CAMBRIDGE GOLF COURSE
& LAND NORTH OF RAMPTON ROAD, LONGSTANTON

MAGNETOMETER (GRADIOMETER) SURVEY

SURVEY REF: 3090406/LGC/JJG

Commissioned by WSP Environmental on behalf of Gallagher Estates & English Partnerships

PRODUCED BY OXFORD ARCHAEOTECHNICS
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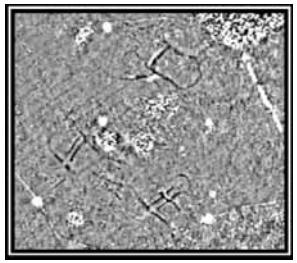
October 2006

OXFORD ARCHAEOTECHNICS

Cambridge Golf Course & Land North of Rampton Road, Longstanton



Prehistoric enclosures beneath the 16th fairway

Archaeological Geophysical Survey

SPECIALIST ARCHAEOLOGICAL FIELD EVALUATION

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SUMMARY

Magnetometer (gradiometer) survey was undertaken on 121 ha of land north of Rampton Road, Longstanton, Cambridgeshire (centred on NGR 540400 267400), situated approximately 10 km northwest of the centre of Cambridge, in advance of Northstowe New Town development proposals. This work completes gradiometer survey of the majority of the 'footprint' of the proposed new town; the site of the former wartime RAF Oakington Airfield, on the opposite (south) side of Rampton Road, Longstanton, having already been completed and reported on earlier in 2006. Following previous exploratory geophysical work, comprising limited topsoil magnetic susceptibility mapping and targeted gradiometer survey within fields on the north side of Rampton Road, more extensive magnetometer (gradiometer) survey was commissioned to extend coverage across all available land including not only the agricultural fields (arable, nursery and pasture) fronting the road, but also extending northwards to include Cambridge Golf Course and (set-aside) farmland further north, within a roughly triangular block bounded on the west by Longstanton village, on the northwest by the B 1050 Station Road, and on the north and east by the disused Cambridge to St. Ives railway line. Data from the current survey has been fully integrated with previous results.

Archaeological magnetic survey is 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.

It was noted that disturbance caused to buried archaeological horizons by the construction of the golf course appears to have been mostly of a relatively superficial nature.

The extent and location of an area of conjoined enclosures of Romano-British date, with probable later prehistoric elements, between 55 and 75 m in width, has been confirmed, extending northwestwards from the nursery across the western half of the golf course for a distance of at least 300 m. This settlement lies on the eastern edge of terrace gravels close to their interface with clays. The further identification of a c.125 m wide zone characterised by linear and rectilinear positive and negative anomalies together with more broad and sinuous anomalies recorded east of these settlement enclosures appears to be defined to the east by one or more former palaeochannels, with possible ploughed-down banks containing material with low magnetic susceptibility also present, which may include the remains of small cultivation plots or 'lazy beds'. Further areas of ancient activity within the western part of the golf course (gravel geology) have been recorded as a series of enclosures of probable later prehistoric date close to the western boundary, with another (partial) enclosure and linears identified on the practice driving range.

Also, and importantly, a c.1 ha area of small enclosures, one with 'antenna' ditches, which from their morphology probably represent a settlement of mid-late Iron Age date, was identified upon the clay geology in the centre of the golf course, in addition to a settlement of similar date located in previous geophysical work c.300 m to the south within pasture fields fronting the road; the local clay geology has previously only provided limited evidence for early activity.

A number of isolated substantial ferrous anomalies were also identified, some of which have a magnetic signature similar to those associated with buried ordnance recorded by magnetometry within the former RAF Oakington Airfield.

1. INTRODUCTION

1.1 Geophysical (magnetic) survey was commissioned by WSP Environmental and the Cambridge Archaeological Unit (CAU) on behalf of Gallagher Estates and English Partnerships on land north of Rampton Road, Longstanton (centred on NGR 540400 267400). The work was undertaken in advance of proposed development plans for the new town of Northstowe, and completes the gradiometer survey of the majority of the unbuilt-up portion of the 'footprint' of the proposed development; the southern area, covering the site of the former wartime RAF Oakington Airfield, on the opposite (south) side of Rampton Road, Longstanton, having already been completed and reported on earlier in 2006 (Johnson 2006). Following previous exploratory geophysical work, comprising limited topsoil magnetic susceptibility mapping and targeted gradiometry within fields on the north side of Rampton Road (Johnson 2004), magnetometer (gradiometer) work was commissioned to extend coverage across all available land covering not only the agricultural land fronting the road, but also extending northwards to include Cambridge Golf Course and (set-aside) farmland further north, within a roughly triangular land block bounded on the west by Longstanton village property boundaries, on the northwest by the B1050 Station Road, and on the north and east by the disused Cambridge to St. Ives railway line. The location is shown on Fig. 1. The fieldwork was carried out between April and October 2006. The current survey has been fully integrated with the previous results.

1.2 The survey area is almost bisected on NW-SE axis by the interface between 3rd and 4th Terrace gravels to the west and clay geology on the east (Evans and Dickens 2002). Of the fields fronting Rampton Road, those sited on the gravels west of this interface were under arable cultivation – the southwesternmost under a cereal crop (and stubble), with an adjacent horticultural nursery, whilst those on the clays to the northeast were all pasture. Apart from the obvious landscape features such as bunkers, tees and embanked greens, within the curtilage of the golf course there were small stands of tree planting, ponds, mounds of modern material, areas of particularly dense scrub and also items of static equipment and machinery, which hindered and, in some cases, precluded survey. North of the golf course the land extending as far as the contractors' compounds adjacent to the railway was set-aside, with areas of rough ground. A vertical aerial photograph taken in September 2001 shows the nature and extent of the golf course landscaping, and the landuse of adjacent fields within the survey area (Fig. 2).

