JOHN MOORE HERITAGE SERVICES

ARCHAEOLOGICAL EVALUATION REPORT

ON LAND AT

CHURCH FARM, THAME

OXFORDSHIRE.

SP 70900 06900

On behalf of

Thame Football Partnership

DECEMBER 2007

REPORT FOR	Thame Football Partnership 4 Arnold Way Thame Oxfordshire OX9 2QA
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CONTENTS

Summary

A geophysical survey and an evaluation were carried out by John Moore Heritage Services on behalf of Thame Football Partnership on land east of Aylesbury Road. These investigations located an undated ring-ditch and a number of Iron Age to early Roman enclosure ditches.

1 INTRODUCTION

1.1 Site Location *(Figure 1)*

The site is lies on the northwest outskirts of Thame in the angle between Aylesbury Road A418 and the A4129 (NGR SP 70900 06900). A stream forms the northern boundary and a fence bounds the east side. The southern part of the field has already been partially developed for sports pitches and an associated car park. The rest of the field is currently undeveloped and is under grassland management for grazing cattle. The underlying geology is Third River Terrace Deposits and the site forms a gravel island lying above the alluvial floodplain. The site slopes gently from *c.* 69m OD in the south to about 63m OD in the north of the site.

1.2 Planning Background

The site has been included in South Oxfordshire District Council's Development Plan Document as an allocated site (site number 56). The need for an archaeological field evaluation in advance of any development on this site was highlighted by the County Archaeologist as part of his response on the DPD Site Allocation consultation. Oxfordshire County Council owns the site and Thame Football Partnership (TFP) is currently in the process of securing a long-term lease with the County Council. The TFP is due to submit a planning application for the creation of multiple games pitches including one all weather pitch, a single storey clubhouse, and an expanded car park for 178 cars and coaches.

1.3 Archaeological and Historical Background

A ring ditch has been recorded from aerial photographic evidence (National Monument Record SP 7006/1/45) at SP 7090 0690. The ring ditch is approximately 20m in diameter and does not appear to be associated with other cropmarks. The site is recorded on the Oxfordshire Historic Environment Record as monument 11853. No other ring ditches are known from the immediate area, but the location on a gravel terrace island rising above the alluvial floodplain of the river Thame and its tributaries, is a highly suitable one for a monument of this type and period.

2 AIMS OF THE INVESTIGATION

The aims of the investigation as laid out in the Written Scheme of Investigation were as follows:

- To establish the presence/absence of archaeological remains within the site.

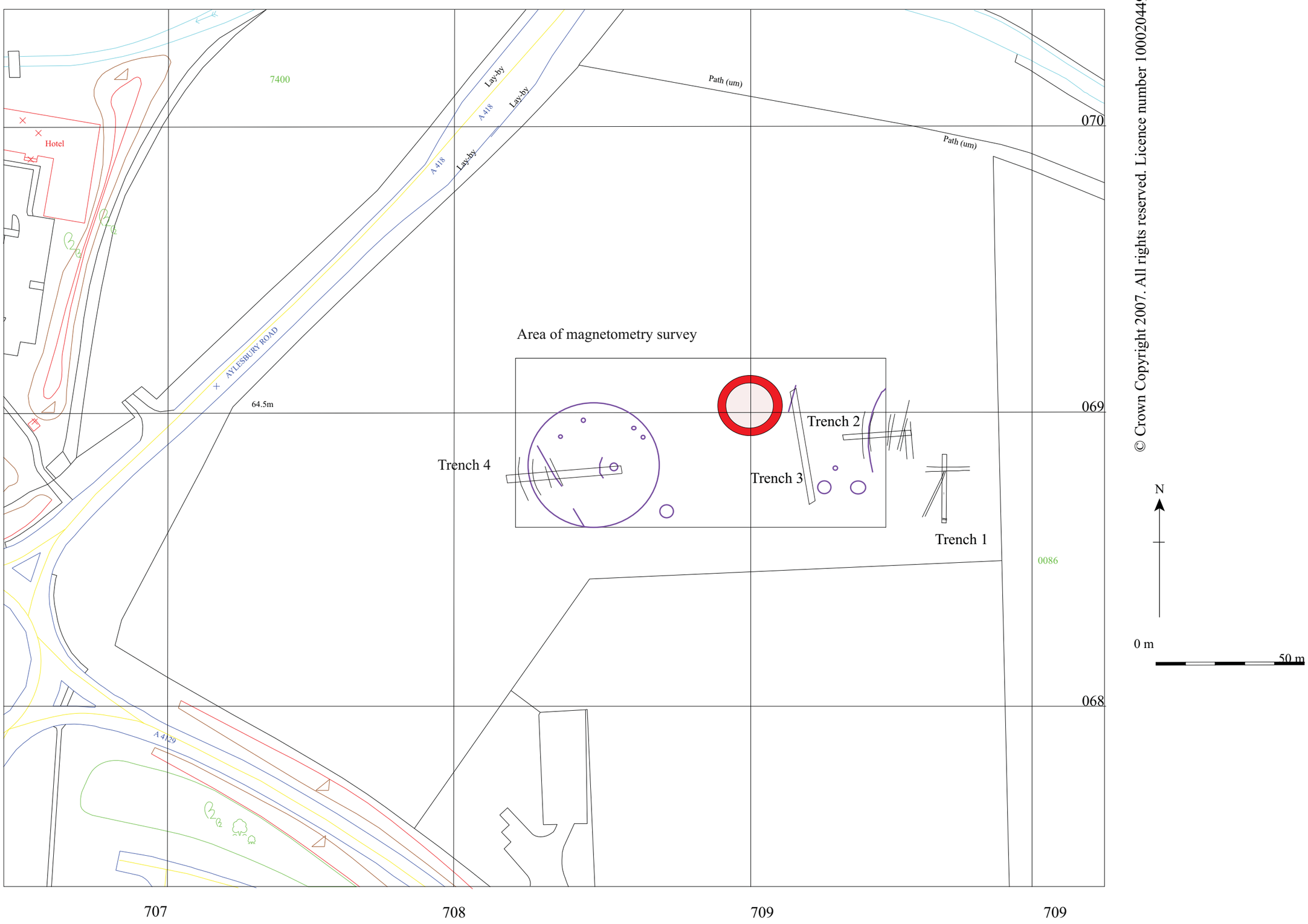

Figure 1. Site and Trench Location; purple indicates results from magnetometry survey; black indicates field results; red indicates SMR location for ring ditch

- To determine the extent, condition, nature, character, quality and date of any archaeological remains encountered.

- To assess the ecofactual and environmental potential of the archaeological features and deposits.

- In particular:
  - To determine whether the crop mark is a ring ditch
  - To determine whether other archaeological remains are present

- To make available to interested parties the results of the investigation subject to any confidentiality restrictions.

3 STRATEGY

3.1 Research Design

In response to a *Brief* issued by Oxford County Council, a scheme of investigation was designed by John Moore Heritage Services (JMHS) and agreed with Oxford County Council's Archaeologist. As a first stage of evaluation a magnetometer (gradiometer) survey was carried out by Oxford Archaeotechnics. The second stage work was carried out by JMHS and involved the excavation of four trenches across the site (Fig. 1).

Site procedures for the investigation and recording of potential archaeological deposits and features were defined in a *Written Scheme of Investigation* agreed with the Oxford City Council's Archaeologist. The work was carried out in accordance with the standards specified by the Institute of Field Archaeologists (1994) and the principles of MAP2 (English Heritage 1991).

3.2 Methodology

A magnetometer (gradiometer) survey was carried out and a report issued. Four 1.5m wide trenches were excavated across the site targeted on anomalies detected by the magnetometer survey.

Trenches 1 and 2 were to measure 25m in length; Trench 2 was extended to 28.5m. Trenches 3 and 4 were to be 30m in length but were extended to 40m and 38.5m respectively. They were excavated by a 5-tonne excavator with a ditching bucket, to the top of the archaeology or the natural, whichever occurred first. The resultant surfaces were cleaned by hand, where necessary, prior to limited hand excavation of any identified archaeological features.

Standard John Moore Heritage Services techniques were employed throughout, involving the completion of a written record for each deposit encountered, with scale plans and sections drawings compiled where appropriate. A photographic record was produced.

