**) and a section of clay pipe stem (**3005**).

Table of Artefacts

Context	Pottery	Tile	Glass	Clay Pipe	Nail
3002	1	-	-	-	1
3005	5	1	1	1	1
3008	-	6	-	-	-

7 THE ENVIRONMENTAL EVIDENCE *BY DR EMMA TETLOW*

The full analysis is presented as Appendix 1, and will be summarised here.

During the evaluation four bulk samples (contexts **3006**, **3008**, **3009** and **3010**) of waterlogged organic material were sampled for palaeoentomological analysis from Trench 3. One sample was from **3006**, the lower fill of the linear ditch; this consisted of organic-rich clay with sandy inclusions.

Samples from **3008**, **3009** and **3010** were taken from the palaeochannel. The uppermost context, **3008**, was a dark grey, alluvial deposit with organic inclusions, context **3009** was a brown clay, also with abundant organics and some sandy inclusions, and the basal context, **3010** was an organic rich sand and gravel.

Diverse, well-preserved and interpretable assemblages were recovered from two of the four contexts, **3006** and **3008**. Material from contexts **3009** and **3010** was well preserved. However, further interpretation of these samples is precluded by limited species abundance and diversity.

A full environmental assessment was therefore conducted on the assemblages from contexts **3006**, the lower fill of the ditch, and **3008**, the upper fill of the palaeochannel.

Three contexts were also selected for radiocarbon dating. As no artefactual dating evidence was recovered from context **3006** or context **3010,** AMS dating of both contexts was recommended with a further date from context **3008** (the upper fill of the palaeochannel) to confirm the broad date provided by the medieval tile.

Viable dates were recovered from the lower fills of the palaeochannel and the ditch, which indicated that both features originally date from the Iron Age period. The date from **3006** suggested deposit formation commencing *c*. 410-360 cal BC, the middle Iron Age. The date from **3010** appeared to be slightly later with deposit formation at the base of the palaeochannel commencing *c*. 210-40 cal BC, the late Iron Age. An anomalous result was returned for the upper fill **3008**, which is likely to be from modern or post-medieval contamination. The medieval period is at the very edge of the envelope at which radiocarbon dating can be applied.

Of the two samples selected for full analysis the ditch **3006** produced the most restricted assemblage. The majority of species are those associated with grassland or disturbed ground. This damp grassland surrounds a ditch mostly filled with standing water, slowly becoming in-filled and in which conditions were becoming increasingly dry. The composition of the vegetation that surrounds the ditch includes plants that are primarily associated with disturbed ground, waysides, meadows and hedgerows. Some of the meadow species are characteristic of damper meadows. It is clear that the channel did receive a periodic supply of water from a relatively fast flowing source. The precise nature of land use in the area remains unknown, however, as evidence of human activity is totally absent, whilst small numbers of dung beetles preclude grazing in the immediate vicinity.

The assemblage recovered from the upper fill of the palaeochannel **3008** was significantly more diverse, with an abundance of species associated with surrounding vegetation, the aquatic regime and possible land use.

The assemblage suggests that the vegetation surrounding the palaeochannel is characteristic of floodplain grassland. Species associated with drier grassland and meadows were present, but species associated with wet, tussocky meadows and sedge and moss polsters on floodplains and wetlands were also identified. Large numbers of dung beetles suggest that the grassland was being used as pasture, and other taxa indicating accumulations of foul, decaying organic material and dung were also present.

The assemblage from **3008** is also suggestive of relatively deep, standing or very slow moving water, and there are indications that the palaeochannel was fringed by a muddy shoreline.

No direct evidence of human habitation or waste associated with human habitation or activity (eg. Kenward's 'house fauna', Hall and Kenward 1990, Kenward 1997, Kenward and Hall 1995) were recovered from any of the samples. The paucity of dung beetles in sample **3006**, despite contextual similarities between **3006** and **3008**, would suggest that formation of the two deposits was not contemporaneous. However, the environment surrounding both the palaeochannel and the ditch is strikingly similar; a grassy floodplain prone to periodic flooding and vegetated by sedges, mosses and low growing forbs such as cuckoo flower, a herbaceous species commonly found in periodically waterlogged sites.

8 DISCUSSION

The evaluation identified the palaeochannel and the ditch, and full environmental analysis of the samples taken from the contexts has further enhanced our understanding of the landscape.

The dating of the ditch to the middle Iron Age period puts it contemporary with the 'banjo' enclosure identified to the northwest of the site. The environmental evidence suggests that the landscape at this time was grassy floodplain, a situation that is still similar in the medieval period, when both the environmental evidence from the upper fill of the palaeochannel and the documentary evidence point to a landscape prone to seasonal flooding.

The evidence from the ditch also indicates disturbance similar to that on waysides, meadows and hedgerows. However, evidence for grazing, the most common cause of disturbance in this kind of environment, is lacking. On other sites waterlogged deposits associated with nearby settlements and enclosures commonly exhibit strong signals of pastoral farming. Evidence for human agency is also lacking, leaving the possibility that the disturbance was caused by natural factors such as flood pulses and bank erosion. This may further confirm that the settlement at the 'banjo' enclosure did not extend into the site.

The radiocarbon date for the lower fill of the palaeochannel was late Iron Age, however the environmental evidence from this context was not sufficient in diversity to analyse further. The lower fill and middle fill of the palaeochannel were similar in composition, and both differed from the composition of the upper fill.

The upper fill returned an anomalous radiocarbon result and was dated on the basis of the tile to the 14^{th} – 15^{th} century. The environmental evidence suggests that the palaeochannel at this time contained standing or very slow moving water, surrounded by a landscape also characteristic of grassy floodplain. The evidence further suggests that the area was being used as pasture during this period.

The 14^{th} – 15^{th} century tile recovered from the upper fill of the infilled watercourse not only dates the final silting up of this feature, but is indicative of a possible structure in the area. No evidence for this structure was identified, however, during the course of the works.

