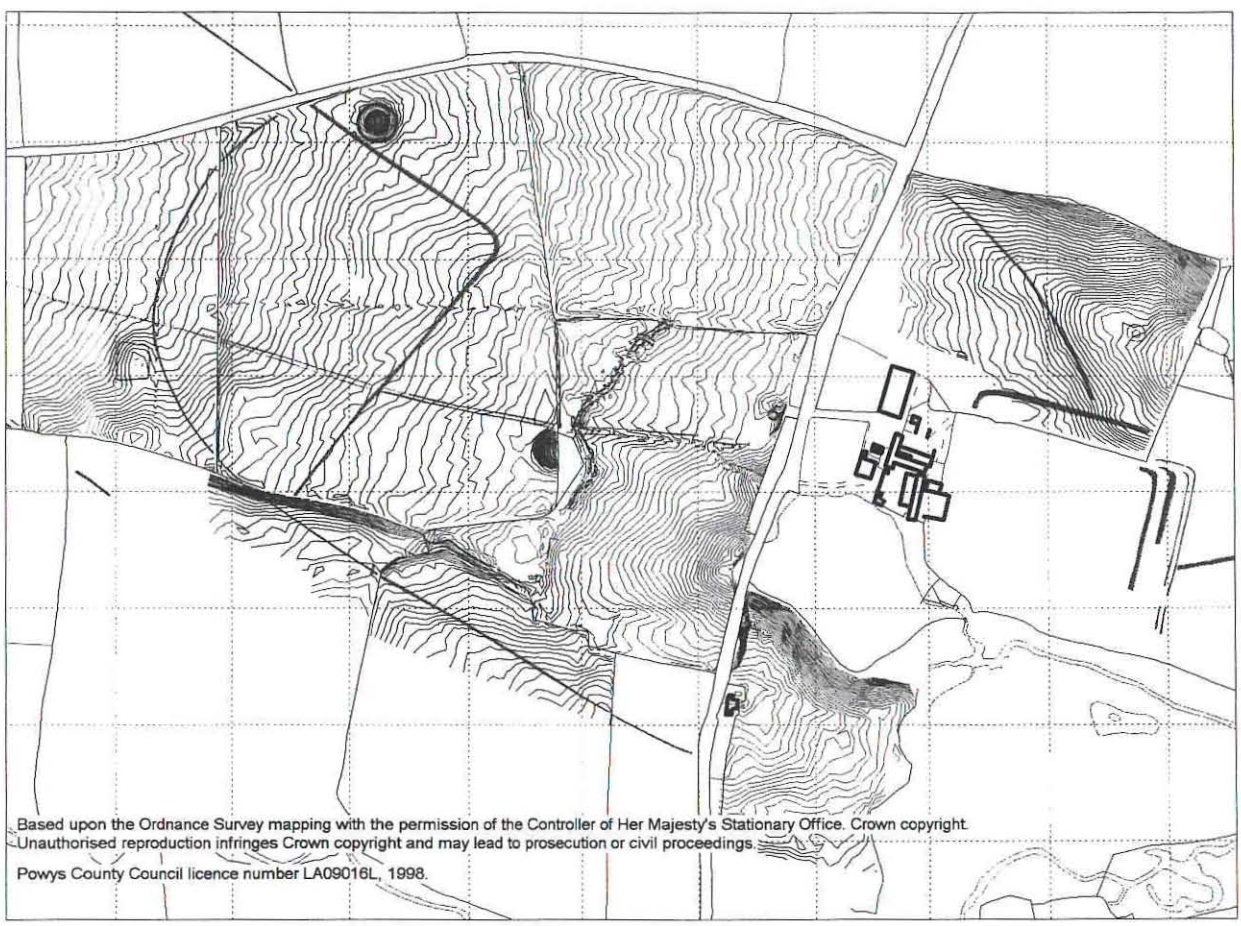
CLWYD POWYS ARCHAEOLOGICAL TRUST

SEPAH - Survey, Exploration and Protection of the Archaeological Heritage

PROJECT REPORT



CPAT Report No 301

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SEPAH - Survey, Exploration and Protection of the Archaeological Heritage

PROJECT REPORT

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November 1998

Report prepared for European Commission Directorate General

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CPAT Report Record

Report and status

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CONTENTS

1 INTRODUCTION

1.1 The host organisation, CPAT

CPAT was formed in 1974 and works closely with other national, regional and local bodies to help protect, record, and interpret all aspects of the historic (and prehistoric) environment. CPAT curates the computerised Sites and Monuments Register for its region as well as an extensive collection of archaeological aerial photographs. CPAT is also active in education providing study packs based on the National Curriculum to schools and teachers. Staff regularly lecture to local and national interest groups as well as in academic fora. CPAT regularly runs training excavations and courses in field archaeology for undergraduates from the University of Wales and provides post-graduate placements courses for students from Oxford and Bradford Universities. Copies of some recent documentation outlining Trust activities are enclosed.

Dr A M Gibson, formerly of CPAT, now of English Heritage, has co-ordinated the project throughout, having, through CPAT, made most of the travel and accommodation arrangements for the delegates and has acted as archaeological adviser. Mr N Jones of CPAT took responsibility for the physical survey of the area and Mr C Martin made available background data from the Sites and Monuments Record.

1.2 Other partners in SEPAH

The Irish Republic's *Discovery Programme* has an international reputation for the excellence of its fieldwork, survey and digital terrain modelling (DTM) surveys. These last-named computer-based techniques add considerable detailed topographical information and clarity to ground surveys and thus highlight the slightest surviving earthwork elements of archaeological monuments. This partner took responsibility for the DTM element of the project and instructed the delegates in the theory, practice and development of this technique and allowed Dr E Grogan and Mr B Masterson to take part in the project.

Bayerisches Landesamt für Denkmalpflege is Europe's leading institution for large-scale geophysical survey and Dr Becker is an acknowledged world authority having worked on international projects in, amongst other places, Siberia, Jordan, Syria, Egypt and Italy as well as Bavaria. This partner took responsibility for the high resolution Caesium magnetometry which made up the geophysical survey element of the project and instructed other delegates in the theory, practice and development of this technique.

Sectie Monumentenzoorg, Zwolle is the city of Zwolle's archaeological service and undertakes rescue excavations and survey within the municipality. The service has a well-established volunteer base and already has professional links with CPAT. A CPAT-Zwolle-Ghent project (PLIME - Prehistoric Links in Modern Europe) has already benefited from generous EU funding. Staff from Zwolle were keen to learn of survey techniques which were not regularly used in the city and accordingly visited Wales during the survey to gain experience of physical and geophysical survey to better understand the survival of the buried features. They were instructed by staff from the three other partners.

1.3 Delegates

SEPAH was undertaken as a practical project firstly to enable the participants to better understand the practical implications of the survey techniques being used and secondly to provide a real and beneficial outcome; namely to shed further light on the recently-discovered later Neolithic enclosure at Hindwell, Radnorshire. As each participant had their own levels of expertise, so were the tutors also delegates, learning new techniques from their specialist peers. There were 3 practical elements to the project.

1 The physical survey of the Hindwell enclosure (34 Ha)

Tutors: Mr N Jones (CPAT), Mr B Masterson (Discovery), Dr E Grogan (Discovery)

Delegates: Dr A. Gibson (CPAT), Mr C Martin (CPAT), Dr H Becker (BLD), Mr H Heikamp (Zwolle), Ms N van der Meer (Zwolle), Ms H Wevers (Zwolle).