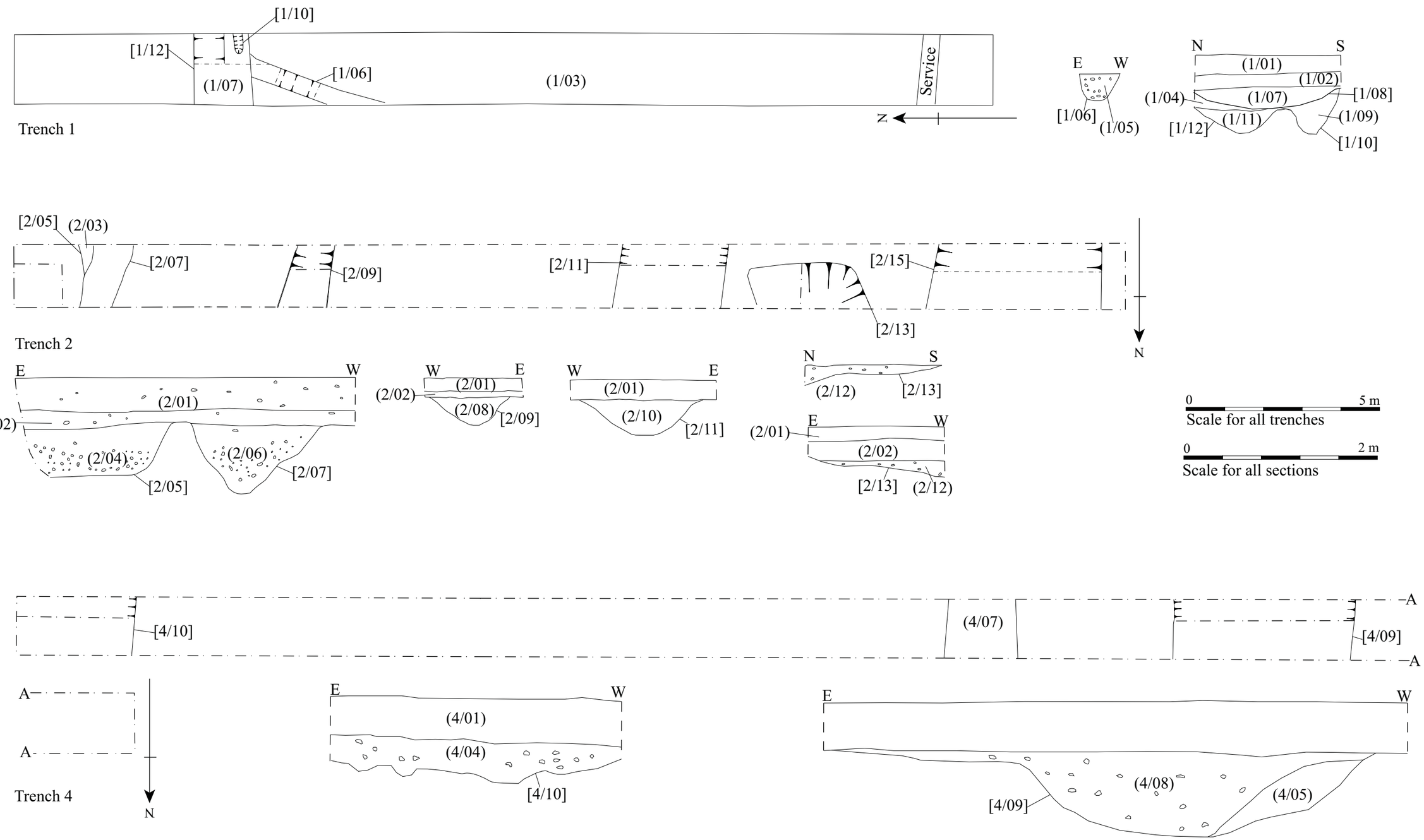

Figure 2. Trench plans and sections

4 RESULTS
4.1 Field Results

All deposits and features were assigned individual context numbers. Context numbers in square brackets - [ ] - indicate features i.e. cuts; while numbers in parentheses - ( ) - show feature fills or deposits of material. Land drains and some features were assigned a joint cut and fill number, which is indicated with square brackets. All measurements are given in metres. A general description of the feature fills is given.

4.1.1 All trenches
All trenches evidenced the same basic sequence of layers. The natural was brownish yellow to reddish brown mottled sand with 30% small stone/gravel (Tr. No./03). This was overlain by subsoil, a moderately compacted brown loamy sand, with small stone through it (Tr. No./02). Topsoil was a friable brown sandy loam with 2% small stone (Tr. No./01). These layers were present in all four trenches. The two uppermost layers sealed all the archaeological features.

4.1.2 Trench 1
Trench 1 measured 25m long and was aligned north/south.

The earliest feature [1/12] cut through the natural (1/03). The cut [1/12] measured c. 1m wide and c. 0.35m deep. It was oriented east/west. Filled with (1/11), a yellowish brown loamy sand, it was sealed with (1/04), a layer of redeposited natural. No finds were recovered. The southern edge of [1/12] was cut by [1/10].

The cut [1/06], to the south of [1/12], was a northeast/southwest aligned gully, measuring 0.4m wide and 0.25m deep. This cut was filled with brown sandy loam. No finds were recovered. The gully was cut by [1/10].

The gully [1/10], which cut [1/06] and [1/12] – and also aligned east/west – measured 0.5m wide and c. 0.4m deep. It was filled with yellowish brown loamy sand (1/09). Animal bone was recovered during the evaluation.

Cutting thorough the top of these three gullies was the broad shallow ditch [1/08]. This was c. 1.5m wide and 0.2m deep. It was filled with dark brown sandy loam (1/07). Bone was recovered from this deposit.

No other features were observed in this trench.

4.1.3 Trench 2
Trench 2 measured 28.5m long and was aligned east/west. Originally proposed to be 25m the uncovering of [2/15] led to an extension of c. 3.5m to expose the feature in full.

At the east end of the trench two ditches [2/05] and [2/07] were exposed. These ditches were broadly north/south aligned. It was not possible to tell within the evaluation which cut the other, although on the south side of the trench they were separated by a band of natural. The feature [2/05] extended beyond the edge of the trench, but measured at least 1.4m east/west and was c. 0.4m deep. It was filled with moderately compacted mid brown, yellow mottled sandy loam (2/04) with significant gravel inclusions. A single bone was recovered from this feature.

To the west was another ditch [2/07], which appeared to be more SW/NE oriented. The ditch measured c. 1.3m east/west and was 0.7m deep. It had an irregular V-shaped profile and was filled with compact dark brown clay sand (2/06) containing small stone & gravel. The pottery from this ditch dated from the late Iron Age through to the early Roman period – c. 1st C AD. Animal bone was also recovered during the evaluation.

To the west of this linear feature was a further ditch [2/09], measuring approximately 1m wide and 0.3m deep and oriented north/south. It was filled with mid brown clay sand (2/08). The single sherd of pottery from this ditch was dated to the middle Iron Age.

The ditch [2/11] to the west was also oriented north/south. It measured c. 2.75m across and c. 0.4m deep. It was filled with dark brown/grey clay sand (2/10) and some small stone. The date range for pottery recovered from this feature was late Iron Age/early Roman. Additionally, bone and daub were also recovered during the evaluation. This feature was recorded during the magnetometry survey, and was located on the very eastern edge of the survey area. Initially, this was believed to be part of a second ring-ditch. This does not seem to be a suitable interpretation, as no corresponding arc of ditch was observed in Trench 1 although the possibility remains that it is just beyond the south extent of Trench 1. If such were the case the ditch would have a diameter of some 58m.

Immediately adjacent to this ditch was a shallow feature [2/13]; during machining it appeared to be almost positive, standing proud of the surrounding natural. It was sub-rectangular in shape with an irregular base. The fill was a dark brown/grey clay sand (2/12). A large quantity of pottery – 12 sherds – was recovered during machining and excavation generating a late Iron Age to early Roman date, although the material spanned the middle Iron Age to early Roman period traditions. Animal bone was also recovered during the evaluation.

Approximately 1.5m west of the feature [2/13] was a north/south aligned depression [2/15]. This depression was filled with the subsoil (2/14), which contained a small amount of tile. No datable finds were recovered from the possible feature.

4.1.4 Trench 3

Trench 3 measured 40m long and was aligned north/south.