The environmental evidence from the watercourse very much enhances the documentary evidence relating to the development area. It illustrates a landscape prone to seasonal flooding, which was utilised for the grazing of cattle, and this corroborates the historical information that the area was agricultural in use during this period, possibly with an emphasis on cheese production.

The early map evidence also shows that the present watercourse had at some point been deliberately diverted. Comparison of the Ordnance Survey 1^{st} Edition and modern maps (Fig. 4) shows that the watercourse has been straightened and altered slightly at the western part of the site. The meandering course of the watercourse is also mirrored in the field boundary directly to the west, suggesting that an earlier course of the river was originally along this boundary. It is likely that these alterations were due to water management specifically associated with brick making industry in the locality. Further to the west along the line of the watercourse is a pump house, most likely feeding the brickworks in the area (Fig. 4). The diversion of the watercourse in this area is likely to have been a tail-race, allowing the water run off to be properly controlled.

The upper fill of the ditch was dated to the post-medieval period by the artefacts which suggests that this deposit was an infilling of a depression created by the earlier feature.

The landscaping known to have occurred in the area associated with the creation of sports pitches is also depicted in the archaeological record.

9 ACKNOWLEDGEMENTS

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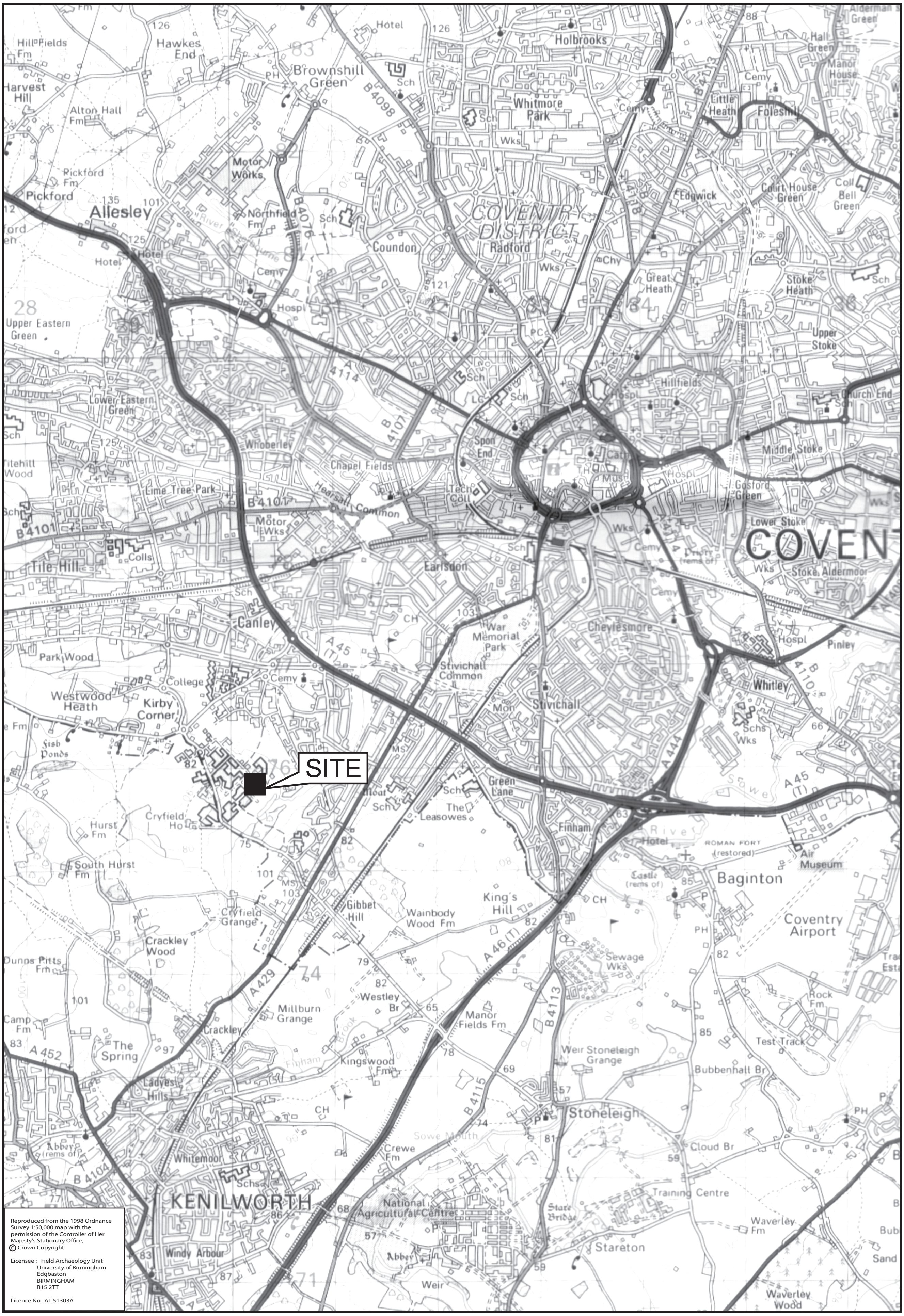
SITE
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COVENT
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Coundon
Radford
Edgwick
Foleshill
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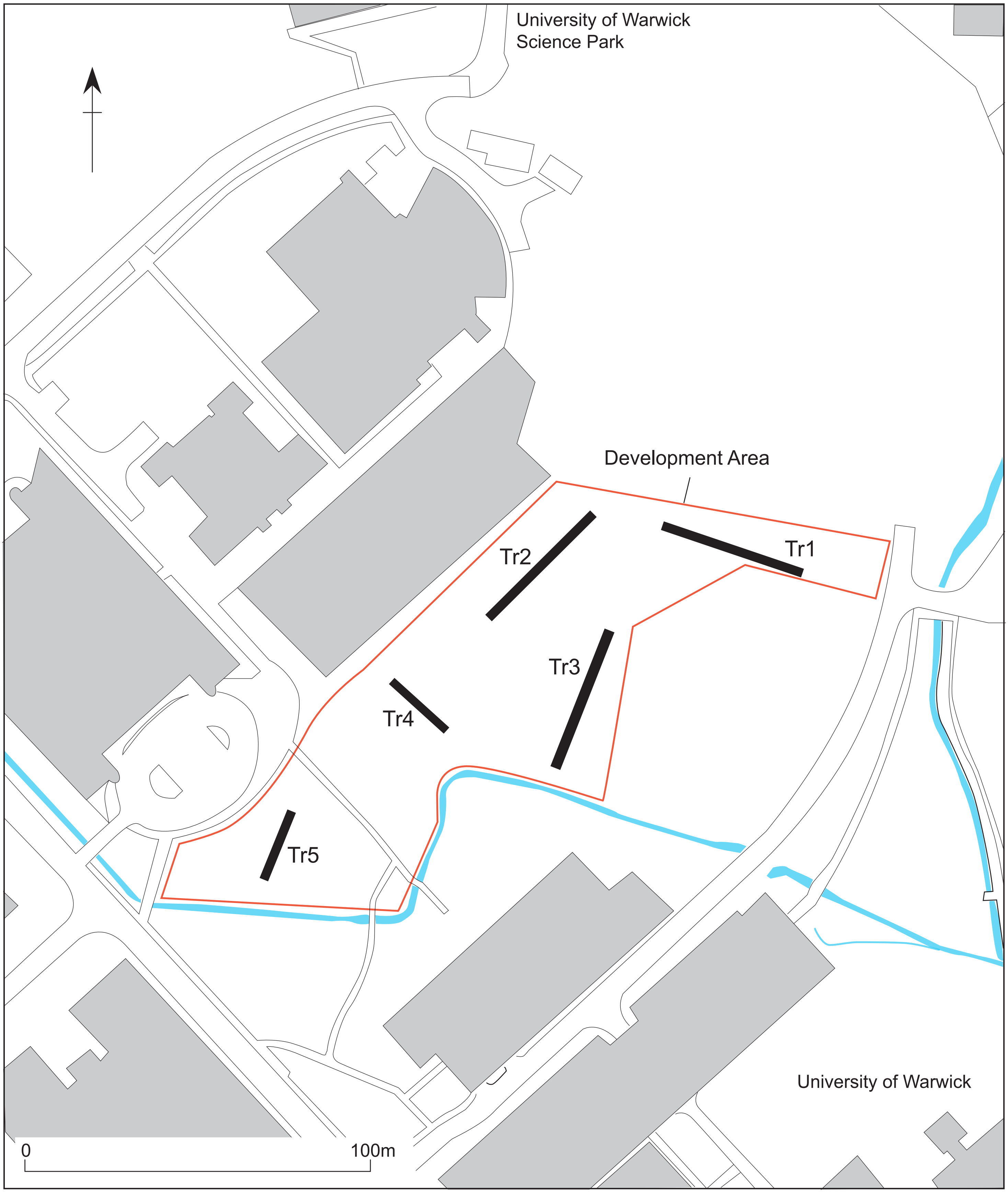
Upper Stoke
Hillfields
Middle Stoke
Spon End
Chapel Fields
Whoberley
Lime Tree Park
Tile Hill
Earlsdon
Canley
Cheylesmore
Stivichall
Whitley
Finham
Baginton
Coventry Airport
Stoneleigh
Stareton
Westwood Heath
Kirby Corner
Cryfield Ho
Gibbet Hill
Crackley Wood
Millburn Grange
Westley Br
Kingswood Fm
Whitemoor
Windy Arbour
National Agricultural Centre
Reproduced from the 1998 Ordnance Survey 1:50,000 map with the permission of the Controller of Her Majesty's Stationary Office, © Crown Copyright
Licensee : Field Archaeology Unit University of Birmingham Edgbaston BIRMINGHAM B15 2TT
Licence No. AL 51303A