1.3 Aerial photographs have also revealed cropmarks extending from the nursery on a NW-SE trend across the western side of the golf course and across adjacent land to the north. The cropmark evidence (courtesy of CAU) has been superimposed upon the current geophysical survey results (Fig. 52). A limited exploratory trenching programme was conducted on the golf course by CAU in 1991-2 (Evans 1991; Gdaniec 1992), with more extensive trial trenching in the fields fronting Rampton Road and north of the golf course, following geophysical survey by Oxford Archaeotechnics, in 2004 (Johnson 2004, Evans and Mackay 2004). The results of both the previous geophysical work and trial trenching are summarised within the relevant grid squares below.

1.4 Patterns of former landuse influence the magnetic character of the overlying topsoils and can have a significant bearing on the preservation of archaeological horizons. In this context, the variable geology between the western and eastern halves of the survey area will inevitably have influenced historical landuse. A sketch map of the pre-Enclosure (1816) parish (Wright & Lewis 1989) gives

some indication of the Medieval and later agricultural landscape, showing that the majority of the western half of the survey area on the eastern outskirts of the village comprised temporary closes (Inholms), under arable cultivation which were probably utilised as common land after the harvest (Fig. 51). The eastern boundary of the Inholm closes, still surviving in part within the nursery, reflects the extent of the original cleared and cultivated gravel soils on this side of the village; the remainder of the land east of this boundary, comprising two of the village's Medieval (and later) communal Open Fields (Willingham Field to the north, and Stanwell Field to the south) on either side of the extant northeast-southwest boundary which crosses the golf course (then known as Moor Way), lies on the much heavier clay soils, which are better suited to pasture. Within the northeastern angle of Stanwell Field, (covering the eastern edge of the golf course) the area known as Great Moor was probably long-term permanent grazing land (Wright & Lewis 1989). The western side of the survey area will therefore probably always, historically, have been under more intensive cultivation than the east. The utilisation of a small strip of land corresponding to the more easterly part of the nursery fronting Rampton Road (then known as Moor Baulk), as an area of common pasture may be significant, perhaps being indicative of locally variable ground conditions relating to the underlying geology.

1.5 The survey comprised detailed gridded magnetometry (gradiometry). An explanation of the techniques used, and the rationale behind their selection, is included in an Appendix to the present report. The survey was conducted according to the *Standards and Guidance for Archaeological Field Evaluation* (1993, revised 1994) of the Institute of Field Archaeologists and follows the standards for the conduct and reporting of geophysical survey in field evaluations set out by English Heritage Ancient Monuments Laboratory (David, A. 1995. *Geophysical survey in archaeological field evaluation*, Research and Professional Services Guideline No.1, English Heritage, 1995) (hereafter abbreviated as AML 1995).

1.6 Magnetometer (gradiometer) survey within an operational golf course presented unique logistical and survey problems as, despite the fullest co-operation and assistance of the golf course manager and his staff, fitting the survey work between an often steady stream of golfers produced a series of challenges, some of which have direct influence upon the quality of the magnetic data extracted. Magnetometers are extremely sensitive to environmental conditions, particularly to thermal drift. Frequent, and often protracted, delays to permit golfers to play though often made it impossible to eliminate instrument drift, and consequently a series of interruptions and continuations often required significant adjustments to be made to the resultant data, showing on some of the plots as 'blocks' of somewhat variable nature. Such data does not appear from a 'cosmetic' point of view to be as 'seamless' as that retrieved from previous survey work on the adjacent airfield, nevertheless the results are of a quality which enables the confident identification of both areas of archaeological significance and ferrous material buried beneath the golf course.

2. SURVEY DESIGN

2.1 Detailed gridded magnetometer (gradiometer) survey was carried out in 30 x 30 m survey grids using Geoscan Research FM 36 Fluxgate Gradiometers, sampling 4 readings per metre at 1 metre traverse intervals, operating in the 1nT 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.

2.2 Following the AML 1995 guidelines, the 30 m geophysical survey grids are internally accurate to ± 10 cm, and the master survey is locatable to the National Grid to the nearest metre (David 1995:Part I, 3.2).

2.3 For ease of reference, the 30 m grids have been grouped together in arrays of 10 x 10, i.e. measuring 300 x 300m (9 hectares). Each of these master grid squares has been allocated a reference letter and number, for which an index is provided on Fig. 4. To maintain consistency with the previous magnetometer (gradiometer) survey within the curtilage of former RAF Oakington on the opposite side of Rampton Road, the original survey master grids were extended to the north and northwest; where possible the grid letters allocated to the previous survey were maintained (i.e. A,B,C eastings). However, as the current survey extended westwards beyond the original survey area, here new grid letters were allocated, giving X, Y and Z eastings; the northings remaining consistent with the earlier survey (Johnson 2006).

2.4 A small-scale overview of the total gradiometer coverage and results is shown on Fig. 3, and a larger overview, at 1:2500 scale, is included in the wallet at the back of this report.

2.5 As the relative difference in the strength of the magnetic signal between modern structures/detritus is many orders of magnitude higher than the extremely subtle signals generated by early landscape features, a balance has had to be found to show both ends of the magnetic response without allowing the more subtle anomalies to be 'swamped' by strong ferrous signals. For presentation purposes, and to keep the number of figures to manageable proportions, this has been accomplished by configuring the stacked trace plots to provide results appropriate to the detection of stronger magnetic material (ferrous, brick rubble, burning events etc.), whilst the earlier landscape features are most effectively represented in the grey shade plots.

2.6 A summary of the principal anomalies recorded is shown on Fig. 49 and summary of magnetic evidence for areas of archaeological potential (excluding ridge and furrow) on Fig. 50.

2.7 CAD drawings to enable the precise re-location of each survey grid to the National Grid have been archived to the accompanying CD. This CD also contains a full digital copy of this report (text in Adobe Acrobat and figures in AutoCAD 14, Corel DRAW 12 and Windows Metafile formats).