2 The geophysical survey of the Hindwell enclosure

Tutors: Dr H Becker (BLD)

Delegates: Dr A. Gibson (CPAT), Mr C Martin (CPAT), Mr N Jones (CPAT), Mr H Heikamp (Zwolle), Ms N van der Meer (Zwolle), Ms H Wevers (Zwolle), Dr E Grogan (Discovery), Mr B Masterson (Discovery).

3 The Digital Terrain Modelling of the Hindwell Enclosure
Tutors: Dr E Grogan (Discovery), Mr B Masterson (Discovery)
Delegates: Dr A Gibson (CPAT), Mr N Jones (CPAT), Mr C Martin (CPAT), Dr H Becker (BLD)

As the intention of the project was to allow the results from the different surveys to be combined, two seminars were also held at which results were discussed and exchanged. Thus data obtained from the physical surveys could be used to augment the magnetometry. These seminars were held in two of the participating institutions (BLD and Discovery). The seminar hosted by the Discovery programme presented the final results of the project to a wider audience prior to the final publication.

1 Bayerisches Landesamt fur Denkmalpflege, Munich (geophysics)
Host: Dr H Becker
Delegates: Dr A Gibson (English Heritage), Mr C Martin (CPAT), Mr N Jones (CPAT), Mr B Masterson (Discovery)

2 Discovery Programme, Dublin (DTM)
Tutors: Dr A Gibson (EH), Dr H Becker (BLD), Dr E Grogan (Discovery), Mr C Martin (CPAT), Mr N Jones (CPAT)
Delegates: In addition to the above speaker/delegates, Ms H Wevers (Zwolle), Mr P Rogers (Zwolle), Mr H Heikamp (Zwolle), plus varied numbers of staff from the Discovery Programme, University College Dublin and the Irish Office of Public Works (Ducas).

2 SEPAH

2.1 Introduction

The project was designed as a practical field course on physical and geophysical survey techniques at Hindwell in the Radnor Valley, Wales (fig. 1). This is the site of the largest late Neolithic enclosure so-far discovered in Europe and covers some 34 hectares. It is clearly a monument of international importance and currently enjoys no specific statutory protection. It is visible only from air photographs and its presence is generally unknown to the non-professional archaeologist. Little is known of its internal arrangements, nor indeed its function or full extent.

Palisaded sites have also been studied in Ireland as well as in Continental Europe and this project therefore was designed to have a European dimension in both its academic facet as well as in its European co-operation. The project also provided an opportunity to undertake an academic study of this type of site and subsequently to present this study to a wide European audience who, because of the buried nature of the evidence, cannot visit or explore these sites for themselves.

The field course/instruction was intended to use the best survey techniques in Europe in a site-specific context to shed as much light as possible on this monument and in so doing to instruct the European project partners in the latest field techniques available, to disseminate the results of the project to a wide European audience and to put forward proposals for the better management of the archaeological resource. Physical survey, geophysical survey, and computer modelling techniques were used.

The survey course was clearly interdisciplinary and used the latest field survey and computer techniques to explore this site. The detailed results will be used to formulate long-term protection proposals for the monument which is currently lies within an active and erosive agricultural regime.

Survey of this kind is becoming increasingly important in the European heritage as it maximises the understanding of a site in a non-destructive way. By co-operating in this way with European centres of excellence and by publishing the results, professional archaeologists, as well as the public, will be given a greater awareness of the non-destructive techniques available in the study of the common archaeological heritage.

2.2 Data collection and the field course

A set-up meeting was held at CPAT offices in Welshpool on the 7th-9th May 1998. The CPAT, BLD and Discovery staff involved in the project were all present. A field trip to Walton was organised to familiarise the participants with the landscape and the archaeological problems. A methodology was proposed and a timetable agreed. Unfortunately, an excavation which it was hoped would take part during the main survey period had to be postponed due to a delay in being granted landowner

permission. This was subsequently undertaken by CPAT staff. Minutes of this meeting were circulated to all the participating partners.

Phase 1 involved the physical survey of the whole of the available interior of the enclosure. This started on 29th June 1998. During this survey, a 40m grid was laid over the interior. A commercial surveyor surveyed 6 fixed points to within 6mm accuracy, by means of GPS, to which our grid could be tied. Wooden pegs were left in position to ensure that all the surveys could be undertaken on the same grid. This work was undertaken by Mr N Jones (CPAT) with delegates Mr H Heikamp (Zwolle), Ms N van der Meer (Zwolle) and Ms H Wevers (Zwolle). A bonus to the original project was that the Discovery Programme were able to undertake the survey of the Hindwell Roman fort which lies within the Neolithic enclosure. This was undertaken by Dr E Grogan and Mr B Masterson.

Phase 2 involved the geophysical survey of approximately 20Ha of the interior. The fields chosen were those which were generally under permanent pasture and for which there was little meaningful aerial photographic cover. A field of some 4.5Ha was omitted from the survey since it was frequently under cereals and there existed good aerial photographs of cropmarks within the field. Caesium magnetometry was used. This is 1000 times more powerful than conventional fluxgate magnetometers. Dr Becker brought his own equipment from Munich. This comprises 4 Caesium magnetometers arranged at 25cm intervals on a wooden hand cart and which are triggered to 'fire' at fixed intervals. This process is rapid and detailed and allowed some 10 million measurements to be recorded. The survey was undertaken from the 5th to the 18th of July 1998 under the direction of Dr H Becker (BLD) with the assistance of delegates Mr H Heikamp (Zwolle), Ms N van der Meer (Zwolle) and Ms H Wevers (Zwolle)

Phase 3 involved a trial excavation at the neighbouring palisaded enclosure at Walton, less than 1 km to the South. This was intended to shed light on the nature of the site, the posthole dimensions, and to retrieve material suitable for relative and/or absolute dating. This was undertaken during the week beginning 3rd September 1998 by Mr J Dempsey (CPAT) and Mr G Owen (CPAT). While the pits were proved to have held posts, no datable material was recovered.

2.3 Post-survey seminars

Clearly, the vast amount of data captured during the project takes time to process and the participating institutions have been generous in allowing their staff time to undertake this work.

The processing of the geophysical data were discussed by Dr Becker at the Bayerisches Landesamt für Denkmalpflege in Munich on 1st-2nd October 1998. At this seminar, principally for the tutor/delegates, it was discussed how best to marry the data from the various surveys. The interpretations of the data were discussed and more digital information relating to the sites and monuments record were requested from Mr C Martin, principal curatorial officer with CPAT. It was considered possible to digitally combine surveyed data, geophysical data as well as information from aerial photographs. All delegates agreed to supply the others with the data they required and a series of action points were drawn up with the aim of presenting the results at a seminar in Dublin the following month. This was largely completed and a full discussion of the methodologies involved will be presented in the final publication.

On 5th-6th November 1998, a seminar was hosted by the Discovery programme open to all delegates, tutor/delegates and a wider archaeological audience drawn from Irish academic circles. Some minor problems with some of the data remained to be resolved but otherwise the tutor/delegates were able to present their results. These were enthusiastically received. Publication plans for the project were formulated (see below).