Fig.1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Tr2
Tr3
Tr4
Tr5
University of Warwick
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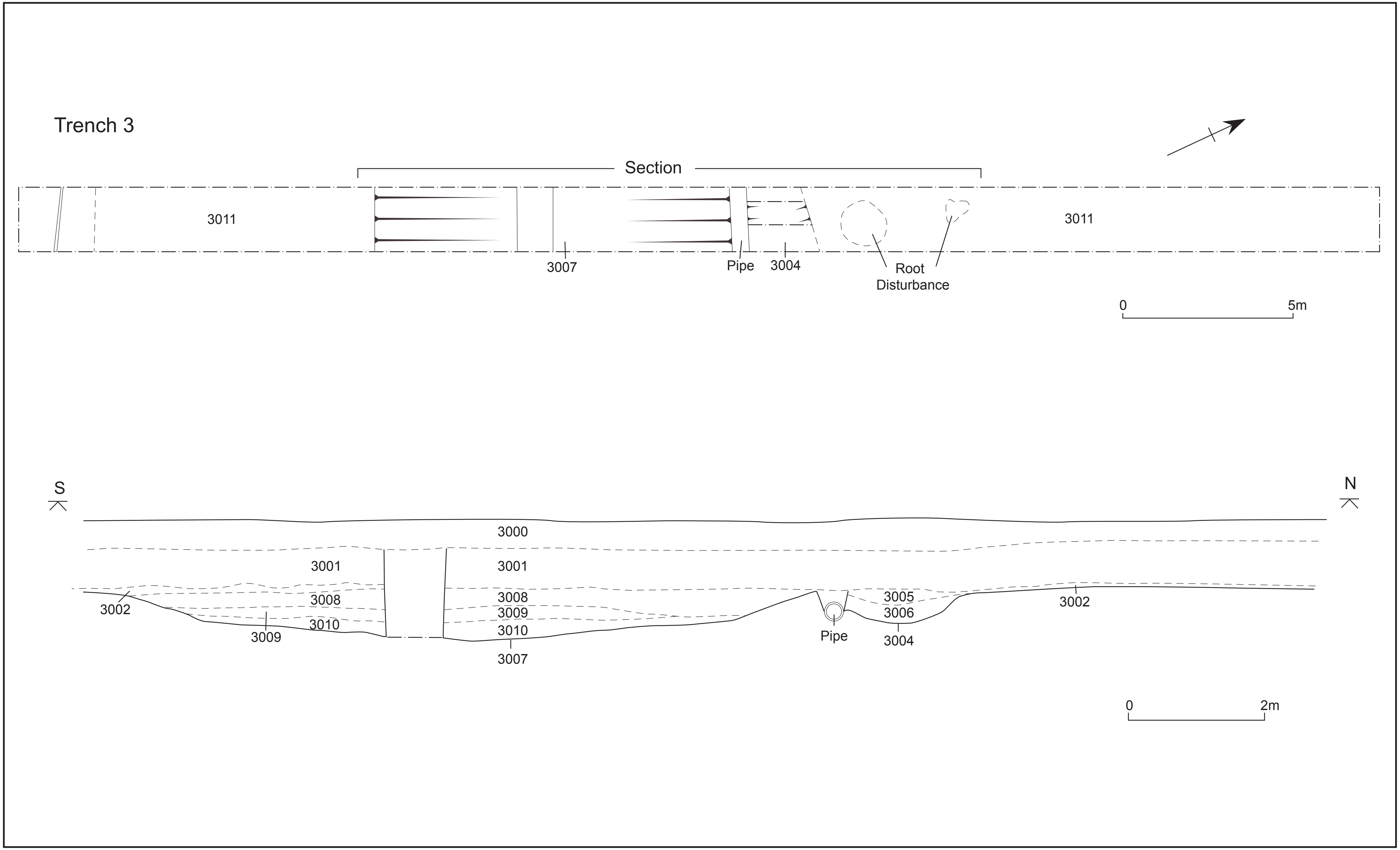
100m