3. RESULTS

3.1 Within the golf course the gradiometer plots show numerous strong and distinctive anomalies generated by landscaped features, whose foundations generally appear to contain quantities of brick or other similar magnetic material. The tees tend to be characterised by long rectangular anomalies and the greens are invariably partially encircled by banks, whilst the bunkers often show clearly as areas of strong magnetic interference, again possibly containing brick hardcore/tile drainage, or as distinct precise magnetic 'scars'. Metal signs and markers, and some items of the greenkeepers' machinery and equipment were also present.

GRID X3 (Figs. 5 & 6)

3.2 This survey grid lies within the extreme southwestern angle of the golf course, bounded by Hatton Park County Primary School. Access to the southern part of the survey area was restricted by the presence of a pond, trees and scrub.

3.3 Anomalies representing several enclosures, which from their morphology are probably of later prehistoric or Romano-British date, occupy an area measuring at least 60 m square centred on NGR 539918 267068, cut by the modern drain; some internal elements are visible within at least one of the enclosures. A single evaluation trench dug by CAU in 1991, parallel with and south of the drain, located evidence for a later Iron Age settlement, with at least six roundhouses at this location (Evans & Mackay 2004: Site XI). A substantial linear anomaly (ditch) visible some 20 m south of the drain running roughly parallel with it, visible for a distance of c.25 m, is similar in magnetic character and width to those seen in the nearby enclosures.

3.4 Immediately to the south west of this group of enclosures, a series of wide linear magnetic anomalies (both positive and negative) form a broad 'cell-like' configuration extending over an area roughly 40 m square (centred on NGR 539889 267032). They appear to be part of a general trend of patterning crossing this grid from northwest-southeast, and extending into the adjacent grid to the east (Y3). These anomalies may be partly of geological origin, being consistent with those often encountered within the deposits of former palaeochannels, although their regular geometry suggests that there may have been anthropogenic modification (channelling or draining natural watercourses).

3.5 A light litter of ferrous material is generally present across the survey grid.

GRID X4 (Figs. 7 & 8)

3.6 This survey grid is bisected on a NE-SW axis by an access track (a western extension of the trackway between two of the village's open fields, known as Moor Way; shown on Fig. 51).

3.7 South of the track an area of almost 1 ha is covered by a pond and scrub, which is encircled by an area of modern ferrous disturbance. West of the pond, several linear striations are visible running on a NNW-SSE axis.

3.8 North of the track a strong linear anomaly resulting from an enclosure fence marks the eastern boundary of the golf club driving range. Several pronounced linear anomalies have been recorded within the driving range, indicating the presence of silted ditches in a rectilinear or orthogonal configuration, which have potential archaeological significance. What appears to be the northeastern rounded angle of a rectilinear enclosure lies within the northern half of the range, although its extent and true geometry are difficult to determine. It is possible that this angle is more clearly visible due to a local increase in the magnetic susceptibility of its infilling at this location, suggesting that the gradiometer may not have revealed the full extent of archaeological features in this area, but has rather brought one of the elements into sharper focus. The nature and extent of disturbance in the construction of the driving range is not known. Landscaping may also have contributed to the differential nature of the magnetic response; these features continues eastwards, beyond the driving range boundary for a distance of at least 30 metres. Cropmarks have been recorded extending northwards from the access track towards the club house buildings as far as the bend in Station Road (extending northwards into Grid X5), several of which conform closely with linears identified by the gradiometer (Fig. 52). Trial trenching in 1991 in this area, together with a watching brief during the construction of the clubhouse and car park in 1992, suggested the presence of field systems of Romano-British date, with a low density of Iron Age material in the vicinity of these cropmarks (Evans 1991; Gdaniec 1992).

3.9 A substantial magnetic response from ferrous and other magnetic material identified in the southwestern angle of the driving range is thought to be of modern origin; otherwise only a light litter of ferrous material is present.

GRID X5 (Figs. 9 & 10)

3.10 Survey in this area, extending east of the club house and bounded by Station Road, was constrained by a large earthen mound situated just north and east of the bend in the road.

3.11 No magnetic anomalies of obvious archaeological significance were recorded.

3.12 A series of linear striations on a NW-SE trend represent former agricultural activity. The southern half of the gradiometer plot is otherwise dominated by magnetic material associated with the golf course.

GRID X6 (Figs. 11 & 12)

3.13 Bounded on the west by Station Road, this survey grid extends into the northern tip of the survey area.

3.14 Several linears on a NNW-SSE trend probably represent former ridge and furrow cultivation.

3.15 A strong NE-SW linear anomaly at the southern end of the survey area is the result of the construction of an area of hard standing and the presence of trackway debris. A further strong linear anomaly running E-W across the centre of the survey grid represents another earlier (now abandoned and overgrown) track.

3.16 A number of strong ferrous anomalies have been identified, two in particular (at NGR 539990 267949 and 539943 267968) have characteristics similar to suspected ordnance recorded at Oakington airfield (Johnson 2006).

GRID Y2 (Figs. 13 & 14)

3.17 This survey grid covers the southern half of an arable field which was under corn stubble at the time of survey. Earlier magnetic survey within this field had shown some subtle magnetic susceptibility patterning typical of topsoils overlying potential archaeological features, particularly within the eastern half and close to the road; follow-up magnetometry was not possible at that time owing to a maturing crop (Johnson 2004: Area F). However, subsequent exploratory trial trenching by CAU has identified two areas of potential archaeological activity: one represented by a prehistoric segmented ditch on a NW-SE alignment containing a sterile grey fill situated within the southwestern quadrant of the field, and the other represented by a series of ditches and pits within the eastern angle, close to the road, probably the site of a small Iron Age farmstead (Evans & Mackay 2004: Sites IV and VI).