The trench failed to reveal any archaeological remains. Anomalies observed during the magnetometry survey and machining were observed to be variations in the natural following cleaning. The sequence of deposits was brownish yellow to reddish brown sand natural (3/03), sealed by subsoil (3/02), which was overlain at the southern half of the trench by what appeared to be redeposited topsoil (3/04). This redeposited topsoil was almost identical with the overlying topsoil (3/01), but more compacted. Apart from some tile from (3/01), all finds from this trench – some animal bone, til and a nail were recovered from (3/04).

4.1.5 Trench 4

Trench 4 measured 38.5m long and was oriented east/west.

At the east end of the trench was the cut [4/10], an anomaly picked up during the magnetometry survey. This extended beyond the eastern edge of the trench, but measured at least 3m east/west. It was filled with (4/04) a brown loamy sand. The base of the cut(?) was irregular, and within the scope of the evaluation it was not clear whether this was a natural feature backfilled with a topsoil-type material in the past, or an archaeological feature. A single piece of animal bone was recovered from the deposit.

To the west, also where geophysical work indicated the presence of negative features (a linear and a ring ditch), two features were observed. The linear feature (4/07) was not excavated, although handmade, presumably prehistoric, pottery was recovered from the surface, which was a brown clay sand. To the west a broad ditch [4/09] was excavated. This measured approximately 4.5m wide and 0.9m deep. It was filled with brown loamy sand (4/08), which on the western edge overlay a deposit (4/05) of redeposited natural. Animal bone was recovered from the deposit (4/08).

4.2 Reliability of methods and results

The evaluation was carried out in moderately wet and cold conditions which gradually improved over the course of the second day.

As constraints were tight, with an initial focussing on the sequence in Trenches 1 and 2, cleaning was briskly carried out in Trench 3. Although no archaeological remains could be identified the relatively small size of the anomalies on the geophysical survey, within such a large area, means that if the trench was only a metre or so off the proposed location, it is possible that they were merely missed, rather than not present.

Trench 4 was completed in the afternoon; equally in this case it is possible that light conditions and the limited time available for weathering contributed to the difficulty in identifying all the anomalies observed during the geophysical survey.

As a consequence of the limited time that the trenches open it is very possible that smaller features such as postholes or stakeholes were not seen as they had not had sufficient time to weather out.

5 FINDS

5.1 The Pottery *by Lisa Brown*

Twenty-one sherds (528 g) were recovered from four contexts. Most sherds are late Iron Age or early Roman in date, but several sherds from 02/12 are more likely to date to the middle Iron Age and a small handled jar from 2/10 probably dates to the later part of the early Iron Age or middle Iron Age. All sherds, with the possible exception of a Roman greyware sherd from 02/12, are handmade.

The pottery was recovered from linear and annular (or ?penannular) ditches (possibly Iron Age or early Roman roundhouse gullies.

Cxt	Sh	Wt (g)	Description/comments	Date
02/06	1	84	Frag of oven plate/wall 20 mm thick	M-LIA / early Roman
02/06	1	11	Body sherd; grog and shell temper; handmade	LIA - early Roman
02/06	1	49	Body sherd; fine micaceous sand/shell/argillaceous material, scored/furrowed decoration; handmade	Probably 1st C AD
02/06	1	30	Short everted rim narrow-neck jar; Fine micaceous/rare fine shell; handmade	LIA / early Roman
02/06				**Early Roman**
O2/08	1	33	Handled globular jar, plain flat rim; glauconitic clay with fine, calcined white flint; handmade	Late EIA-MIA
02/08				**Early-Middle IA**
2/10	3 (join)	29	Plain base (3 conjoining sherds); Fine soapy grog-tempered ware; handmade	LIA / early Roman
2/10				**LIA / early Roman**
02/12	6 (join)	238	Body sherds of large jar; sand/quartzite/glauconite; handmade	M-LIA ?
02/12	2	11	Body sherds; sandy glauconitic, external burnish; handmade	MIA - early Roman
02/12	3 (join)	25	Joining body sherds; slightly sandy micaceous, glauconitic; internal burnish; handmade	MIA – LIA
02/12	1	11	Basal sherd; coarse sand/ferrous pellets/quartzite; handmade	LIA / early Roman
02/12	1	7	Body sherd; coarse rounded quartz sand; ?wheelmade	Early Roman
02/12				**LIA / early Roman**
Total	**21**	**528**		

5.2 The other finds

In addition to the pottery identified in section 5.1, handmade pottery was also recovered from (4/07), which had been mislabelled as tile. Additionally daub was recovered from (2/10) which had also been mislabelled as tile; tile was recovered from (2/01), (2/14), (3/01) and (3/04). Animal bone was recovered from (1/09), (2/04), (2/06), (2/10), (2/12), (3/04), (4/04) and (4/08). A single nail was recovered from (3/04).

5.3 Environmental Remains

No environmental sampling was carried out.

6 DISCUSSION

The field evaluation confirmed much of the geophysical survey work carried out by Oxford Archaeotechnics at the site.

Trench 1 was not examined with geophysical methods. Trenches 2, 3 and 4 were, however. The results from Trenches 2 and 4 were extremely positive; and, although the results from Trench 3 were negative, and Trench 4 did not reveal all the anomalies picked up by the geophysical survey, this may be a consequence of the size of the original anomalies in a field of this size, or equally that they were natural anomalies – differences in the natural were observed during the evaluation.

Trench 4 evidenced the undated but possibly Bronze Age ring-ditch 45m in diameter; the barrow of which having been removed. The barrow, which in its location on a headland overlooking the Thame valley is appropriately placed on a break on the up-slope, and which would only serve to intensify the impression it would have made.

The size is comparable with the largest ring ditches found at Barrow Hills, Abingdon (Barclay & Halpin, 2007: 2; 156-7). The ring-ditch is located on northwest facing spur overlooking the Thame valley. It is possible that the feature [4/10] observed toward the centre of the ring-ditch may represent the original inhumation place, although no positive evidence was recovered for such a conclusion. It is also a possibility that the ditch [2/11] may represent a second ring ditch on the eastern part of the site. However, if this were so, the projected size of such a ring ditch would be in the region of 58m, which is somewhat larger than usual. As such it is unlikely to be a ring ditch, but rather probably represents an enclosure ditch.

The linear feature (4/07), which registered as a weak anomaly on the geophysical survey may well be part of such a system of enclosures. This feature was seen within the ring ditch on the western side of the site. It is an undated, though probably prehistoric, ditch aligned northwest-southeast which was recorded by the geophysical survey and subsequently identified during the evaluation. Pottery was recovered from the surface during machining, but it was not excavated, as, despite cleaning, it was not easily visible, within the narrow confines of the trench. This possible enclosure ditch was not seen during the geophysical survey to extend north of the ring ditch.

To the east Trenches 1 and 2 evidenced remains of a number of possible enclosures; the strongest dated sequence was obtained from Trench 2. The ditches – which are largely a secular part of the landscape – are in close proximity to the earlier barrow. A north/south aligned ditch [2/09] containing early to middle Iron Age pottery was located in the middle of the trench. A single potsherd dates this ditch; it is therefore possible that this is residual material. However, c. 11m to the west the feature [2/13] also evidenced middle Iron Age pottery, and the Roman date for the feature is based on only a few sherds dating, which might be intrusive. Moreover this feature yielded a relatively large quantity of animal bone. This middle to late Iron Age material was recovered from features which are parallel to ditches dating from the late Iron Age and early Roman periods within Trench 2.

Although no datable material was recovered from the ditches in Trench 1, which were at right angles to those in Trench 2, it is more than likely that they are part of some form of a field boundary or a domestic enclosure. The presence of daub in ditch [2/11] may well be indicative of domestic activity nearby. Moreover the strong presence of animal bone in many of the ditches in Trench 2, as well as an overall presence in most ditches in the trenches is strongly indicative of the potential for settlement.

It is difficult to explain easily the presence of the linear features solely as possible field boundaries. The presence of pottery in the ditches in Trench 2 and the associated bone and daub is highly like to indicate settlement activity in the immediate area. The enclosure ditches on the east side of the site are oriented north/south, and it is possible that the ditch [2/05] at the east end of Trench 2 and either of the east/west ditches [1/12] or [1/08] comprise such an enclosure, presently undated. Equally, the linear feature (4/07) on the east side of the site may well form a part of such a settlement.