3 RESULTS

3.1 Physical survey

A detailed contour survey has demonstrated that the enclosure does not survive as an earthwork (fig. 2). No trace of this could be found. However, the survey does demonstrate that the enclosure appeared to have little regard for the natural topography and crossed palaeochanels and terraces. Old field boundaries were located attesting the long-term agriculture to which this site has been subjected. The Roman road emanating from the west gate of Hindwell fort was shown to survive as a slight surface feature in an area where it was previously only known as a cropmark and where no earthwork

traces could be detected with the naked eye. Two round barrows within the enclosure survive as substantial earthworks.

The Roman fort was seen to have two phases surviving as earthworks on two slightly different alignments. The ramparts of the fort survived little more than 200mm high.

Despite the limited results, this survey was essential to the other methods since it provided the framework within which the other surveyors could work. It was thus crucial that it be undertaken irrespective of the apparent flatness of the terrain.

The detailed methodology will be provided by Mr Jones in the final publication.

3.2 Geophysical survey

The results of the Caesium magnetometry are indeed spectacular. Apart from some large pits, the interior of the enclosure appears to have been largely void of significant structural features. However, one of the round barrows was demonstrated to have had a triple ring-ditch and a circle of extremely high magnetic anomalies lay underneath the periphery of the mound (fig. 3). The nature of this pit circle is uncertain. It may possibly be the remains of an *in situ* burnt structure or a series of pits with *in situ* burning. Whether the pits lie below the barrow or within the barrow mound remains to be resolved. It may only be possible to resolve this by excavation.

The entrance to the enclosure was marked by two large post-pits each about 6m in diameter (fig. 4). These pits presumably held substantially larger oak timbers than did the remainder of the perimeter and would have made for an imposing monumental structure.

Some of the perimeter appears to have been double (fig. 5) which has considerable implications for the human and natural resources involved in the construction of the monument. Parts of the perimeter appear to have been burnt down.

The line of the perimeter was discovered in two fields where its course had only been assumed. Thus we now have over 90% of the total perimeter. It was located under the Roman fort and appeared to intersect with another triple-ditched enclosure to the E. Unfortunately the sequence here will only be resolved by excavation.

The magnetometry of the Roman fort itself confirmed the two phases revealed on the physical survey (fig. 6). The outlines of previously unrecorded internal buildings could be clearly discerned as could a similarly previously unknown *vicus*, or civilian settlement, flanking the road emanating from the eastern gate.

An arc of three ditches to the E of the main palisaded enclosure can now be seen to represent an enclosure since the ditches were discovered just to the east of the fort. This gives the enclosure an estimated diameter of some 200m.

The detailed methodology will be provided by Dr Becker in the final publication.

3.3 Digital Terrain Modelling

Digital terrain modelling, undertaken by Mr B Masterson and Dr E Grogan, involved the construction of DTMs for the area of the enclosure itself.

As mentioned above, the contour plan for the enclosure was generally flat and featureless. Nevertheless, the area of the Roman fort provided an area of relief and serves to demonstrate the subtleties of the technique (fig. 7). In addition, experimental work is taking place on the superimposition of the geophysical survey on to the contour survey (fig. 8).

The detailed methodology and DTMs for the whole area including the 'rubber sheeting' of the geophysical plots will be provided by Dr Grogan and Mr Masterson in the final publication.

3.4 Excavation

As mentioned above, a small excavation was originally designed to have coincided with the survey work. However, due to the late harvest, this had to be postponed until September.

The excavation involved an area measuring 11 x 9m, which had been positioned in order to locate and examine one of the post pits belonging to the Walton Pit Circle. The aim of the excavation was to provide evidence for the nature and dating of the site.

Following the removal by machine of modern ploughsoil, the post pit was revealed cut into the natural gravels. The feature was generally oval in shape, measuring 4.3 x 2.0m. When half-sectioned, it was clear that the feature consisted of a post-pipe for a post 0.4m or more in diameter, set at the deepest end of the pit, with a sloping ramp to one side, which would have been constructed to facilitate the erection of the post.

Oak charcoal identified from towards the base of the post-pipe has been retained, but for the time being it has been considered to be unsuitable for a reliable radiocarbon date for the precise date of construction of the post-pit given the uncertainties about what the charcoal represents and the fact that it appears to represent slow-growing wood.

4 PUBLICATION

The processing of the data from such a large programme of survey (34Ha of physical survey and 20Ha of geophysical survey) clearly involves considerable staff time. The processing is being undertaken by the relevant members of the project within their normal work time as well as in their own leisure time. Nevertheless, a deadline of Christmas 1998 has been agreed by all participants for the submission of the final results. This remarkable time-scale for a project not completed until mid-September is an indication of the commitment of the personnel concerned and their parent institutions.

Publication of the results of the study course will ultimately be in a monograph published by CPAT. The publication will be in English with summaries in the languages of the participating organisations (Dutch, German, Irish and Welsh). Other, less detailed articles will be sent to popular archaeological magazines (*Archaeology Ireland, British Archaeology, Scaraebee, Antiquity*) and a more detailed report on the DTM/magnetometry superimpositions will also be given to *Archaeological Prospection* and *Internet Archaeology*.

The results of the project will also be presented at the international Computer Applications in Archaeology conference in Dublin in April 1999 and at the Third International Conference on Archaeological Prospection in Munich in September 1999. The data will thus be presented to the widest possible audience, both popular and specialist. The generosity of the funding bodies will be fully acknowledged in each publication/presentation.

5 FUNDING INSTITUTIONS (alphabetical order)

Bayerisches Landesamt für Denkmalpflege
Cadw: Welsh Historic Monuments
Cambrian Archaeological Association
Clwyd-Powys Archaeological Trust
Discovery Programme
English Heritage
European Commission
Gemeente Zwolle (sectie archeologie)

6 TOTAL LIST OF DELEGATES

Dr H Becker (BLD),
Dr A M Gibson (CPAT/EH),
Dr E Grogan (Discovery),
Mr H Heikamp (Zwolle),
Mr C Martin (CPAT),
Mr B Masterson (Discovery),
Ms N van der Meer (Zwolle),
Mr N Jones (CPAT),
Mr P Rogers (Zwolle),
Ms H Wevers (Zwolle).
Plus attendees at the Dublin seminar (see above).

With the exception of the un-named attendees at the Dublin seminar, all delegates benefited from EU subsidies (travel grants and subsistence).

7 DELEGATE'S REPORT by Hidde Heikamp

In 1997 is er een samenwerkingsverband geweest tussen de gemeente Zwolle, het Archeologisch Instituut van de Universiteit van Gent en de Clwyd-Powys Archaeological Trust uit Wales. Deze samenwerking heeft naast de uitwisseling van personen geresulteerd in een gezamenlijk rapport: Prehistoric Links in Modern Europe.

Afgelopen zomer 1998 zijn er drie archeologische medewerkers uit Zwolle afgereisd naar het Walton Basin (Wales) om samen met de CPAT(Welshpool, Wales), Discovery programme (Dublin) en H. Becker (Archeologische Prospectie en Luchtfotografie afdeling van het Bayerisches Landesamt fur Denkmalpflege) een archeologische site in kaart te brengen.