3.18 The NW-SE linear identified within the adjacent survey grid to the east (Z2, see 3.39 below) in the eastern angle of the field can be seen to continue for a distance of some 20 m within the eastern edge of this survey grid, where a parallel element is also visible, running 5-6 m to the north. There is little magnetic evidence to suggest the presence of extensive archaeological features within the southwestern angle of the field; ephemeral linears were identified, mostly on the trend of the 'modern' landscape and are therefore likely to be of agricultural origin (including potential ridge and furrow). Silted hollows or pit forms are suggested, although only one can be identified with any confidence.

GRID Y3 (Figs. 15 & 16)

3.19 This survey includes the northern half of the arable field (see Y2 above) fronting Rampton Road, together with the northwestern angle of the nursery and southwestern edge of the golf course.

3.20 No features of archaeological significance were identified in this part of the field by CAU during their trial trenching programme in 2004 (Evans & Mackay 2004: 138-9), findings which are supported by the magnetometer evidence, which identified only ephemeral linear anomalies of former agricultural origin.

3.21 The northwest angle of the nursery is crossed by parallel linear agricultural striations on a NE-SW alignment.

3.22 The western and central parts of the golf course contain numerous landscaped features including a small lake and areas of tree planting. Tees, bunkers and a green have contributed further to the recorded magnetic pattern, with each displaying distinctive geometries (predominantly rectilinear and oval). However, magnetic anomalies of archaeological significance have been identified within the northeasternmost hectare; these represent a series of conjoined and inter-cutting linears representing part of a series of extensive enclosures and other archaeological features which extend into adjacent grids to both the north (Grid Y4) and east (Grid Z3).

3.23 A tentative weak curvilinear anomaly centred on NGR 540008 266910 may conceivably be the position of a pre-golf course 'ringform' seen as a cropmark on aerial photograph (CAU Site III); although this identification is considered extremely tentative, and its geometry uncertain, as the northern part lies beneath a dump of modern material.

3.24 Numerous linear striations on various trends (SW-NE, NW-SE and NNE-SSW), crossing both the golf course and the land to the south, result from the superimposition of a series of agricultural regimes, seemingly extending from Medieval and later ridge and furrow cultivation through to more recent agricultural activity.

3.25 A light litter of ferrous material was recorded.

GRID Y4 (Figs. 17 & 18)

3.26 Within the southeasternmost hectare of this survey grid, the gradiometer has defined the northern extent of a complex of multiple conjoined and inter-cutting linears and enclosures, previously identified from aerial photographs as an extensive cropmark complex, and confirmed by exploratory trial trenching by CAU in 1991 to be a Romano-British settlement site of predominantly 3rd – 4th century date, with further elements attributable, on morphological grounds, to probable later prehistoric (Iron Age) origins (Evans 1991; Evans & Mackay 2004: Site XIX). The complex extends southwards into adjacent survey grids to the south (Grid Y3) and southeast (Grid Z3); this zone of archaeological interest is confirmed to extend southeastwards within the northern boundary of the nursery for a distance of some 240 m. In addition to the linear anomalies, areas of pitting are also evident, the majority of which lie within or close to the enclosures, although a few outlying pits are also present.

3.27 An anomaly consistent with the course of a former palaeochannel crosses the northeastern angle of the survey area on a roughly NW-SE alignment. The locally regular nature of this anomaly suggests that it is not entirely natural, but may have been 'cut' or managed.

3.28 The whole survey area is crossed by linear anomalies of agricultural origin predominantly, but not exclusively, on a NE-SW trend.

3.29 Magnetic disturbance is visible within the centre and southwest angle of the survey grid; the cluster of anomalies visible within the northeastern angle represent iron stakes associated with tree planting. A light litter of ferrous material was also recorded.

GRID Y5 (Figs. 19 & 20)

3.30 The cropmark evidence shows several linears together with what appears to be at least one rounded-angle enclosure of potential archaeological significance straddling the fenceline close to the northern boundary of this survey area and the edge of the adjacent grid to the north (Grid Y6) (Fig. 52). Trial trenching by CAU in 2004 (designed to test the cropmarks) identified a geological rather than archaeological origin, together with a few agricultural ditches of indeterminate date and a single Bronze Age pit or well (Evans & Mackay 2004: Field I).

3.31 Little magnetic evidence for underlying features with archaeological potential was identified within this survey grid apart from two anomalies which may be caused by underlying pit forms; one c.1-2 m in diameter centred on NGR 540095 267578 and a second, somewhat larger anomaly, measuring c.5 x 2 m, centred on NGR 540108 267584.

3.32 A series of well-defined agricultural linears, including ridge and furrow striations on both NW-SE and SW-NE trends were identified.

3.33 Several golf course features are clearly visible, and a strong ferrous anomaly centred on NGR 540174 267466 is due to the presence of a derelict mechanical excavator.

GRID Y6 (Figs. 21 & 22)

3.34 This survey grid lies within the most northerly part of the site, bounded on the north by a contractors' compound and animal pens, and lying on either side of the NE-SW boundary between the golf course land holding and rough set-aside land further north. This boundary shows as a broad (c.10 m wide) anomaly containing considerable magnetic debris, which terminates on the northeastern edge of the survey area in a triangular-shaped area of dumped debris, covering an area measuring approximately 60 x 40 m, centred on NGR 540200 267875. This triangle of spread material is approached by a trackway which was also recorded in Grid X6 to the west (note: the track does not continue across the centre of the gradiometer plot, as the data in this area derives from survey data completed before the track's construction).

3.35 A cluster of anomalies within an area measuring 20 m square, centred on NGR 540098 267737, may be caused by dumps/clusters of buried burnt material, although the signals may also derive from pockets of more deeply buried strongly magnetic or ferrous material.