The geophysical survey demonstrated that the cropmark recorded from aerial photography exists, and indicated the possibility that there were further archaeological remains present on the proposal area. The evaluation confirmed much of the results

of the geophysical survey and provided a date range for the remains spanning the middle Iron Age through to the early Roman period. The ring ditch was not dated, but appears to have been brought into the immediate ambit of the putative settlement. The linear observed may well be a field boundary, or an enclosure associated with the putative settlement, which the pottery indicates was active over the course of the middle or late Iron Age into the early Roman period.

7 BIBLIOGRAPHY

Barclay A & Halpin C 2007 Excavations at Barrow Hills, Radley, Oxfordshire Vol 1 The Neolithic and Bronze Age Monument Complex OAU

English Heritage 1991 *Management of Archaeological Projects*

Institute of Field Archaeologists. 1994 *Standard and Guidance for Archaeological Field Evaluations.*

APPENDIX 1

ARCHAEOLOGICAL CONTEXT INVENTORY

Context	Type	Description	Depth (m)	Width (m)	Length (m)	Finds	Interpretation
Trench 1							
1/01	Layer	Friable brown sandy loam 2% small stone	0.16m	1.5m	30m	-	Topsoil
1/02	Layer	Moderate brown loamy sand, small stone	0.2m	1.5m	30m	-	Subsoil
1/03	Layer	Moderate mid-red brown, yellow mottling sand; 30% small stone/gravel	Unk.	1.5m	30m	-	Natural
1/04	Layer	Moderate mid-red brown, mottled yellow sand; gravel	0.25m	1.5m	1.6m	-	Redeposited natural in top of [1/08]
1/05	Fill	Moderate brown sandy loam; small stone c. 40%	0.18m	0.46m	3.2m	-	Gully fill
1/06	Cut	Linear, sharp break of slope at top, rounded at base, vertical sides, flattish bottom; SW/NE	0.18m	0.46m	3.2m	-	Gully cut
1/07	Fill	Friable dark brown sandy loam, c. 25% gravel	0.2m	1.5m	1.60	-	Fill of ring ditch
1/08	Cut	Linear (slightly rounded); moderate break of slope at top concave sides, gentle break of slope at base flat bottom; E/W oriented	0.2m	1.5m	1.60	-	Ring ditch cut?
1/09	Fill	Moderate, yellowish brown loamy sand, gravel	0.35m	0.34m	0.6m	-	Fill of gully
1/10	Cut	Linear; rounded W edge (terminal?); moderate break of slope at top, gentle at base, concave sides rounded base; E/W	0.35m	0.34m	0.6m	-	Gully cut
1/11	Fill	Moderate, yellowish brown loamy sand, 10% gravel	0.m	0.m	.m	-	Ditch fill
1/12	Cut	Linear; gentle break of slope at top and base, concave sides rounded base					Ditch cut

Context	Type	Description	Depth (m)	Width (m)	Length (m)	Finds	Interpretation
Trench 2							
2/01	Layer	Friable brown sandy loam 2% small stone	0.16m	1.5m	30m	-	Topsoil
2/02	Layer	Moderate brown loamy sand, small stone	0.2m	1.5m	30m	-	Subsoil
2/03	Layer	Moderate mid-red brown, yellow mottling sand; 30% small stone/gravel	Unk.	1.5m	30m	-	Natural
2/04	Fill	Medium mid-red brown, yellow mottling sandy loam; gravel	0.4m	1.4m	1.6m	-	Ditch fill
2/05	Cut	Linear; gentle break of slope at top and base, concave sides rounded base	0.4m	1.4m	1.6m	-	Cut of ditch
2/06	Fill	Moderate dark brown clay sand; small stone & gravel	0.68m	1.26m	1.6m	-	Fill of ditch
2/07	Cut	Linear; medium break of slope at top and base, concave sides rounded base	0.68m	1.26m	1.6m	-	Cut of ditch
2/08	Fill	Medium, mid brown, clay sand; small stone	0.4m	1m	1.5m	Pot	Fill of ditch
2/09	Cut	Linear; NE/SW	0.4	1m	1.5m		Cut of ditch
2/10	Fill	Medium, dark brown/grey, clay sand; small stone	0.5m	1.5m	1.5m	pot	Fill of ditch
2/11	Cut	Linear; S/N deep ditch	0.5m	1.5m	1.5m		Cut of ditch
2/12	Fill	Medium, dark brown/grey, clay sand; small stone	0.08m	1.8m	1m	Pot, bone	Fill of ditch
2/13	Cut	Sub-rectangular? Extends beyond edge of trench	0.08m	1.8m	1m		Cut of ditch
2/14	Fill	Moderate brown loamy sand, small stone	0.1m	4.5m	>1.5m		Subsoil?
2/15	Cut	Linear? Poor edge definition		4.5m	>1.5m		Possible hollow or green way
Trench 3							
3/01	Layer	Friable brown sandy loam 2% small stone	0.16m	1.5m	30m	-	Topsoil
3/02	Layer	Moderate brown loamy sand, small stone	0.2m	1.5m	30m	-	Subsoil

Context	Type	Description	Depth (m)	Width (m)	Length (m)	Finds	Interpretation
3/03	Layer	Moderate mid-red brown, yellow mottling sand; 30% small stone/gravel	Unk.	1.5m	30m	-	Natural
3/04	Layer	Moderate brown, loamy sand; small stone/gravel	0.25m	1.5m	c.11m (S end of trench)	-	Redeposited topsoil
Trench 4							
4/01	Layer	Friable dark/ reddish brown sandy loam 1% mixed gravels small stone	0.3-0.4m	1.5m	30m	-	Topsoil
4/02	Layer	Moderate brown loamy sand, small stone	0.2m	1.5m	30m	-	Subsoil
4/03	Layer	Moderate mid-red brown, yellow mottling sand; 30% small stone/gravel	Unk.	1.5m	30m	-	Natural
4/04	Fill	Moderate mid brown, yellow mottling loamy sand; 10% small stone/gravel	0.4m	1.5m	3m+		Fill
4/05	Fill	Moderate mid-red brown, yellow mottling sand; 30% small stone/gravel	0.4m	1.5m	c. 1.5m	-	Redeposited natural on western edge of ring ditch
4/08		Moderate brown loamy sand, small stone	0.9m	1.5m	c. 4m		Fill of ring ditch
4/09		Linear; gradual break of slope on E & W edges; concave sides and rounded bottom	0.9m	1.5m	c. 4m		Ring ditch cut
4/10		Unknown shape: sub-rounded? sides gradual, irregular base	c. 0.4	1.5m	3m+		Cut

LAND AT CHURCH FARM, THAME, OXFORDSHIRE

Magnetometer (Gradiometer) Survey

Commissioned by

John Moore Heritage Services

(Survey Ref: 3151107/THO/JMH)

Produced by

A Johnson BA (Hons)

NOVEMBER 2007

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SUMMARY

A geophysical evaluation programme comprising magnetometer (gradiometer) survey was carried out on c.0.8 ha of land at Church Farm, on the northern outskirts of the town of Thame, Oxfordshire (centred on NGR 470880 206870), in advance of the proposed construction of sports pitches and associated facilities.

The survey was based upon the principle that past human activity and its associated debris usually creates slight but persistent changes in the local magnetic environment which can be sensed from the surface.

The survey area responded favourably to magnetometer (gradiometer) survey, revealing a large (c.45 m diamterer) ring ditch together with other features including a stretch of curving ditch and pockets of deeper soils and possible pitting which may have further archaeological potential.

1. INTRODUCTION

1.1 Geophysical survey was commissioned by John Moore Heritage Services on land at Church Farm, on the northern outskirts of the town of Thame, Oxfordshire in advance of the proposed construction of sports pitches and associated facilities. The location is shown on Fig. 1. The fieldwork was carried out in November 2007.

1.2 The survey area (centred on NGR 470880 206870) was sited within a pasture field situated within the angle of the A 418 (Aylesbury Road) and the A 4129), covering an area measuring 130 x 60 m (c.0.8 ha).

1.3 The lies on the south side of the valley of a small stream, the ground sloping from 69m AOD on the north to 63m AOD at the stream. The primary object of the survey was to focus on the cropmark of a ring ditch c.20 m in diameter (Oxfordshire HER 11853) known from aerial photographs (SP 7006/1/45) and plotted at SP 470900 206900.

1.4 The geology is reported as 3rd River Terrace deposits, comprising a 'gravel island rising above the alluvial floodplain of the River Thame and its tributaries (John Moore 2007).