Met de hulp van de Zwolse medewerkers is er op verschillende weilanden een grid uitgelegd en is er een Geophysical survey en physical survey op uitgevoerd met het gebruik van GIS en GPS programma's. Deze wijze van onderzoek was voor de medewerkers van de archeologische dienst van de gemeente Zwolle zeer interessant omdat ze er nog niet zo lang daarvoor in Zwolle ook mee gestart waren. Daarnaast had Zwolle al drie projecten gekend met gebruik making van grondradar, maar met teleurstellende resultaten. Het onderzoek van H. Becker wekte dan ook terdege de belangstelling. Zwolle is zeer geinteresseerd in dit magnetische/geophysisch onderzoek naar gegevens onder de grond. Bij het veldwerk hebben de Zwolse deelnemers geassisteerd.

In Dublin zijn de gegevens bekeken en afspraken gemaakt over het publiceren ervan. Drie Zwolse medewerkers zijn hierbij aanwezig geweest en hebben o.a. een voordracht geleverd over de opgravingen in Zwolle-Ittersumerbroek, waarvan een deel viel onder het eerdere samenwerkingsverband (PLIME). Wellicht dat de publicatie over het SEPAH project in Zwolle opgemaakt wordt voor publicatie.

8 CONCLUSIONS

As has been mentioned above, Hindwell in the Radnor Valley, Wales, is the largest late Neolithic enclosure so-far discovered in Europe and covers some 34 hectares. It is clearly a monument of international importance and currently enjoys no statutory protection. It is visible only from air photographs and its presence is generally unknown to the non-professional archaeologist. Prior to this survey, little was known of its internal arrangements nor, indeed its function or full extent. This field course was therefore intended to use the best survey techniques in Europe to shed as much light as possible on this site and in so doing to instruct the European project partners in the latest field techniques available.

This course has been exemplary in bringing together acknowledged experts from across Europe to exchange their ideas and professional practice through use of the latest field techniques. The initial aims of the project have been successfully realised within a remarkably short time-scale for such a wide-ranging multi-national project.

The project has raised considerable interest among other institutions within the host countries and lectures regarding the subject and the acknowledgement of EU involvement have already been given to *inter alia* the Neolithic Studies Group (London), an International conference on the Orcadian and western European Neolithic (Kirkwall, Orkney), University College Dublin, Council for British Archaeology (Wales) and Trinity College Carmarthen.

Hindwell is now the most fully investigated (non-destructive investigations) of all the British later Neolithic palisaded enclosures. The enhanced understanding that we now have of this landscape, and in particular the erosive nature of the agricultural regime, will allow more informed decisions to be made regarding the archaeological management and preservation of the area.

9 PUBLICATIONS REGARDING HINDWELL AND THE WALTON BASIN

1995 Walton. *Current Archaeology*, 12, 444-5.

1995 Walton Basin Project, Powys. *Archaeology in Wales,* 35, 48-49. Author - A. Gibson.

1996 A Neolithic enclosure at Hindwell, Radnorshire, Powys. *Oxford Journal of Archaeology*, 15 (3), 341-8. Author - A. Gibson.

1996 Walton Basin Project, Powys. *Archaeology in Wales,* 36, 71 and 80. Author - A. Gibson.

1997 Survey in the Walton Basin (Radnor Valley) Powys. *Transactions of the Radnorshire Society*, 67, 20-62. Author - A. Gibson.

1997 Hindwell Neolithic Palisaded Enclosure, Walton. *Archaeology in Wales,* 37, 61. Author - A. Gibson.

1998 Hindwell and the palisaded enclosures of Britain and Ireland. In A. Gibson & D. Simpson (eds), *Prehistoric Ritual and Religion,* 68-79. Stroud: Sutton Publishing. Author - A. Gibson.

The Walton Basin Project. In H. Clevis & J. de Jong (eds) *Archaeology and Landuse, Three Case Studies: Prehistoric Links in Modern Europe*, 8-31. Zwolle: Municipality of Zwolle Heritage and Archaeology. Author - A. Gibson.

1998 *Walton Pit Circle, Radnorshire: Trial Excavation 1998*, CPAT Report 298. Author - J. Dempsey.

In Press *The Walton Basin Project: Excavation and Survey in a Prehistoric Landscape 1993-1997.* Council for British Archaeology Monograph. Author - A. Gibson.

APPENDIX 1: ACCOUNTS

THE CLWYD POWYS ARCHAEOLOGICAL TRUST

S.E.P.A.H. Accounts

1st April 1998-27th November 1998

INCOME
all figures in ECUs

	anticipated	actual
European Commission - grant	17.500	17.500
Cambrian Archaeological Association - grant	711	711
Cadw: Welsh Historic Monuments - grant	6.938	6.938
Munich - help in kind	17.167	22.766
Zwolle - help in kind	13.467	19.510
Dublin - help in kind	-	3.515
English Heritage - help in kind	-	4.084
Top-up from Clwyd-Powys Archaeological Trust		2.532
TOTAL INCOME		**77.556**

SPEND
all figures in ECUs

	Cadw	Cambrians	EC	English Heritage	Dublin	Munich	Zwolle
wages/salaries	7.041	465		3.202	2.289		12.304
travel/transport/subsistence		165	12.220	882	1.226		7.206
survey consumables			447				
photographic consumables	6						
photo processing	35						
service & hire		157	418				
geophysics						22.766	
publication			4.415				
administration	2.312						
TOTALS	**9.394**	**787**	**17.500**	**4.084**	**3.515**	**22.766**	**19.510**