3.36 A single, slightly curving, linear anomaly, probably a silted ditch, is visible running for a distance of at least 80 m on a WSW-ENE trend within the northwestern part of the survey grid immediately south of the contractors' compound and extending beneath the compound's southeast corner. Agricultural striations are generally present, predominantly on a NW-SE trend.

3.37 Within this survey grid and its neighbour to the west (Grid X6) there are a number of strong ferrous anomalies, but there is also a great deal of ferrous 'junk' derived from the contractors' area together with spreads of rubble which probably incorporate highly magnetic brick, iron, ?clinker and other magnetic material. North of the track, a number of anomalies must be flagged as being potentially hazardous, as their magnetic identity is very similar in character, though not in absolute strength, to buried ordnance previously detected on the former RAF Oakington airfield. They are not necessarily ordnance, but they should be treated with caution: centred on NGR 540074 267893 and 540111 267872. There are three further anomalies which do not have quite the same characteristics but are nevertheless suspicious; centred on NGR 540046 267857, 540061 267857 and 540072 267857. There are other strong ferrous anomalies present which, whilst generally being more variable in magnetic character, are also potentially hazardous, centred on: NGR 540134 267861, 540158 267863, 540166 267899, and 540157 267895.

GRID Z2 (Figs. 23 & 24)

3.38 This survey grid covers the southernmost angle of the nursery and the eastern tip of the adjacent arable field within which CAU trial trenching has located traces of a small Iron Age farmstead (see 3.17 above).

3.39 Part of a silted ditch on a roughly NW-SE trend was recorded, this feature (and several associated linears) is known from aerial photographs and has been confirmed by trial trenching (Evans & Mackay 2004)

GRID Z3 (Figs. 25 & 26)

3.40 This survey grid covered the majority of the land within the nursery, together with small parts of the golf course to the north and pasture fields close to Brookfield Farm to the east. The c.60 m wide strip of conjoined enclosures and linears recorded within adjacent survey grids to the northwest continues into the northwest angle of this area, and extends southeastwards within the nursery for a distance of at least 30 m.

3.41 The magnetic evidence indicates that the main focus of the conjoined enclosures and settlement activity was situated upon the gravels, A single evaluation trench dug by CAU in 2004 just north of and parallel with this boundary recorded several phases of dense settlement features of mid – late Roman date (2nd – 4th centuries AD), with the majority of linears on a NW-SE alignment; despite sharing a common alignment, the excavators noted that there was little correspondence between the excavated features and the cropmark evidence (Evans & Mackay 2004: Trench 78). The aerial photographic plots show dense cropmarks crossing the eastern part of the nursery, although beyond (north of) the golf course boundary only the more westerly of the enclosure complex has been recorded. There are no magnetic anomalies present which substantiate the complex of cropmarks plotted immediately northeast and east of the horticultural buildings.

3.42 The survey grid is bisected on a NNW-SSE trend by a broad positive anomaly suggestive of an underlying palaeochannel; a zone of similar linear anomalies extends across the whole of the eastern half of the nursery site 80 – 100 m in width, with some potential for the survival of waterlogged deposits. Significantly, one of the ditches excavated by CAU (Evans & Mackay 2004: F. 285) towards the northeastern end of their evaluation trench (close to the northeasternmost extent of the present survey within the nursery) contained mollusca indicative of seasonal waterlogging. Prior to Enclosure, at the beginning of the 19th century, the strip of land east of the horticultural buildings had been subject to different landuse, as common pasture, whilst the surrounding land was under open field cultivation, possibly a reflection of variable ground conditions at this location (Fig. 51).

3.43 This distinctive magnetically patterned ground approaching the geological boundary between the gravels to the west and clay soils to the east (cf. Evans & Mackay 2004, figure 1), extends eastwards into the northwestern angle of the adjacent field before curving northwestwards across the southwestern angle of the adjacent survey grid to the north (Z4). CAU evaluation trenches immediately east of the boundary between the nursery and the two small pasture fields confirmed a series of possible Roman-period agricultural furrows (interpreted by CAU as perhaps the remains of 'lazy beds' or market garden cultivation), with later Roman ditches containing domestic occupation material superimposed upon them, in the northernmost of the two fields (Evans & Mackay 2004: Trench 39), within the zone of magnetic patterning, whilst a corresponding trench in the southern field contained a much lower density of features, the majority being relatively recent furrow bases (Trench 30).

3.44 A series of conjoined circular and curvilinear anomalies previously identified by geophysical survey, straddling the field boundary in the adjacent fields to the northeast of the nursery (Johnson 2004: Area O1), have been confirmed by CAU as an Iron Age occupation site (Evans & Mackay 2004: Site VII).

3.45 Several large ferrous anomalies were recorded, one of which, centred on NGR 540461 266948 is of similar character to potentially hazardous signals identified on the nearby airfield (Johnson 2006). There is a strong anomaly in the angle of the nursery buildings, at NGR 540451 266884, although it is uncertain whether this is related to a building or piece of machinery, or whether it is buried. A cluster of ferrous material centred on NGR 540497 266856, close to the road edge may be associated with the nursery. Strong anomalies are visible within the adjacent field to the east, centred on NGR 540579 266931, 540581 266989, 540540 267001 and 540595 267092; although strong they do not appear to have the same characteristics as the other suspicious anomalies within this survey grid. Apart from these strong signals there is a generally light litter of ferrous material on the golf course and pasture fields, with a higher than average concentration of small items recorded on the nursery, particularly north of the greenhouses, although such a density is not atypical of horticultural activities.

3.46 Linear agricultural striations, which are generally apparent on a NE-SW trend, are particularly well-defined within the field to the northwest and west of the horticultural buildings.