Fig.2


Trench 3
Section
3011
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3007
Pipe
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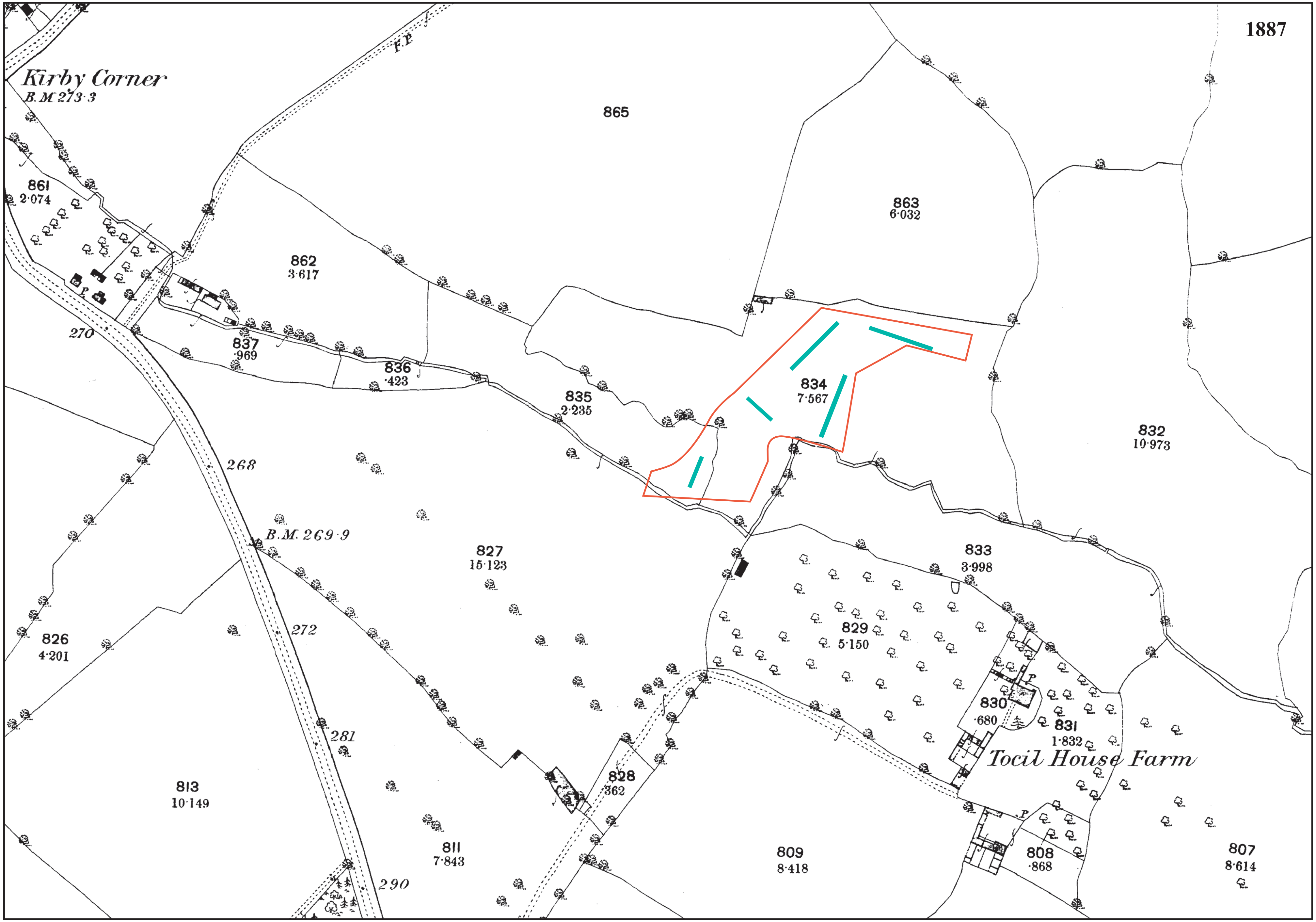
Fig.3


1887
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6·032
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2·235
834
7·567
832
10·973
270
268
B.M. 269·9
827
15·123
833
3·998
829
5·150
826
4·201
272
830
·680
831
1·832
Tocil House Farm
281
828
·362
813
10·149
811
7·843
290
809
8·418
808
·868
807
8·614

Fig.4

APPENDIX 1

Birmingham Archaeo-Environmental
BAE

The Environmental Evidence from Warwick Digital Laboratory Site, University of Warwick, Coventry.