TOTAL SPEND **77.556**

J E Britnell
Administrative Officer
27/11/98

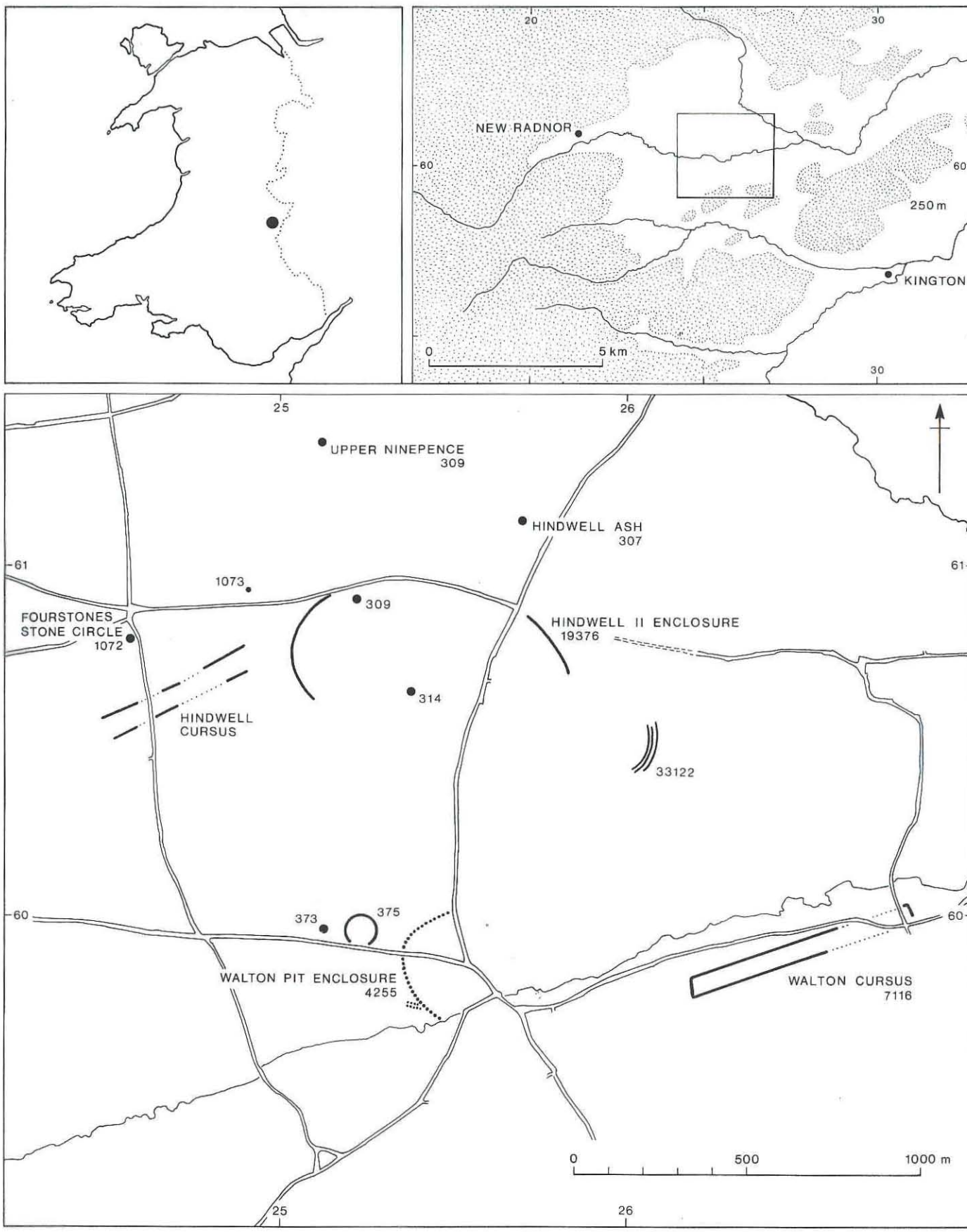
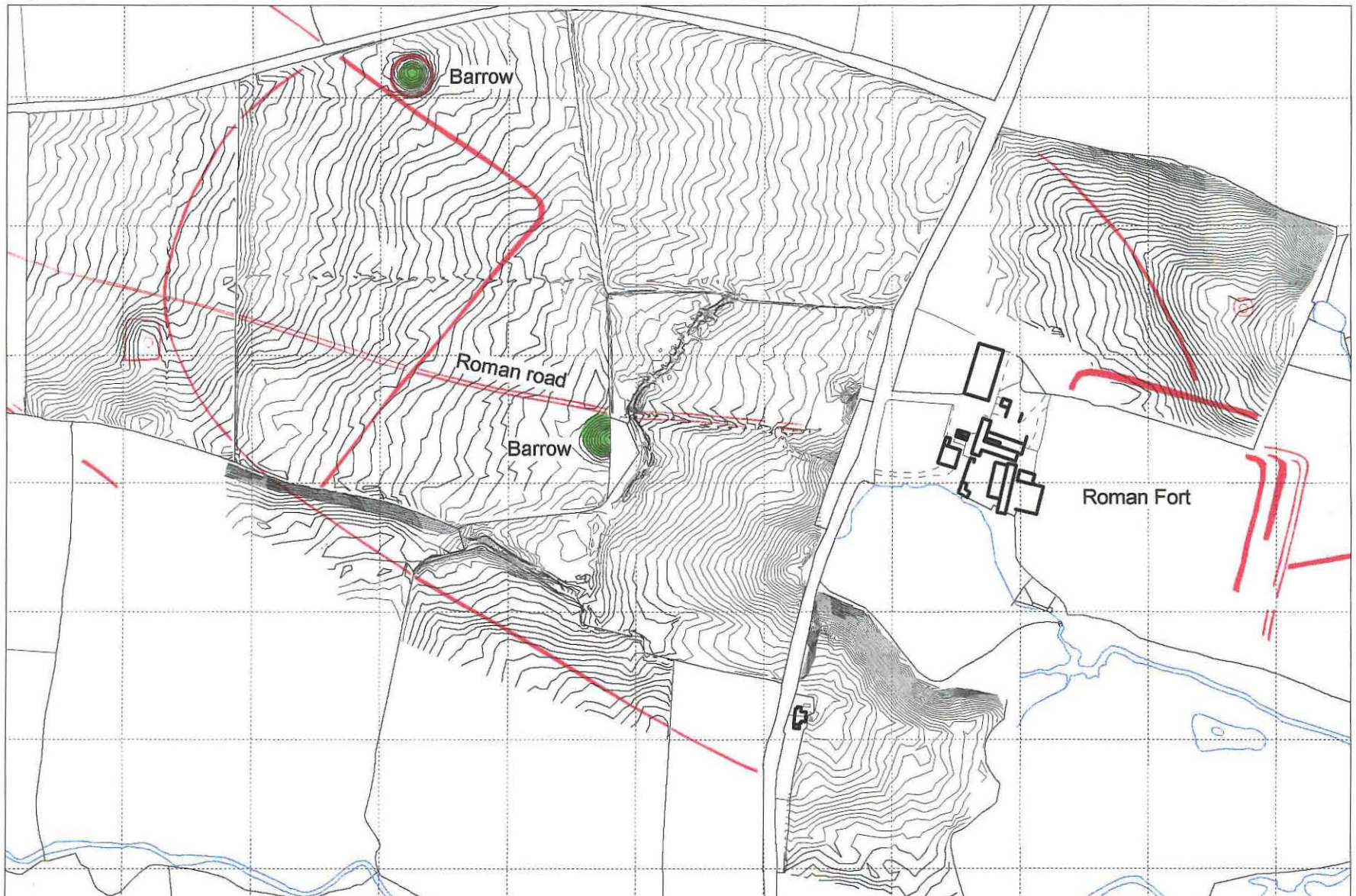


Fig. 1 Location map of Hindwell Enclosure and other sites within the immediate area of the Walton Basin

Fig. 2: Hindwell Enclosure. Ground Survey and Cropmarks. Contours at 0.1m intervals. CPAT 1998.