GRID Z4 (Figs. 27 & 28)

3.47 The southwestern angle of this survey grid is dominated by the series of inter-cutting and conjoined linear anomalies recorded within the adjacent grids to the south and west (Grids Z3, Y4 and Y3), although in this grid the anomalies are predominantly negative, curving northwestwards for a distance of 300 m and covering an area of some 2 ha, suggesting the presence of buried banks or baulks comprising low magnetic susceptibility material; alternatively, although less likely, is the presence of underlying 'cut' features infilled with low susceptibility deposits.

3.48 A series of conjoined and inter-cutting ditches forming an orthogonal pattern on a SW-NE/NW-SE trend occupies an area measuring not less than 30 m square within the northeastern angle of the survey grid, centred on NGR 540535 267381. The regular and planned symmetry is similar to a similar configuration of 'cut' features identified approximately 100 m to the northwest in the adjacent survey grid to the north (Grid Z5).

3.49 Numerous agricultural linear striations are visible on a predominantly SW-NE alignment. Two sinuous linears crossing the centre of the survey grid are feature associated with golf course drainage.

3.50 A light litter of ferrous material was recorded, with some local clustering.

GRID Z5 (Figs. 29 & 30)

3.51 Two areas of unambiguous archaeological potential are visible within this survey grid. A well-defined sub-rectangular enclosure measuring c.40 x 20 m lies within the southeastern angle of the grid (centred on NGR 540548 267488). Outlying 'antenna-like' elements enclosing a ring form 12 m in diameter which lies approximately 10 m east of the main enclosure; pits and other 'cut features' are also present in the vicinity. Approximately 100 m to the southwest of this enclosure, a pattern of roughly orthogonal linears (silted ditches) extending across an area of some 40 x 30 m, centred on NGR 540464 267425, is similar in form to a group identified within the adjacent survey grid to the south (Grid Z4; see 3.48 above). Both these groupings of ditches, of similar geometric arrangement, and possibly the larger 'bag-shaped' enclosure to the north, apparently belonging to a contemporary, or near-contemporary, regime, with each element sharing a similar NE-SW / NW-SE alignment.

3.52 Linear agricultural striations are apparent, on a predominant NE-SW trend.

3.53 A number of golf course elements are visible, including two areas of greens and several bunkers. A light litter of ferrous material is present in the topsoil.

GRID Z6 (Figs. 31 & 32)

3.54 Apart from a few linear striations of agricultural origin, no magnetic anomalies of obvious archaeological significance were recorded, and remarkably few (well below average) ferrous signals recorded, confirming the findings from the CAU evaluation trenches in this area and the adjacent survey grid to the east (Grid A6) in which only shallow post Medieval linears features, with nothing of archaeological significance, were observed (Evans & Mackay 2004: Trenches 91 - 94).

GRID A3 (Figs. 33 & 34)

3.55 This survey grid covers part of the eastern half of the pasture field immediately west of Brookfield Farm. The field margins show magnetic evidence for the inclusion of modern magnetic trackway material. A single linear running parallel with the farm track on a NW-SE trend appears to define the edge of the spread of trackway material and is probably therefore of recent origin.

3.56 There is a general light litter of ferrous material, with concentrations in the vicinity of the farm track and gateways. A small cluster containing at least three ferrous anomalies centred on NGR 540709 267008 is most probably of recent origin.

GRID A4 (Figs. 35 & 36)

3.57 This survey grid covers the majority of the three pasture fields north of Brookfield Farm. A few agricultural striations were recorded, generally on a NE-SW trend, together with several pipes/services parallel with fence and field margins. A generally light litter of ferrous material is present. Stronger ferrous anomalies appear to relate to modern agricultural features such as water troughs and fences, and are generally confined to the field edges. One or two isolated stronger anomalies were also recorded, none with the strength of potentially hazardous material recorded on the airfield. A small cluster of ferrous material centred on NGR 540753 267191 and isolated ferrous anomalies centred on NGR 540776 267156 and NGR 540867 267168 are distinctive outlying signals of unknown origin.

3.58 Magnetic interference from both a NW-SE cable/pipe and along the field margin behind the farm buildings within the southeastern angle of the survey grid, was too strong and cluttered to permit the detection of the small isolated Iron Age enclosure found within the eastern angle of the field during trial trenching by CAU in 2004 (Evans & Mackay 2004: Site VIII).

GRID A5 (Figs. 37 & 38)

3.59 The gradiometer plot is dominated by modern golf course landscape features. Otherwise only a few ephemeral magnetic anomalies, probably relating to former agricultural cultivation / drainage patterns were recorded and no magnetic anomalies representing obvious underlying archaeological features were identified.

3.60 There is a general litter of ferrous material, both surface and buried, including golf course marker posts running on an E-W alignment, close to the southern boundary of the survey grid.

GRID A6 (Figs. 39 & 40)

3.61 Only former agricultural striations and material associated with the construction of a golf tee were recorded within this small (1 ha) area adjacent to the former railway line.

GRID B4 (Figs. 41 & 42)

3.62 This survey grid covers the southern half of the large pasture field northeast of Brookfield Farm, fronting Rampton Road. No firm magnetic evidence for any features of archaeological significance was recorded within this c.10 ha field, confirming previous topsoil magnetic susceptibility mapping (Johnson 2004: Field O) and subsequent evaluation trenching by CAU (Evans & Mackay 2004: Trenches 57-76). A possible pit is tentatively identified at NGR 541012 267343 and further group centred on NGR 540929 267338; there are further hollows and scoops which have produced anomalies suggestive of pit-like forms at other isolated locations, but with no real geometry. Slight ephemeral traces of linear striations are attributable to former agricultural activity. Very little ferrous material is present.

3.63 However, a number of strong ferrous anomalies were recorded which, although not particularly strong (in the range 100 – 200 nT), nevertheless display signals broadly similar to those of probable unexploded ordnance identified on the opposite side of Rampton Road, close to the northern perimeter of former RAF Oakington airfield (Johnson 2006), displaying a 'smooth' magnetic response consistent with that recorded from certain casings and /or fragments of ordnance. The depth of burial may also be significant in this context, most particularly with regard to the anomaly centred on NGR 541025 267327. Further potentially hazardous ferrous objects are centred on NGR 541062 267283, 540977 267251, 540979 267274 and 540935 267348, together with an unusual double anomaly centred on NGR 541024 267248.