Dr. Emma Tetlow

BA-34-07

The Environmental Evidence from Warwick Digital Laboratory Site, University of Warwick, Coventry.

By
Dr. Emma Tetlow

July 2007

Birmingham Archaeology undertook palaeoenvironmental analysis of deposits from a ditch and palaeochannel from the Digital Laboratory site at Warwick University, Coventry. The study consisted of palaeoentomological analysis and radiocarbon dating of key contexts to provide a chronostratigraphic understanding of the sedimemtary archive.

Of the four samples from the evaluation assessed for insect remains, two contained assemblages with potential for further, full analysis. The ditch is concluded to have developed proximal to open grassland with periodic influxes of flowing water. Radiometric evidence suggests deposition during the mid Iron Age. Evidence suggests that the palaeochannel feature originally dates from the late Iron Age. However, medieval tile and inconclusive radiocarbon dating from the upper fill renders defining the exact developmental timeframe for this feature problematic. Coleopteran evidence clearly indicates this feature was surrounded by damp grassland used for pastoral purposes.

KEYWORDS: Warwick University, Palaeoentomology, Iron Age, Post Medieval

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The Environmental Evidence from Warwick Digital Laboratory Site, University of Warwick, Coventry.

1. INTRODUCTION

Introduction

The insect remains and radiocarbon evidence discussed are from two features, a natural water-course or 'palaeochannel' (feature 3007, contexts 3008, 3009 and 3010), and a ditch (feature 3004, context 3006) at the University of Warwick site, where activity stretches from the Iron Age/Romano British to the late post medieval period. It was hoped that the insect remains from the site would provide information on a number levels:

- To establish the environment surrounding the features.
- To define the nature of land use and aquatic regime
- Facilitate further landscape reconstruction and visualisation.

2. METHODS

The samples were processed at the University of Birmingham using the standard method of paraffin flotation outlined in Kenward *et al.* (1980). The insect remains were then sorted from the paraffin flot, and the remains identified under a low power binocular microscope at x10 magnification. Where possible, the insect remains were identified by comparison with specimens in the Gorham and Girling collections housed at the University of Birmingham. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987).

Results

To aid interpretation, where applicable, the taxa have been assigned ecological groups following those of Kenward and Hall (1995). The affiliation of each species to a particular group is listed in the second column (marked 'EG') in Table 1. The meaning of each ecological code is explained in Table 2. The occurrence of each of the ecological groups is expressed as a percentage in Tables 1 and 2. In Figure 1 and Table 2 these totals are shown as percentages of the entire assemblage from each individual sample.

From feature 3007, samples from contexts 3009 and 3010 produced poorly preserved and limited assemblages which precluded further, meaningful interpretation. Samples from 3008 (feature 3007) and 3006 (feature 3004) produced diverse and well preserved assemblages which were subsequently selected for full analysis and interpretation.

The Insect Assemblages

The Ditch (feature 3004, context 3006)

Of the two samples selected for full analysis, the ditch produced the most restricted assemblage. The majority of species are those of grassland or disturbed ground. This damp grassland surrounds a ditch filled with standing water, slowly becoming in-filled and in which conditions were becoming increasingly dry.

Distinctly aquatic taxa are absent. The limited hygrophilous species which are present are those associated with muddy, ephemeral pools such as the Hydraenidae, *Helophorus* spp. and *Octhebius* spp. (Hansen 1987). It is clear is that the channel did receive a periodic supply of water from a relatively fast flowing source. The Dryopidae, *Elmis aenea*, and *Limnius volkmari*, are members of the Elmidae or 'riffle beetle' family and are both associated with the clear, well oxygenated waters of the upper and middle reaches of rivers (Holland 1972).

Several species indicate the composition of the vegetation which surrounds the ditch. The Curculionidae, *Apion urticarium,* and *Cidnorhinus quadrimaculatus*, are phytophagous taxa exclusively found on, nettles (*Urtica* spp.) (Hyman 1992, Koch 1992). A large number of elytra from the *Apion* spp. family (which cannot be identified to species level), were also recovered. Species of this family are primarily associated with the vegetation of disturbed ground, waysides, meadows and hedgerows (Bullock 1993, Koch 1992). Other taxa typical of meadows include a further suite of Curculionidae, such as *Apion subulatum*, found on meadow vetchling (*Lathyrus pratensis*) and *Ceutorhychus pervicax*, found on herbaceous taxa characteristic of damper meadows, such as cuckoo flower (*Cardamine pratensis*). The precise nature of land use in the area surrounding the ditch remains unclear. Evidence of human activity is totally absent, whilst small numbers of Scarabaeidae ('dung beetles') also preclude grazing activity in the immediate vicinity.

The Palaeochannel (feature 3007, context 3008)

The assemblage recovered from the upper fill of the palaeochannel was significantly more diverse than that recovered from context 3006, with an abundance of species associated with surrounding vegetation, the aquatic regime and possible land use.