1.5 The work comprised magnetometer (gradiometer) survey. An explanation of the techniques used is included in an Appendix below.

2. MAGNETIC SURVEY DESIGN

2.1 Survey control was established by EDM Total Station to the National Grid. Following the English Heritage Ancient Monuments Laboratory (AML) guidelines, the geophysical survey grid is internally accurate to ± 10 cm, and locatable on the OS 1:2500 map to the nearest metre (AML 1995:Part I, 3.2). The survey resection details are shown on Fig. 5.

2.2 Detailed gridded magnetometer (gradiometer) survey was undertaken with a Geoscan Research FM 36 Fluxgate Gradiometer (sampling 4 readings per metre at 1 metre traverse intervals in the 1 nT range). The nanotesla (nT) is the standard unit of magnetic flux (expressed as the current density), here used to indicate positive and negative deviations from the Earth's normal magnetic field.

2.3 Gradiometer data have been presented as grey scale, interpretative and stacked trace (raw data) plots (Figs. 3 & 4); an overview of results at 1:2500 scale is shown on Fig. 2.

3. SURVEY RESULTS

3.1 Having investigated the presumed position of the cropmark ring ditch, it became apparent that the plotted location was cut through by a substantial pipe, presumed to be a sewer pipe, running on a NW-SE trend from the direction of the sewage works in the neighbouring field to the southeast. Manholes and ferrous inclusions associated with this pipeline had created significant areas of magnetic 'interference' slightly greater than 10 m in diameter. However, despite this substantial modern anomaly, there was a sufficient clear area on either side to permit the identification of a ring ditch with an anticipated diameter 20 m, but no trace was found at this location.

3.2 However, a substantial ring ditch, almost 45 m in diameter, was identified by the magnetometer (gradiometer) centred approximately 50 m WSW of the anticipated location (at NGR 470847 206882). A weak lnear anomaly, visible for a distance of perhaps 35 m and running on a NW-SE trend crosses the southwestern quadrant of the ring, and there is also a possible curving linear just east of its centre.

3.3 A somewhat weaker curvilinear anomaly was also identified close to the eastern edge of the survey area, running on a roughly N-S trend, and traced for a distance of some 25 m.

3.4 Pockets of slightly deeper soil / possible pits were identified at several locations. There is a hint of similar activity within the ring form itself.

3.5 There is a higher than average litter of ferrous material in the topsoil, much more than might normally be anticipated in a pasture context, and there is a likelihood of the presence of deeply buried ferrous material capable of generating anomalies which might be misinterpreted as infilled pits.

4. CONCLUSIONS

4.1 The site responded favourably to magnetometer survey.

4.2 Had a ring form lain in its anticipated location it would have been cut through by a modern (?sewer) pipeline. Apart from this pipeline and associated ferrous and other magnetic debris, the wider area appears substantially undisturbed and no magnetic evidence for a ring ditch was found here.

4.3 The magnetometer did, however, identify a substantial ring form somewhat larger in size and displaced c. 50 m from the cropmark target.

4.4 There are hints of further buried features which, by comparison with the magnetic response from the ring ditch, appear to be relatively free of modern magnetic debris and are therefore considered to indicate features with archaeological potential.

REFERENCES

CLARK, A.J. 2000. *Seeing Beneath the Soil*. 2nd Edition. Routledge: London.

GAFFNEY, C. & GATER, J. 2003. *Revealing the Buried Past: Geophysics for Archaeologists* Tempus: Stroud.

GALE, S.J. & HOARE, P.G. 1991. *Quaternary Sediments: petrographic methods for the study of unlithified rocks*. Belhaven Press: London (see Section 4.7, pp.201-229, "The magnetic susceptibility of regolith materials").

HALCROW GROUP 2007. *Bude Stratton Business Park Development Site Condition Report, July 2003*. Report prepared for South West Regional Development Agency (SWRDA).

MOORE, J. 2007. *Church Farm, Thame Archaeological Evaluation: Written Scheme of Investigation* November 2007.

SCOLLAR, I., TABBAGH, A., HESSE, A. & HERZOG, I. 1990. *Archaeological Prospecting and Remote Sensing*. Cambridge University Press.

THOMPSON, R. & OLDFIELD, F. 1986. *Environmental Magnetism*. Allen & Unwin: London.

The survey was carried out by Oxford Archaeotechnics under the direction of A.E. Johnson *BA*, assisted by Dr. B. Gilmour.

The project was co-ordinated by A.P. Johnson *BA, PhD, MIFA*.

APPENDIX 1 - MAGNETIC TECHNIQUES: GENERAL PRINCIPLES

A1.1 It is possible to define areas of human activity (particularly soils spread from occupation sites and the fills of cut features such as pits or ditches) by means of *magnetic survey* (Clark 2000; Scollar et al. 1990; Gaffney & Gater 2003; Walden, Oldfield and Smith 1998). The results will vary, according to the local geology and soils (Thompson & Oldfield 1986; Gale & Hoare 1991), as modified by past and present agricultural practices. Under favourable conditions, areas of suspected archaeological activity can be accurately located and targeted for further investigative work (if required) without the necessity for extensive random exploratory trenching. Magnetic survey has the added advantages of enabling large areas to be assessed relatively quickly, and is non-destructive.

A1.2 Topsoil is normally more magnetic than the subsoil or bedrock from which it is derived. Human activity further locally enhances the magnetic properties of soils, and amplifies the contrast with the geological background. The main enhancement effect is the increase of *magnetic susceptibility*, by fire and, to a lesser extent, by the bacterial activity associated with rubbish decomposition; the introduction of materials such as fired clay and ceramics - and, of course, iron and many industrial residues - may also be important in some cases. Other agencies include the addition and redistribution of naturally magnetic rock such as basalt or ironstone, either locally derived or imported.

A1.3 The tendency of most human activity is to increase soil magnetic susceptibility locally. In some cases, however, features such as traces of former mounds or banks, or imported soil/subsoil or non-magnetic bedrock (such as most limestones), will show as zones of lower susceptibility in comparison with the surrounding topsoil.

A1.4 Archaeologically magnetically enhanced soils are therefore a response of the parent geological material to a series of events which make up the total domestic, agricultural and industrial history of a site, usually over a prolonged period. Climatic factors may subsequently further modify the susceptibility of soils but, in the absence of strong chemical alteration (e.g. during the process of podzolisation or extreme reduction), magnetic characteristics may persist over thousands of years.

A1.5 Both the magnetic contrast between archaeological features and the subsoil into which they are dug, and the magnetic susceptibility of topsoil spreads associated with occupation horizons, can be measured in the field.

A1.6 There are several highly sensitive instruments available which can be used to measure these magnetic variations. Some are capable, under favourable conditions, of producing extraordinarily detailed plots of subsurface features. The detection of these features is usually by means of a *magnetometer* (normally a fluxgate gradiometer). These are defined as passive instruments which respond to the magnetic anomalies produced by buried features in the presence of the Earth's magnetic field. The gradiometer uses two sensors mounted vertically, often 50 cm apart. The bottom sensor is carried some 30 cm above the ground, and registers local magnetic anomalies

with respect to the top sensor. As both sensors are affected equally by gross magnetic effects these are cancelled out. In order to produce good results, the magnetic susceptibility contrast between features and their surroundings must be reasonably high, thereby creating good local anomalies; a generally raised background, even if due to human occupation within a settlement context, will sometimes preclude meaningful magnetometer results. The sensitive nature of magnetometers makes them suitable for detailed work, logging measurements at a closely spaced (less than 1 metre) sample interval, particularly in areas where an archaeological site is already suspected. Magnetometers may also be used for rapid 'prospecting' (‘scanning’) of larger areas (where the operator directly monitors the changing magnetic field and pinpoints specific anomalies).

A1.7 *Magnetic susceptibility measuring systems*, whilst responding to basically the same magnetic component in the soil, are 'active' instruments which subject the sample area being measured (according to the size of the sensor used) to a low intensity alternating magnetic field. Magnetically susceptible material within the influence of this field can be measured by means of changes which are induced in oscillator frequency. For general work, measuring topsoil susceptibility *in situ*, a sensor loop of around 20 cm diameter is convenient, and responds to the concentration of magnetic (especially ferrimagnetic) minerals mostly in the top 10 cm of the soil. Magnetically enhanced horizons which have been reached by the plough, and even those from which material has been transported by soil biological activity, can thus be recognised.