GRID B5 (Figs. 43 & 44)

3.64 This survey grid covers the northern part of the large pasture field east of Brookfield Farm, and the eastern angle of the golf course, bounded on the north by the disused railway.

3.65 The pasture field proved magnetically 'quiet' (similar to the adjacent survey grid to the south, Grid B4). An isolated, although not strong, anomaly recorded at NGR 541029 267418 may represent a more deeply buried ferrous object.

3.66 Within the golf course, the gradiometer plot is dominated by golf course features. Further ferrous signals are generally confined to the field margins and the edge of the railway track and are mostly attributable to current (and former) fencing material.

GRIDS C4 & C5 (Figs. 45 - 48)

3.67 These two survey grids cover the extreme eastern tip of the large pasture field within the angle of Rampton Road and the railway line.

3.68 No anomalies of archaeological significance were recorded in either survey grid. A light litter of ferrous material is present close to the field margins and in the vicinity of an extant pillbox adjacent to the railway.

4. CONCLUSIONS

4.1 Gradiometer survey of land north of Rampton Road, including Cambridge Golf Course, has both identified new areas of archaeological significance, and confirmed features previously known from a variety of evidence compiled over the past 15 years, each source having its own specific limitations: cropmarks have been recorded from air photographs upon the gravel substrate within the western half of the land block, but not on the clays to the east; previous topsoil susceptibility mapping within the strip of fields fronting Rampton Road (with only a very limited amount of targeted follow-up magnetometry) had shown the archaeological potential of the clay geology; a small isolated area of detailed magnetometry at the northern tip of the site carried out in advance of the Park & Ride scheme revealed only relatively modern and agricultural features; elsewhere evaluation trenches by CAU have been restricted. These fragmentary elements have now been placed within a secure landscape context and their geometry and extent confirmed.

4.2 In addition, new sites and features of archaeological significance have been added on the clay geology occupying the eastern half of the site, where an area of at least 1 ha of probable prehistoric (Middle to Late Iron Age) enclosures lies almost centrally within the eastern part of the golf course, the third site of this date located on the clay geology north of Rampton Road (in addition to Sites VII and VIII close to Brookfield Farm). Of considerable archaeological interest is a series of broad irregular linear anomalies consistent with a geomorphological boundary close to the interface of the gravel and clay geology, the magnetic evidence seemingly representing infilled, perhaps waterlogged or former waterlogged palaeochannels, some of which may have had some anthropogenic modification, running on a NW-SW trend and seen most graphically immediately east and north of the nursery, projecting into the northwestern angle of the adjacent pasture fields. Such former palaeochannels may retain organic material and environmental indicators predating or contemporary with the adjacent ancient settlements. The complexity of the anomalies representing 'cut' features, combined with what may be ancient drainage systems following this geological interface, together with a series of negative magnetic anomalies, perhaps representing former (ploughed-down) baulks or banks (certainly containing material with low magnetic susceptibility) hints at a variety of more complex archaeological depositional contexts other than simply the presence of buried infilled 'cut' features. It is also quite possible that in this area the cropmarks have been enhanced by the presence of this geological boundary, with the potential for some elements to be over-represented. Nevertheless it is clear that this zone of magnetic anomalies is important; it remains a major land division, forming the boundary between arable cultivation and pasture in the modern agricultural landscape.

4.3 The magnetic evidence confirms c.8 ha of land with archaeological potential (c.6.5 % of the total survey area). From their morphology, the majority, if not all, of the ancient settlement sites detected by the gradiometer are likely to be of later prehistoric or Romano-British origin The principal anomalies are summarised on Fig. 49 and areas of potential archaeological significance (excluding ridge and furrow) indicated on Fig. 50. The survey indicates that the overall disturbance caused to archaeological horizons by the golf course appears relatively superficial.

4.4 The gradiometer results are generally concordant with the alignments of the cropmark evidence, particularly confirming the extent and precise location of the series of conjoined enclosures and linears occupying the eastern edge of the gravel which extend northwestwards from the nursery across the western half of the golf course (Fig. 52). There are, however, numerous points of detail at which the cropmark and magnetic evidence diverge. Significantly, the area of dense cropmarks recorded within the southeastern part of the nursery has not been confirmed by the gradiometer. The reasons for this discrepancy are not immediately apparent, although it is possible that if much of the cropmark evidence for this area derives from wartime Luftwaffe photographs, intensive landuse in the interim may have largely denuded or obliterated the underlying features. Within the golf course itself, there is little magnetic evidence to confirm the cropmarks recorded north of the axial trackway; the corner of an enclosure and several linear anomalies recorded within the golf driving range bear some resemblance to the plotted cropmarks, but further north, beyond the golf course, no magnetic anomalies were recorded in the area of the recorded cropmarks (it is significant that the CAU trial trenching identified cropmarks in this area as largely geological in origin).

4.5 With respect to strong ferrous signals, very few anomalies were recorded which are not either typical of an agricultural landscape, or obviously introduced with the construction of the golf course. However, there are a few strong signals for which no immediate explanation can be given, and which are not dissimilar from those identified on the former airfield and flagged there as potentially hazardous (Johnson 2006). The strongest group lies within the extreme northern tip of the survey area close to the railway, on land designated for the Cambridge Guided Busway Park and Ride scheme, although this area does contain material dumped during trackway and hardstanding construction, and therefore some ferrous objects may have been introduced with this phase of activity. Further similar anomalies have been flagged on the nursery, at one or two locations close to Brookfield Farm, and within the large pasture field to the northeast of the farm.