Vegetation surrounding the palaeochannel is characteristic of floodplain grassland. Coleoptera such as the elaterid, *Athous*, spp, and the scarabaeid, *Phylopertha horticola*, are found in drier grassland and in meadows (Jessop 1986, Koch 1989). Other species of wet, tussocky meadows include the curculionid, *Notaris acridulus*, which is found on sedges (*Carex* spp.) and reed sweet grass (*Glyceria maxima*) (Koch 1992). The Staphylinidae, *Olophrum piceum,* and *Lesteva Longelytrata* are found in similar habitats on sedge and moss polsters on floodplains and in wetlands (Koch 1992, Tottenham 1954). Large numbers of Scarabaeidae family, *Aphodius* spp, also suggest this grassland was being used as pasture (Jessop 1986). Other taxa indicate accumulations of foul, decaying organic material and dung, such as the Staphylinidae, *Oxytelus rugosus*, *Platystethus nitens* and the histerid, *Paralister puperascens* (Koch 1989, Tottenham 1954).

Finally, the aquatic taxa indicate relatively deep, standing or very slow moving water. The large Hydrophilidae, *Hydrobius fuscipes*, and *Cymbiodyta marginella*, are typical of eutrophic or 'nutrient rich', stagnant water (Hansen 1987). The presence of caddis fly larvae (Trichoptera) also suggests the deposit accumulated in waterlain conditions. The Carabidae, *Dyschirius globosus*, *Pterostichus anthracinus*, and the hydraenid family indicate the palaeochannel was fringed by a muddy shoreline, riparian vegetation composed of taller reeds are also suggested by the Chrysomelidae, *Plateumaris/Donacia* families (Hansem 1987, Lindroth 1974, Menzies and Cox 1996)

Radiocarbon and artefactual dating evidence.

Artefacts, which provide a broad *terminus post quem* for each deposit, were recovered from both features selected for environmental analysis. Post medieval clay pipe and pot were recovered from context 3005, the upper fill of the ditch (feature 3004) (Ramsey 2006). Late medieval tile (14^{th}-15^{th} century) was also recovered from context 3008 (feature 3007) the top-most waterlogged deposit in the palaeochannel (Ramsey 2006). Disparity between the two insect assemblages, which will be discussed in greater detail below, also clearly suggests that the deposition of these two deposits is not contemporaneous. As no dating evidence was recovered from context 3006 (the basal context of the ditch) or context 3010 (the primary fill of the palaeochannel), AMS dating of both contexts was recommended, with a further date from context 3008 to confirm the broad date provided by the medieval tile.

Results of the radiometric dating is presented in Table 4. Two viable dates were recovered from the basal fills of the palaeochannel and the ditch, which indicate that both features date from the Iron Age. Infilling of the palaeochannel occurred during the later Iron Age date, *c*. 210-40 cal BC whilst the ditch appears to be slightly earlier, deposit formation commencing *c.* 410-360 cal BC. The third date from this suite, recovered from the upper fill of the palaoechannel (context 3008), of 47,000±1290 ^{14}C BP (Beta-230304) sets this deposit formation during the late early Devensian. This anomalous date is likely to be the result of modern contamination. Younger carbon is substantially more active than older material; hence contamination by younger material, either during sampling or laboratory procedures prior to the AMS/radiocarbon process will produce significant errors (Walker 2004). Despite stringent laboratory procedures, at both the submitting laboratory and the radiocarbon laboratory, the risk of contamination is substantial (Walker 2004). The possibility of contamination by modern carbon in this sample is more than feasible when considering the artefactual evidence from this deposit, which suggests a medieval date. The medieval period is at the very edge of the envelope at which radiocarbon dating can be applied. Hence while it seems likely that the artefactual evidence from this context has produced a reasonably conclusive date for this fill, it has not been possible to corroborate this date with radiocarbon dating.

Discussion

Radiometric dating has clarified the chronostratigraphy at the Warwick site and substantiated hypotheses present in the original assessment of coleopteran assemblages from the site (Ramsey 2006, Tetlow 2006a).

The environment surrounding both the palaeochannel and the ditch is strikingly similar; a grassy floodplain, prone to periodic flooding and vegetated by sedges, mosses and low growing forbs such as cuckoo flower, a herbaceous species commonly found in periodically waterlogged sites.

The large numbers of Scarabaeidae or ‘dung beetles’ from the assemblage recovered from the upper fill of the palaeochannel strongly suggests that the grassland around the feature was being used for pastoral activity at the time of deposition. On the basis of the artefactual evidence this occurred in the late medival period.

However, the radiocarbon dating is inconclusive, and similar assemblages have also been recovered from Iron Age contexts associated with settlements and enclosures at contemporary sites such as Heathrow and Bishops Cleeve, Gloucestershire. At the Heathrow site, samples were recovered from a late Iron Age ditch system which contained large numbers of dung beetles and assemblages strikingly similar to that from the palaeochannel sample. These assemblages clearly suggest that the landscape around the late Iron Age ditch system at Heathrow was being used for pasture, (Tetlow 2006b).

The assemblage from the banks of the middle Iron Age ditch contain coleopteran which suggest this ditch was fringed by species characteristic of disturbance, particularly nitrophilous taxa such as nettle and vetches The source of this disturbance, however, remains ambiguous as coleoptera associated with the dung of grazing animals (a factor which is often the cause of disturbance in similar sites) were limited. Other possible reasons for the source of this disturbance include natural factors such as flood pulses and bank erosion. The effect of natural disturbance on bankside vegetation can be similar to that of human or animal agency. Another less likely cause is human agency itself, e.g. the palaeochannel acted as a water supply for the nearby enclosure settlement.

Considering the proximity of this ditch to the 'banjo' enclosure, the absence of Coleoptera associated with either human habitation or pastured animals is particularly notable. Waterlogged deposits associated with nearby settlements and enclosures dating to this period commonly exhibit strong signals of pastoral farming. Other Iron Age sites which lack large assemblages of dung beetles include as those at Mingies Ditch in the Thames Valley (Robinson 1993), and at Love's Farm, St Neots, Cambridgeshire (Tetlow 2006c). The evidence here suggests that these settlements had been abandoned by Later Iron Age. In the case of Mingies Ditch this was probably due to elevated water tables and increased waterlogging (Robinson 1993). However, as the ditch was dated to the middle Iron Age, it is more likely that the lack of evidence for human habitation or pastoral activity is indicative that the influence of the 'banjo' enclosure did not extend into the study area.