A1.8 Whilst only rarely encountering anomalies as graphically defined as those detected by magnetometers, magnetic susceptibility systems are ideal for detecting magnetic spreads and thin archaeological horizons not seen by magnetometers. Using a 10 m interval grid, large areas of landscape can be covered relatively quickly. The resulting plot can frequently determine the general pattern of activity and define the nuclei of any occupation or industrial areas. As the intervals between susceptibility readings generally exceed the parameters of most individual archaeological features (but not of the general spread of enhancement around features), the resulting plots should be used as a guide to areas of archaeological potential and to suggest the general form of major activity areas; further refinement is possible using a finer mesh grid or, more usually, by detailing underlying features using a gradiometer.

A1.9 Magnetic survey is not successful on all geological and pedological substrates. As a rule of thumb, in the lowland zone of Britain, the more sandy/stony a deposit, the less magnetic material is likely to be present, so that a greater magnetic contrast in soil materials will be needed to locate archaeological features; in practice, this means that only stronger magnetic anomalies (e.g. larger accumulations of burnt material) will be visible, with weaker signals (e.g. from the fillings of simple agricultural ditches) disappearing into the background. Similar problems can arise when the natural background itself is very high or very variable (e.g. in the presence of sediments partially derived from magnetic volcanic rocks).

A1.10 The precise physical and chemical processes of changing soil magnetism are extremely complex and subject to innumerable variations. In general terms, however,

there is no doubt that magnetic enhancement of soils by human activity provides valuable archaeological information.

A1.11 As well as locating specific sites, topsoil magnetic susceptibility survey frequently provides information relating to former landuse. Variations in the soils and subsoils, both natural and those enhanced by anthropogenic agencies, when modified by agriculture, give rise to distinctive patterns of topsoil susceptibility. The containment of these spreads by either natural or man-made features (streams, hedgerows, etc.) gives rise to a characteristic chequerboard or strip pattern of varying enhancement, often showing the location of former field systems, which persist even after the physical barriers have been removed. These patterns are often further amplified in fields containing underlying archaeological features within reach of the plough. More subtle landuse boundaries and indications of former cultivation regimes are often suggested by topsoil magnetic susceptibility plots.

A1.12 Where a general spread of magnetically enhanced soils contained within a long-established boundary becomes admixed over a long period by constant ploughing, it can be diffused to such a point that the original source is masked altogether. Magnetically enhanced material may also be moved or masked by natural agencies such as colluviation or alluviation. Generally, it appears that the longer a parcel of land has been under arable cultivation, the greater is the tendency for topsoil susceptibility to increase; at the same time there is increasing homogeneity of the magnetic signal within the soils owing to continuous agricultural mixing of the material.

FIGURE CAPTIONS

Figure 1. Location maps. Based upon OS 1:50,000 Landranger Sheet 165 and digital data supplied by the client.

Figure 2. Magnetometer (gradiometer) survey: overview. Scale 1:2500.

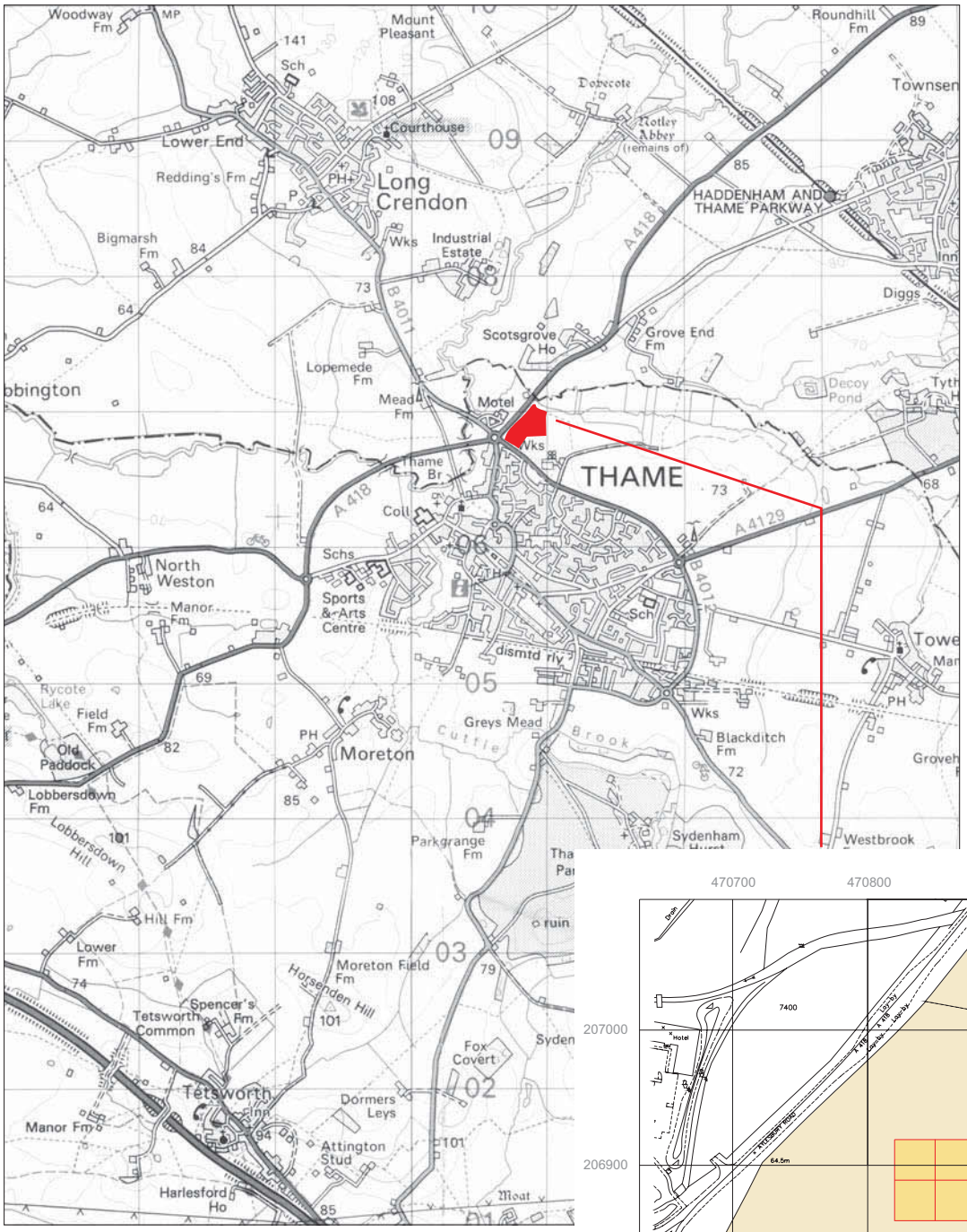
Figure 3. Magnetometer (gradiometer) survey: grey shade and interpretive plots. Scale 1:1000.

Figure 4. Magnetometer (gradiometer) survey: stacked trace plot (raw data). Scale 1:1000.

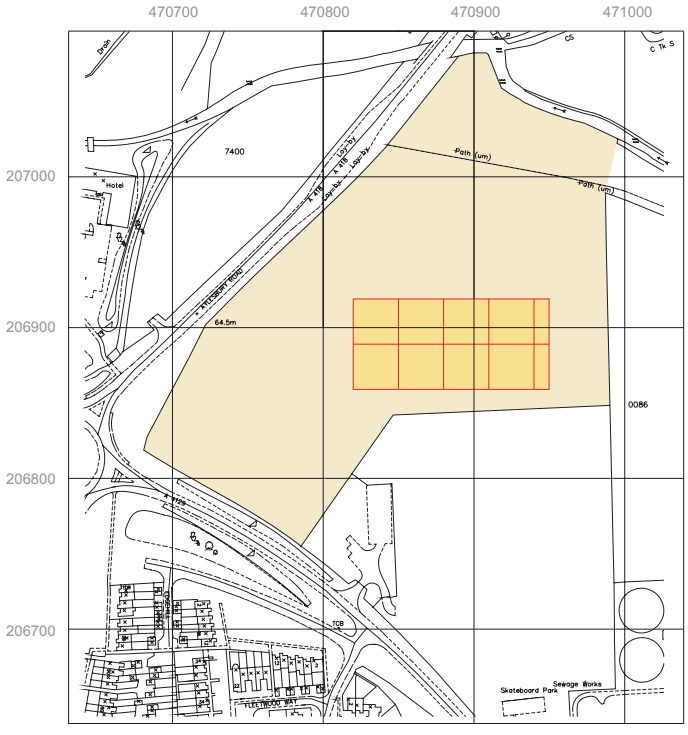
Figure 5. Appendix: survey resection details. Scale 1:2500.