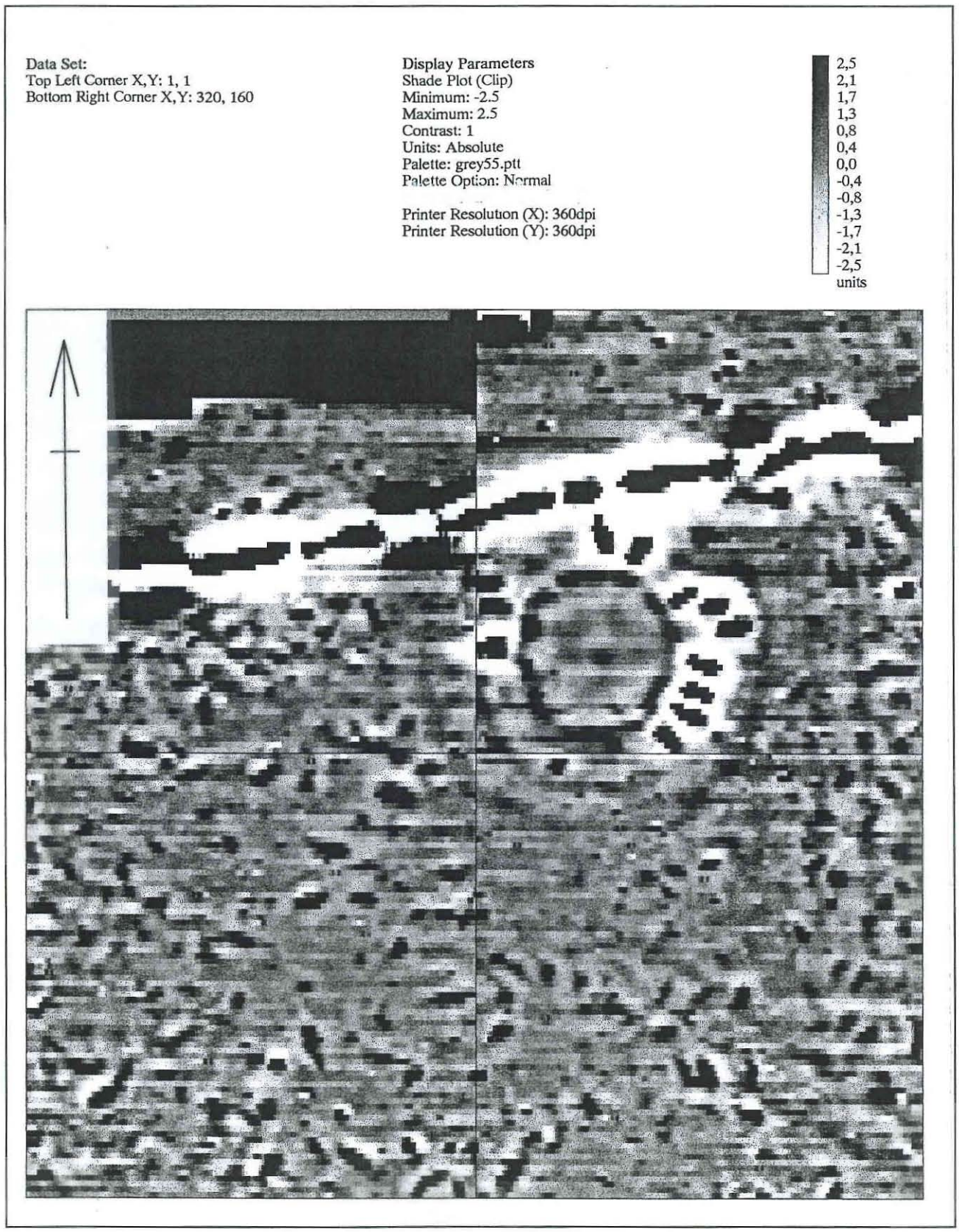


Fig. 3 Magnetometer survey of the Hindwell Barrow

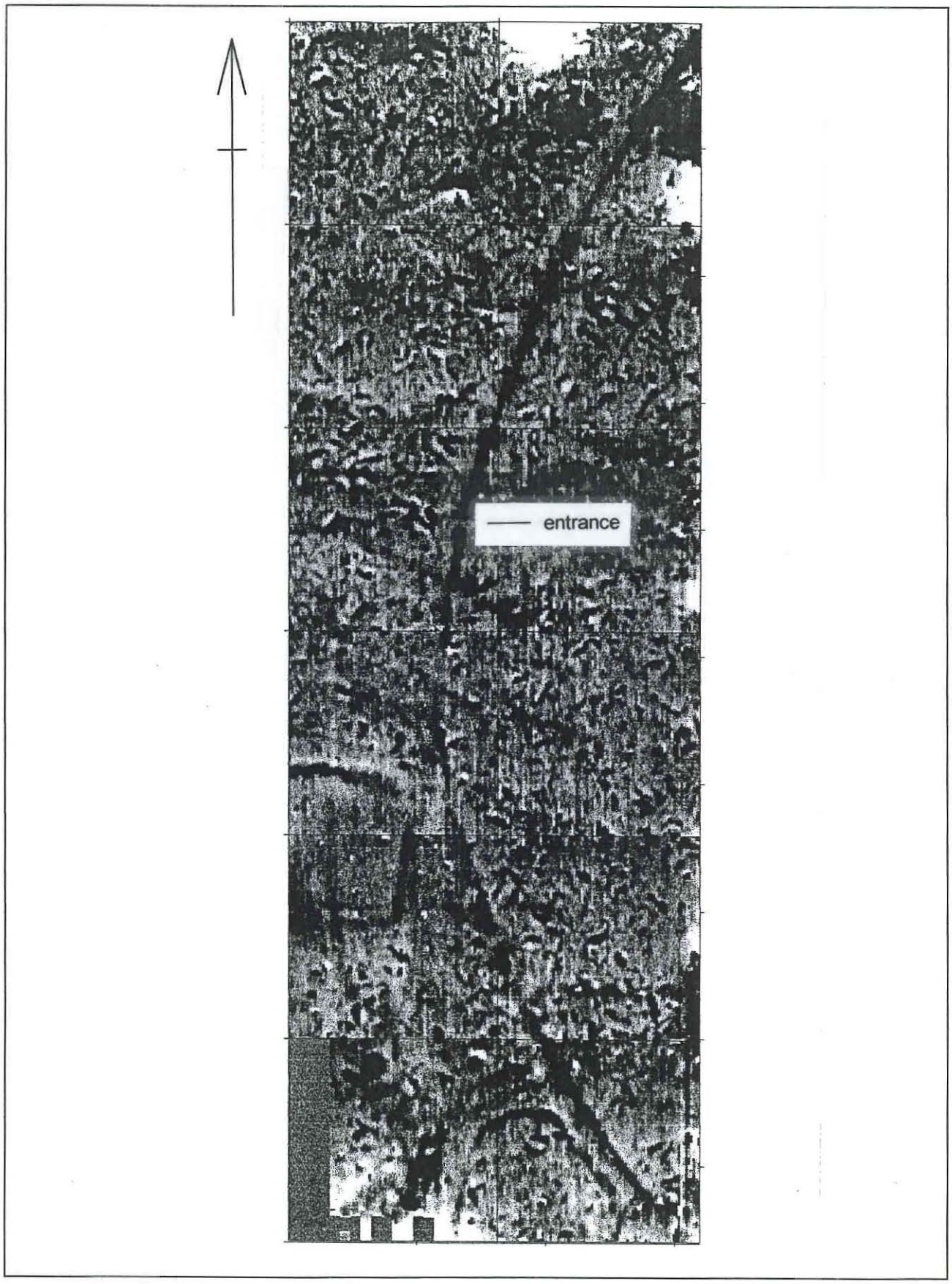


Fig. 4 Magnetometer survey of the Hindwell Enclosure entrance (north to top)

Fig. 5 Magnetometer survey of the Hindwell Enclosure north-eastern section showing double perimeter