4. CONCLUSIONS

Environmental analysis has substantially added to the existing archaeological knowledge of this site at Warwick University.

Whilst the coleopteran remains recovered from the ditch have done little to elucidate potential human activity at the site, radiocarbon dating of the feature has clarified site chronostratigraphy. Radiometric evidence indicates deposit formation took place during the middle Iron Age. Considering the proximity of this feature to the 'banjo' enclosure a number of questions have been raised regarding occupation at the site.

In contrast, the assemblage from the palaeochannel has provided significant evidence of the nature of the landscape around the feature, and strongly suggests that the surrounding damp pasture was used for grazing. The material from the upper fill of the palaeochannel used to provide a radiocarbon date for the feature, was clearly contaminated, hence the only firm dating for the feature is sherds of late medieval tile from the upper fill. This being the case, the insect evidence provides clear evidence of the dairy farming, which documentary evidence suggests was the primary function of the site in general during the early post medieval period, and possibly earlier.

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Table 1: The insect remains from Warwick Digital Laboratory Site, University of Warwick, Coventry

Context		3007	3004
Sample		3008	3006
Processed Weight		10kg	10kg
Processed Volume		10l	10l
COLEOPTERA	**E.G***		
Carabidae			
Clivnia fossor (L.)	oa	1	
Elaphrus cupreus Duft.	oa	1	
Dyschirius globosus (Hbst.)	oa	1	
Bembidion guttula (F.)	oa	1	2
Bembidion spp.	oa	3	1
Trechus spp.	oa	1	
Pterostichus anthracinus (Ill.)	oa	1	
Pterostichus minor (Gyll.)	oa		1
Pterostichus spp.	oa		1
Amara lucida (Duft.)	oa	1	
Hydraenidae			
Octhebius minimus (F.)	oa-w	2	
Octhebius spp.	oa-w	14	1
Limnebius spp.	oa-w	6	
Helophorus spp.	oa-w	8	1
Hydrophilidae			
Cercyon impressus (Sturm.)		1	
Cercyon sternalis Shp.	oa-d	2	1
Cercyon analis (Payk.)	rt	1	
Cercyon spp.		2	1
Crptopleurum minutum (F.)	rf	1	
Hydrobius fuscipes Leach	oa-w	2	
Cymbiodyta marginella (F.)	oa-w	1	
Histeridae			
Paralister puparescens (Hbst.)	rt	1	
Staphylinidae			
Micropeplus porcatus (Payk.)	rt		1
Omalium spp.			1
Lathrimaeum unicolor (Marsh.)		1	
Olophrum piceum (Gyll.)		3	
Lesteva longelytrata (Goeze)	oa-d	12	
Lesteva heeri Fauv.	oa-d	6	
Trogophloeus bilineatus (Steph.)	rt	2	
Trogophloeus corticinus (Grav.)	rt	2	
Trogophloeus spp.	rt	1	
Oxytelus rugosus (F.)	rt		
Oxytelus sculpturatus Grav.	rd	1	1
Platystethus nitens (Salhb.)	rt	1	
Context		3007	3004

Sample		3008	3006
COLEOPTERA	E.G*		
Stenus spp.	u	2	4
Quedius spp.	u	1	
Xantholinus spp.	u	4	1
Philonthus spp.	u	2	1
Bolitobius spp.	u	1	
Tachyporus spp.	u	1	
Aleocharinae gen. & spp. Indet.	u	8	1
Elateridae			
Athous spp.	oa-p	1	
Helodidae			
Helodidae gen & spp. indet		1	
Dryopidae			
Dryops spp.	oa-w	1	1
Elmis aenea (Mull.)	oa-w	1	
Limnius volckmari (Panz.)	oa-w	1	
Lathridiidae			
Encimus minutus	rd-h	1	
Corticaria spp.	rd-h	3	
Scarabaeidae			
Aphodius rufipes (L.)	oa-rf	1	
Aphodius sticticus (Panz.)	oa-rf	1	
Aphodius sphacelatus (Panz.) or *Aphodius prodromus* (Brahm.)	oa-rf	3	
Aphodus granarius (L.)	oa-rf	1	
Aphodius spp.	oa-rf	5	2
Phyllopertha horticola (L.)	oa-p	2	
Chrysomelidae			
Donacia/Plateumaris spp.	oa	1	
Phyllotreta spp.	oa	6	1
Chaetocnema spp.	oa	1	
Curculionidae			
Apion urticarium (Hbst.)	oa-p		
Apion subulatum Kirby.	oa-p	1	4
Apion spp.	oa-p	4	15
Barynotus obscurus (F.)	oa-p		1
Barynotus spp.	oa-p	1	
Sitona humeralis Steph.	oa-p		1
Sitona spp.	oa-p	1	1
Notaris acridulus (L.)	oa-p	2	
Ceutoryhnchus pervicax Weise.	oa-p		1
Ceutoryhnchus spp.	oa-p		1
Cidnorhinus quadrimaculatus (L.)	oa-p		3

Context		3007	3004
Sample		3008	3006
Hemiptera		2	
Trichoptera		2	

Table 2: Ecological *Codings* (Kenward and Hall 1995)

oa (& b) – species which will not breed in human housing
w – aquatic species
d – species associated with damp watersides and river banks
rd – species primarily associated with drier organic matter
rf – species primarily associated with foul organic matter, often dung
g – species associated with grain
l – species associated with timber
p – phytophagous species often associated with waste areas, grassland or pasture.