Land at Church Farm,Thame

Archaeological Geophysical Survey: location



1:50,000



1:5,000

Location of Magnetometer Survey

N

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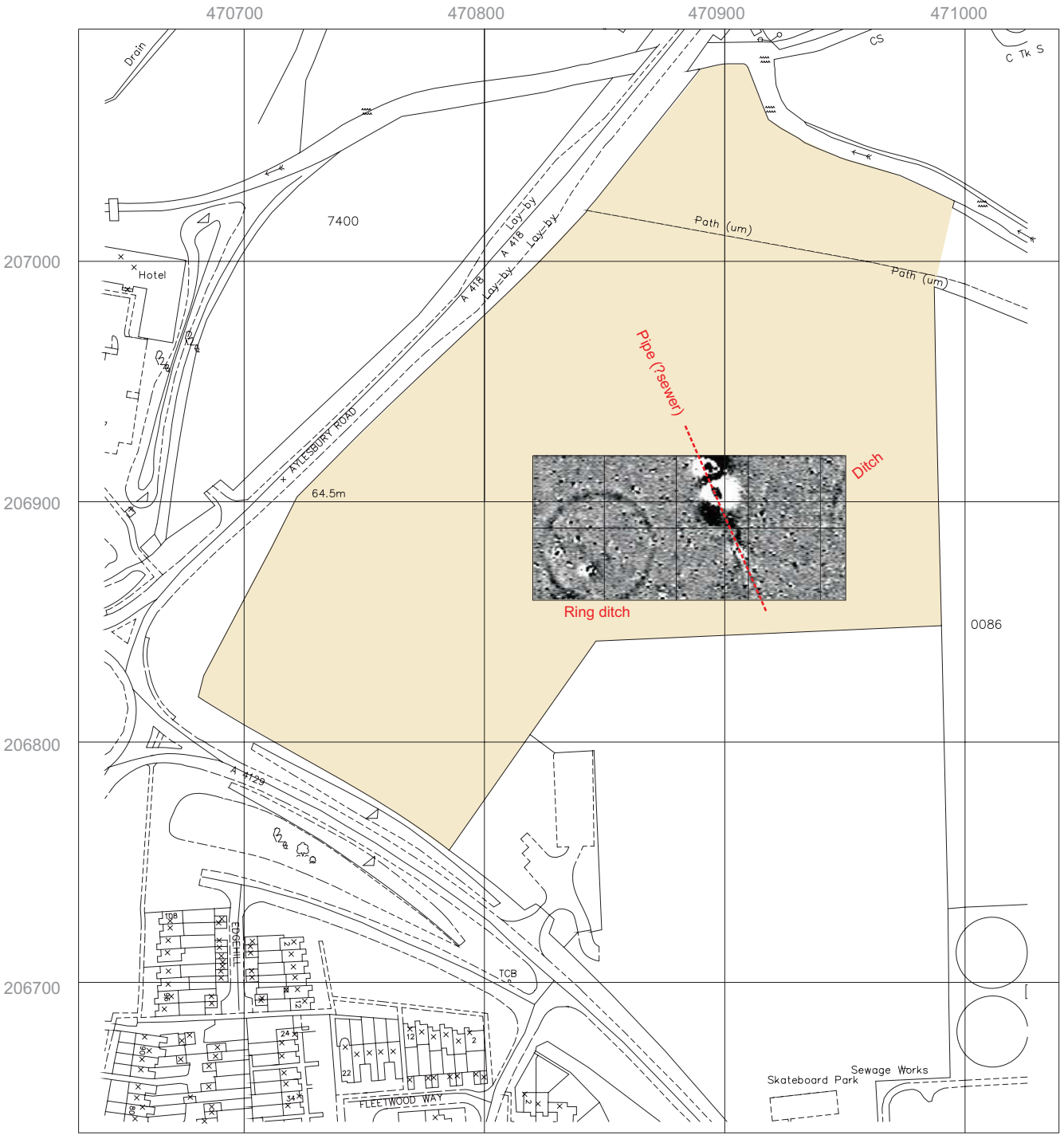
Fig. 1

Land at Church Farm, Thame

Archaeological Geophysical Survey: overview



1:2500

-2.5 0 +2.5 nT

N

30m survey grid

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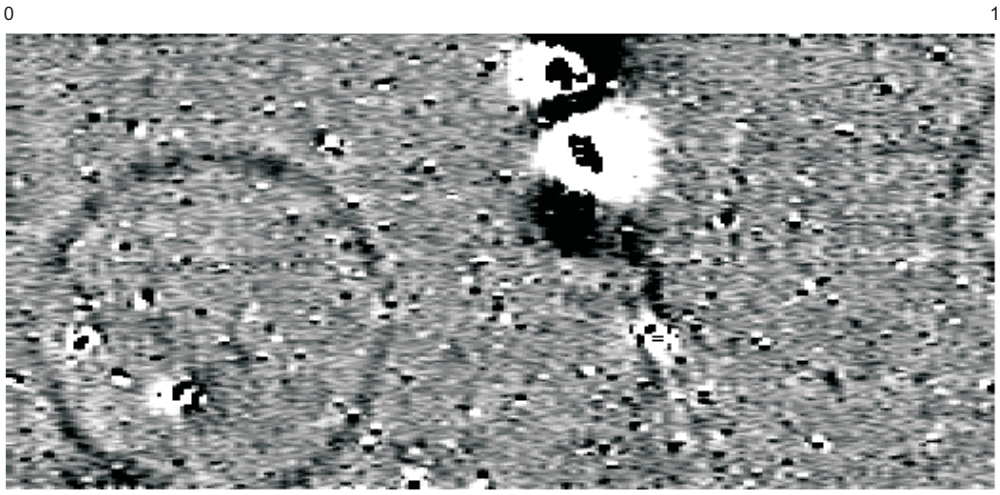
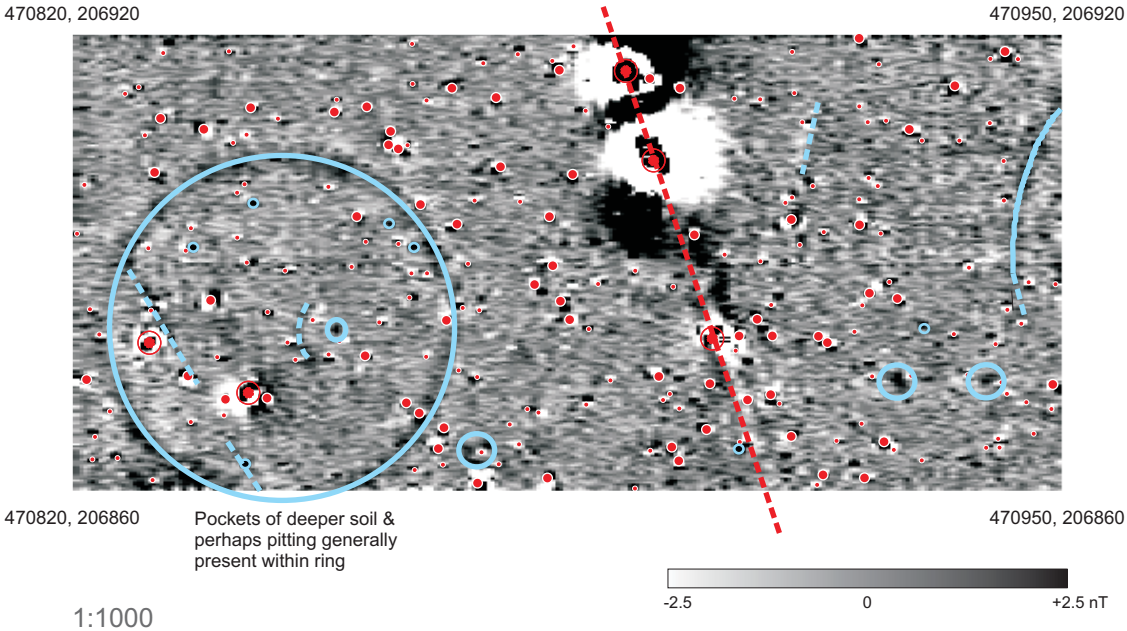
Fig. 2