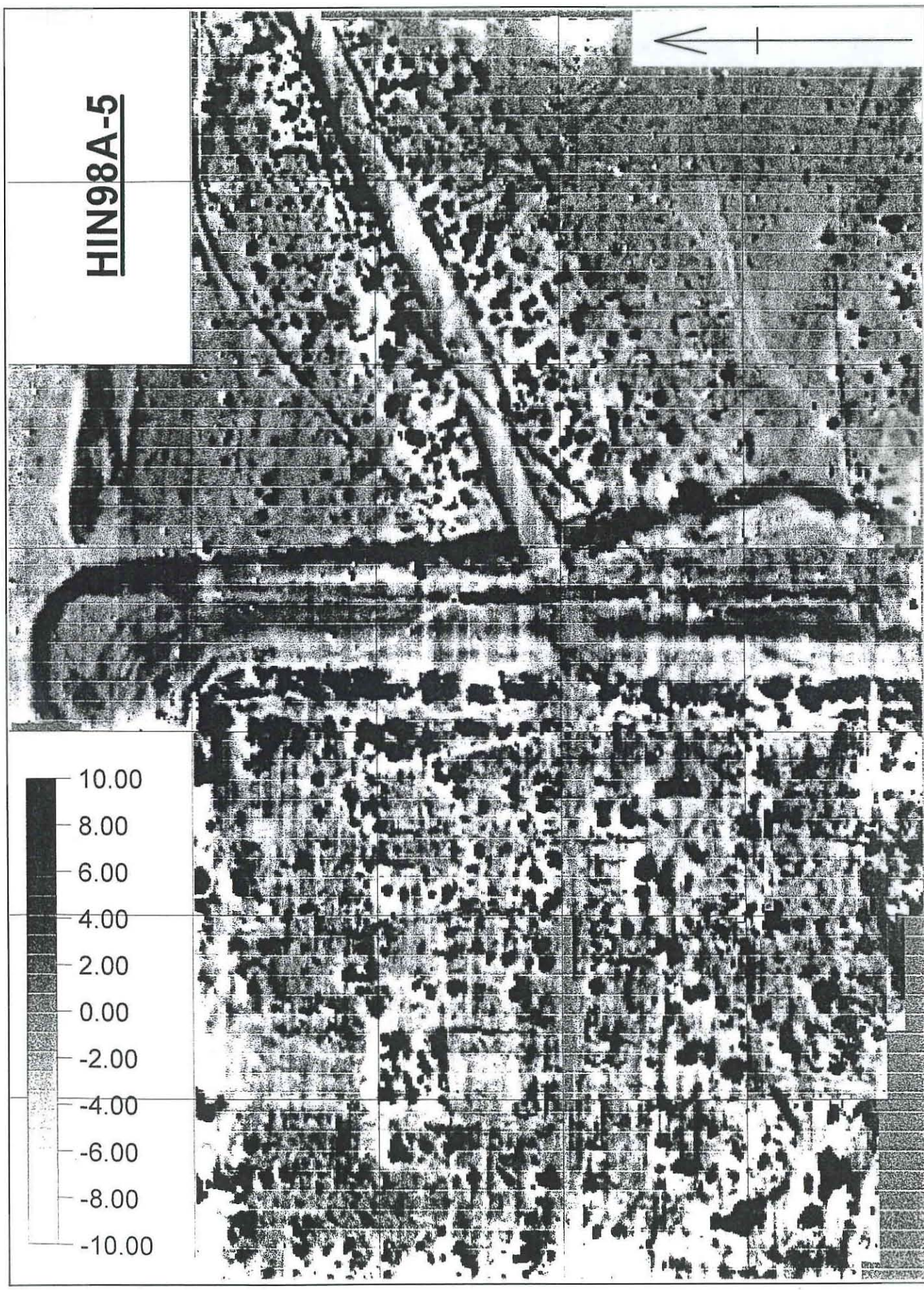


Fig. 6 Magnetometer survey of the Hindwell Roman Fort

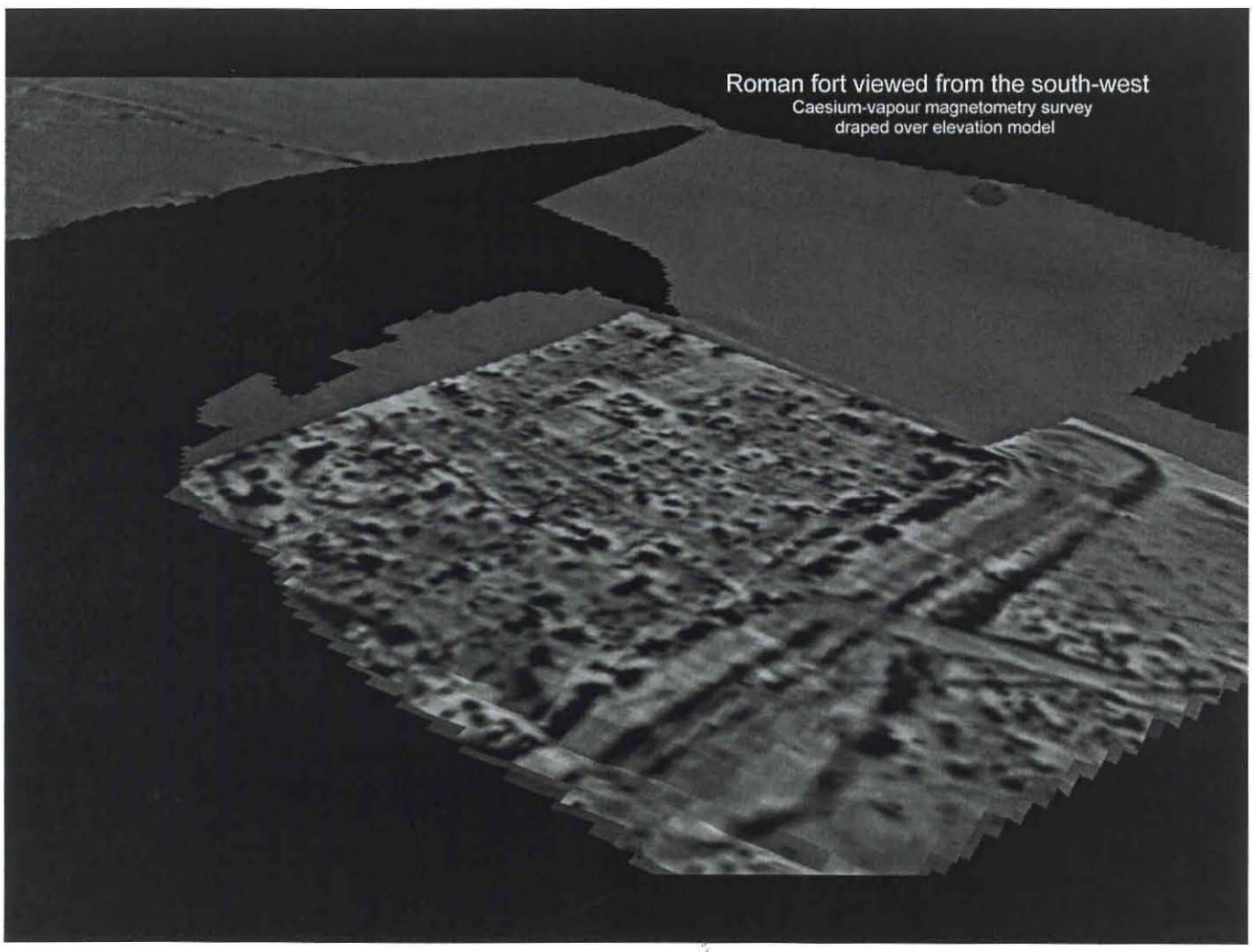


Fig. 7 Digital Terrain Model of the Hindwell Enclosure using data from the ground survey