Table 3: Ecological groups, species % composition

Sample	3008	3006
oa-w	33.5	39
oa	7	6
oa-d	13	1
oa-rf	8	3
oa-p	1.5	35
rd	1	1
rf	1	
rt	6	1
rd-h	3	
u	14	9

Figure 1: Species ecological groups of the insect remains from Warwick Digital Laboratory Site

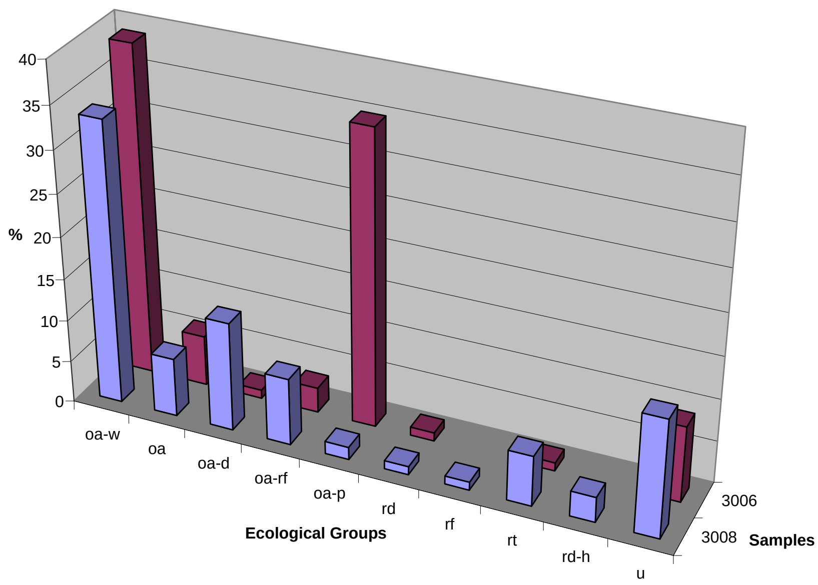

Table 4: Radiometric dating.

Feature	Sample no	Conventional 14 C BP	cal BC	cal BP
3004	15163006	2380+/- 40	410-360	2360-2310
3007	15163008	47000+/- 1290		
	15163010	2150+/- 40	210-40	2160-1990

APPENDIX 2

Trench Number	Strat. Number	Type	Description	Dimensions	Finds
Trench 1 – Aligned east-south-east – west-north-west, 40m x 2m					
1	1000	Layer	Topsoil – mid brown sandy silt with occasional stones	D – 0.2m – 0.4m	
1	1001	Layer	Alluvium – mid orange brown clay silt, varies in depth	D – 0.3m – 0.5m	
1	1002		Natural – red brown silty clay with green mottling and patches of sandstone		
Trench 2 – Aligned north-east – south-west, 40m x 2m					
2	2000	Layer	Topsoil – mid brown silt and coarse sand with small pebbles and grass roots	D – 0.3m – 0.5m	
2	2001	Layer	Levelling layer – mid red sand, redeposited natural	D – 0.2m – 0.5m	
2	2002	Layer	Alluvium – light orange brown clay silt, varied in depth	D – 0. 3m – 0.6m	
2	2003	Fill	Fill of 2004 – mid grey sandy clay with flecks of orange	D – 0.1m	
2	2004	Cut	Root action – irregular linear feature tested and determined to be root action	D – 0.1m, W - irregular	
2	2005		Natural – light yellow orange silt sand with patches of green/blue clay		
Trench 3 – Aligned north-north-east – south-south-west, 40m x 2m					
3	3000	Layer	Topsoil – mid brown sandy silt with occasional stones and charcoal	D – 0.35m – 0.4m	
3	3001	Layer	Levelling layer – red sand clay with few small stones, redeposited natural	D – 0.55m – 0.7m	
3	3002	Layer	Grey silt layer – green brown silt clay not continuous throughout trench, possibly stained natural or alluvium	D – 0.2m max	
3	3003	Fill	Root disturbance – brown silt clay, irregular in plan and profile		
3	3004	Cut	Linear ditch – possibly parallel to 3007, aligned E-W, moderate sloping sides and a U-shaped base	W – 1.75m, D – 0.5m	
3	3005	Fill	Fill of 3004 – dark brown silt sand clay with small stones	D – 0.2m	p-med pot, brick, clay pipe

3	3006	Fill	Lower fill of 3004 – organic brown silt clay with yellow/green and pink sand mixed fill at base of ditch, similar to the fills of 3007	D – 0.3m	
3	3007	Cut	Infilled river channel – very wide with shallow sloping sides and a bowl-shaped base	W –10m, D – 0.75m	
3	3008	Fill	Upper fill of 3007 – dark grey silt clay with much organic deposits	D - 0.3m – 0.4m	Med tile
3	3009	Fill	Middle fill of 3007 – rich brown clay silt sand with much organic material	D – 0.15m – 0.2m	
3	3010	Fill	Lower fill of 3007 – grey green yellow sandy gravels with some organic material	D – 0.3m max	
3	3011		Natural – varies, mixed orange/red/light green sand and clay at north end, blue and red clay with gravel at south end		
Trench 4 – Aligned north-west – south-east, 20m x 2m					
4	4000	Layer	Topsoil – brown silty sand with gravel predominantly at east end	D – 0.1m – 0.3m	
4	4001	Layer	Levelling layer – red redeposited clay natural, varies in depth	D – 0.2m – 0.7m	
4	4002		Natural – dark green grey silt clay with orange mottling, with hexagonal pattern possibly denoting wet conditions		
4	4003	Layer	Grey silt layer – grey silt only present at east end of trench, similar to 4004	D – 0.2m – 0.3m	
4	4004	Cut	Modern cut – grey silt with modern ceramic and charcoal, with service running through it		
Trench 5 – Aligned north-north-east – south-south-west, 20m x 2m					
5	5000	Layer	Topsoil – mid brown silty sand with occasional small pebbles and grass roots	D – 0.22m	
5	5001	Layer	Subsoil/alluvium – light brown orange sandy clay	D - 0.47m	
5	5002		Natural – varied, light yellow orange coarse sand and gravels and green grey clay		