Land at Church Farm,Thame

Archaeological Geophysical Survey: grey scale plot





1:1000

Interpretation

- Linear & curvilinear features
- Weak linear & curvilinear features
- Current or former services
- Locations of possible pits
- Substantial ferrous anomalies
- Strong ferrous anomalies

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Fig. 3

Land at Church Farm,Thame

Archaeological Geophysical Survey: stacked trace plot

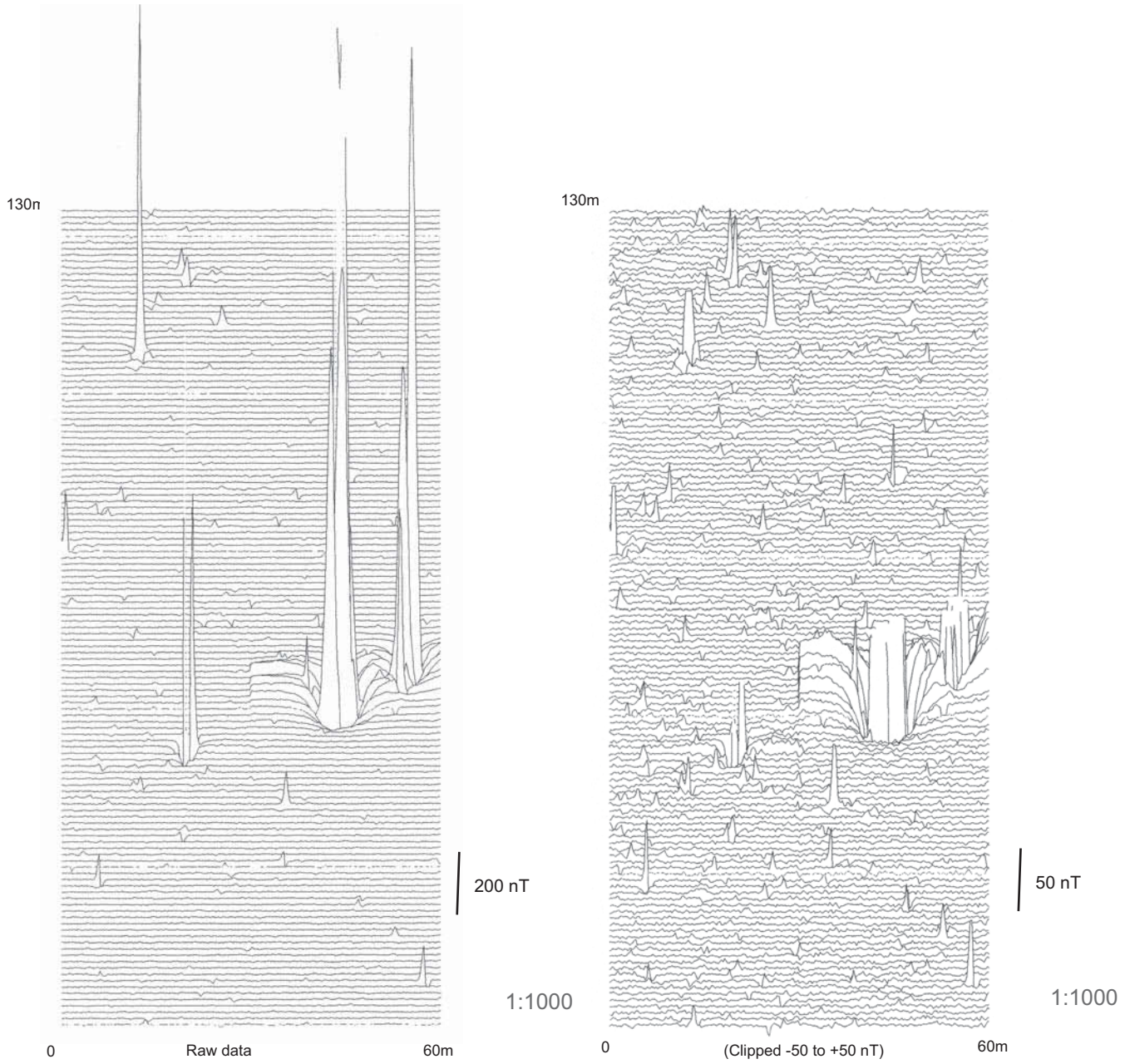

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Fig. 4

Appendix: survey resection details

Church Farm, Thame: Gradiometer Grids established by total station (resection from points RO1 & RO2)

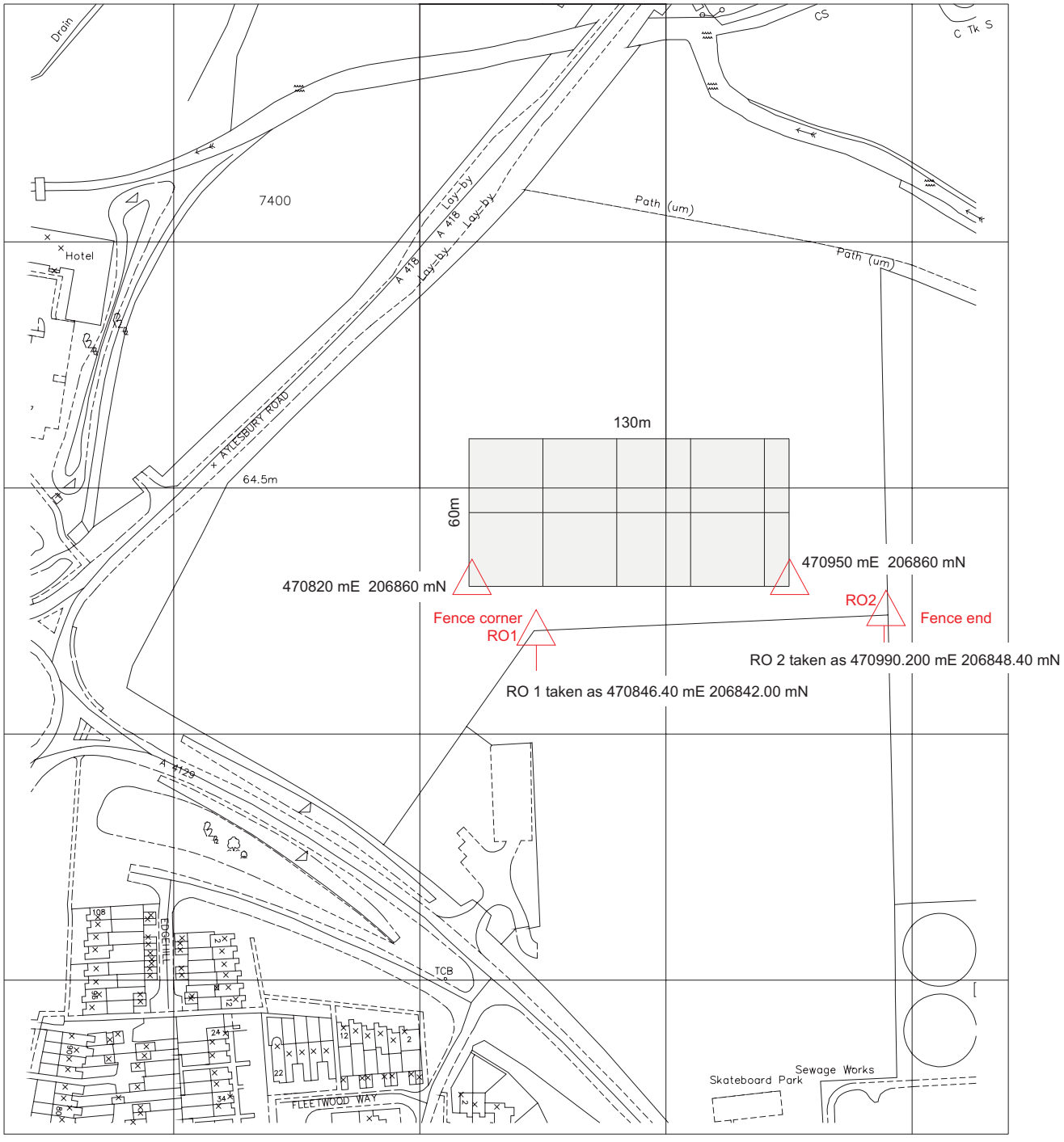

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Fig. 5