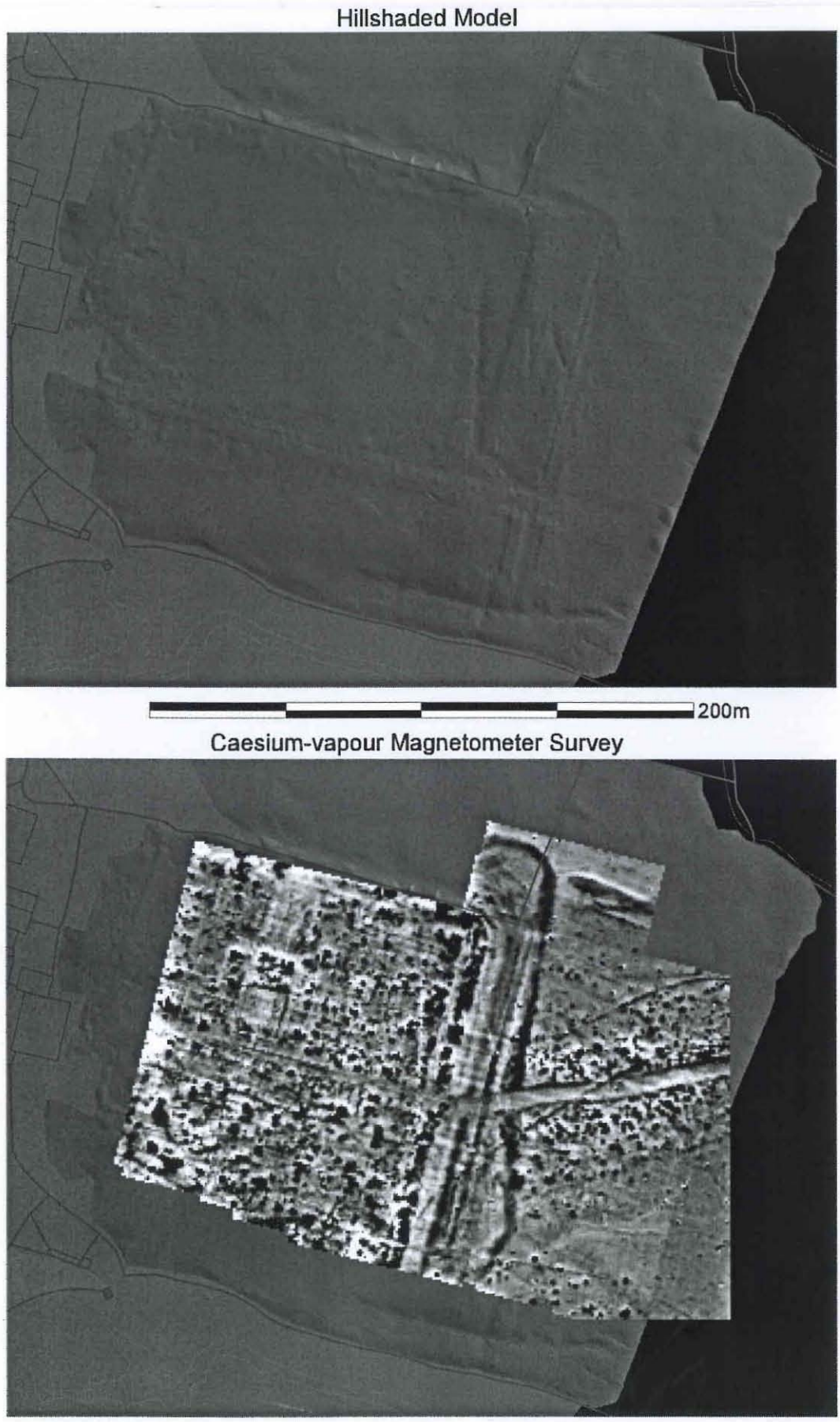


Fig. 8 Hindwell Roman Fort. Hillshaded Model (DTM) and Geophysical Survey

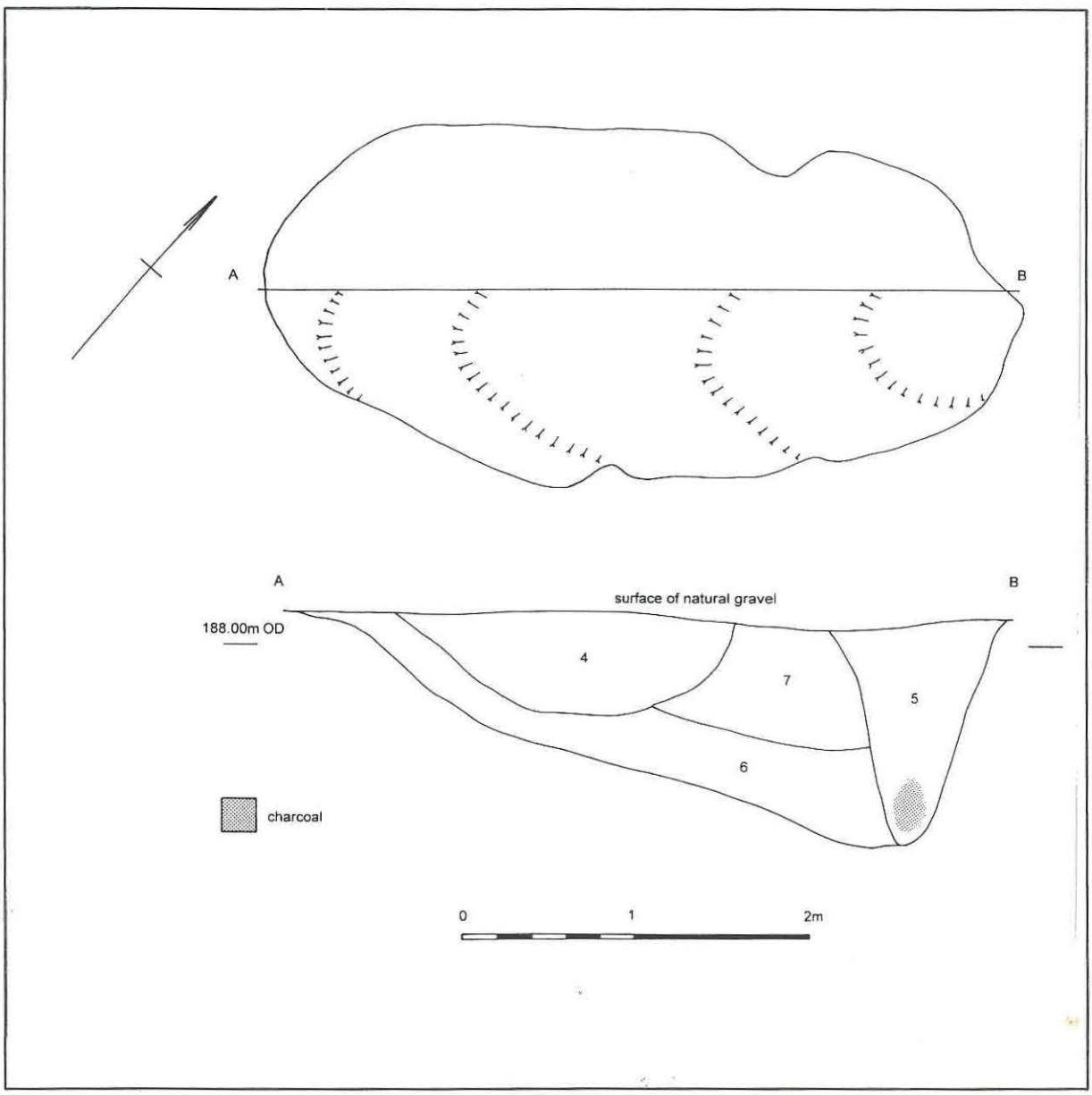


Fig. 9 Walton Pit Circle excavations. Plan and section of excavated post pit.