4.6 The caveats expressed in the identification of potentially hazardous ferrous objects within the adjacent airfield also pertain to the current survey area: i.e that similar ferrous items can produce markedly different signals depending on their exact composition, depth of burial, and angle of repose (the attitude of the long axis in respect to the vertical), and that there are too many variables to be assertive in discriminating between them. Strong isolated ferrous anomalies have been flagged up on the interpretation plots and mentioned in the text, but this should not be regarded as a definitive list of potentially suspicious objects, and it must be stressed that the current survey was carried out for the purpose of archaeological survey, and that the detailed analysis and further computer imaging of magnetic responses to buried ordnance is a specialised area, and it is therefore emphasised that any of the ferrous anomalies could indicate the presence of potentially hazardous wartime material and should be treated with caution (Johnson 2006).

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Maps
1889-91 OS 6-inch sheet

We are indebted to the following for permitting access to their land and their tolerance and active co-operation over the protracted period of survey work: Ken Green and his staff at Cambridge Golf Club, Steve & Maggie Wright, Clive Hayden, Hilary & Neil Stroud, Joanna Toynbee, Linda Burgess, Roger Cowell and the Henry Family; also to Sally Randell and Andy Ricketts of WSP Environmental, and Chris Evans of Cambridge Archaeological Unit for their invaluable assistance throughout the project.

The survey was carried out by Oxford Archaeotechnics under the direction of Tony Johnson *BA*. The project was co-ordinated by Anne 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 1990; 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. Scale 1:50,000 and 1:10,000. Based upon OS 1:50,000 Map 154 and OS digital data.
Figure 2. Aerial Photograph showing the survey area (David Lock Associates, September 2001).
Figure 3. Gradiometer Coverage: Overview.
Figure 4. Gradiometer Survey Index.
Figure 5. Grid X3: interpretation and grey shade plots. Scale 1:2500.
Figure 6. Grid X3: stacked trace plot. Scale 1:1500.
Figure 7. Grid X4: interpretation and grey shade plots. Scale 1:2500.
Figure 8. Grid X4: stacked trace plot. Scale 1:1500.
Figure 9. Grid X5: interpretation and grey shade plots. Scale 1:2500.
Figure 10. Grid X5: stacked trace plot. Scale 1:1500.
Figure 11. Grid X6: interpretation and grey shade plots. Scale 1:2500.
Figure 12. Grid X6: stacked trace plot. Scale 1:1500.
Figure 13. Grid Y2: interpretation and grey shade plots. Scale 1:2500.
Figure 14. Grid Y2: stacked trace plot. Scale 1:1500.
Figure 15. Grid Y3: interpretation and grey shade plots. Scale 1:2500.
Figure 16. Grid Y3: stacked trace plot. Scale 1:1500.
Figure 17. Grid Y4: interpretation and grey shade plots. Scale 1:2500.
Figure 18. Grid Y4: stacked trace plot. Scale 1:1500.
Figure 19. Grid Y5: interpretation and grey shade plots. Scale 1:2500.
Figure 20. Grid Y5: stacked trace plot. Scale 1:1500.
Figure 21. Grid Y6: interpretation and grey shade plots. Scale 1:2500.
Figure 22. Grid Y6: stacked trace plot. Scale 1:1500.
Figure 23. Grid Z2: interpretation and grey shade plots. Scale 1:2500.
Figure 24. Grid Z2: stacked trace plot. Scale 1:1500.
Figure 25. Grid Z3: interpretation and grey shade plots. Scale 1:2500.
Figure 26. Grid Z3: stacked trace plot. Scale 1:1500.
Figure 27. Grid Z4: interpretation and grey shade plots. Scale 1:2500.
Figure 28. Grid Z4: stacked trace plot. Scale 1:1500.
Figure 29. Grid Z5: interpretation and grey shade plots. Scale 1:2500.
Figure 30. Grid Z5: stacked trace plot. Scale 1:1500.
Figure 31. Grid Z6: interpretation and grey shade plots. Scale 1:2500.
Figure 32. Grid Z6: stacked trace plot. Scale 1:1500.
Figure 33. Grid A3: interpretation and grey shade plots. Scale 1:2500.
Figure 34. Grid A3: stacked trace plot. Scale 1:1500.
Figure 35. Grid A4: interpretation and grey shade plots. Scale 1:2500.
Figure 36. Grid A4: stacked trace plot. Scale 1:1500.
Figure 37. Grid A5: interpretation and grey shade plots. Scale 1:2500.
Figure 38. Grid A5: stacked trace plot. Scale 1:1500.
Figure 39. Grid A6: interpretation and grey shade plots. Scale 1:2500.
Figure 40. Grid A6: stacked trace plot. Scale 1:1500.
Figure 41. Grid B4: interpretation and grey shade plots. Scale 1:2500.
Figure 42. Grid B4: stacked trace plot. Scale 1:1500.
Figure 43. Grid B5: interpretation and grey shade plots. Scale 1:2500.
Figure 44. Grid B5: stacked trace plot. Scale 1:1500.
Figure 45. Grid C4: interpretation and grey shade plots. Scale 1:2500.
Figure 46. Grid C4: stacked trace plot. Scale 1:1500.
Figure 47. Grid C5: interpretation and grey shade plots. Scale 1:2500.
Figure 48. Grid C5: stacked trace plot. Scale 1:1500.
Figure 49. Summary of gradiometer anomalies.
Figure 50. Summary of magnetic evidence for areas of archaeological potential (excluding ridge and furrow).
Figure 51. Field layout before Enclosure in 1816 (after Wright & Lewis 1989) superimposed upon the OS 6-inch map (1889-1891).
Figure 52. Cropmark information (red) (courtesy of CAU) superimposed upon the magnetometer (gradiometer) survey results.

[in wallet at back] Overview Map. Scale 1: 2500.

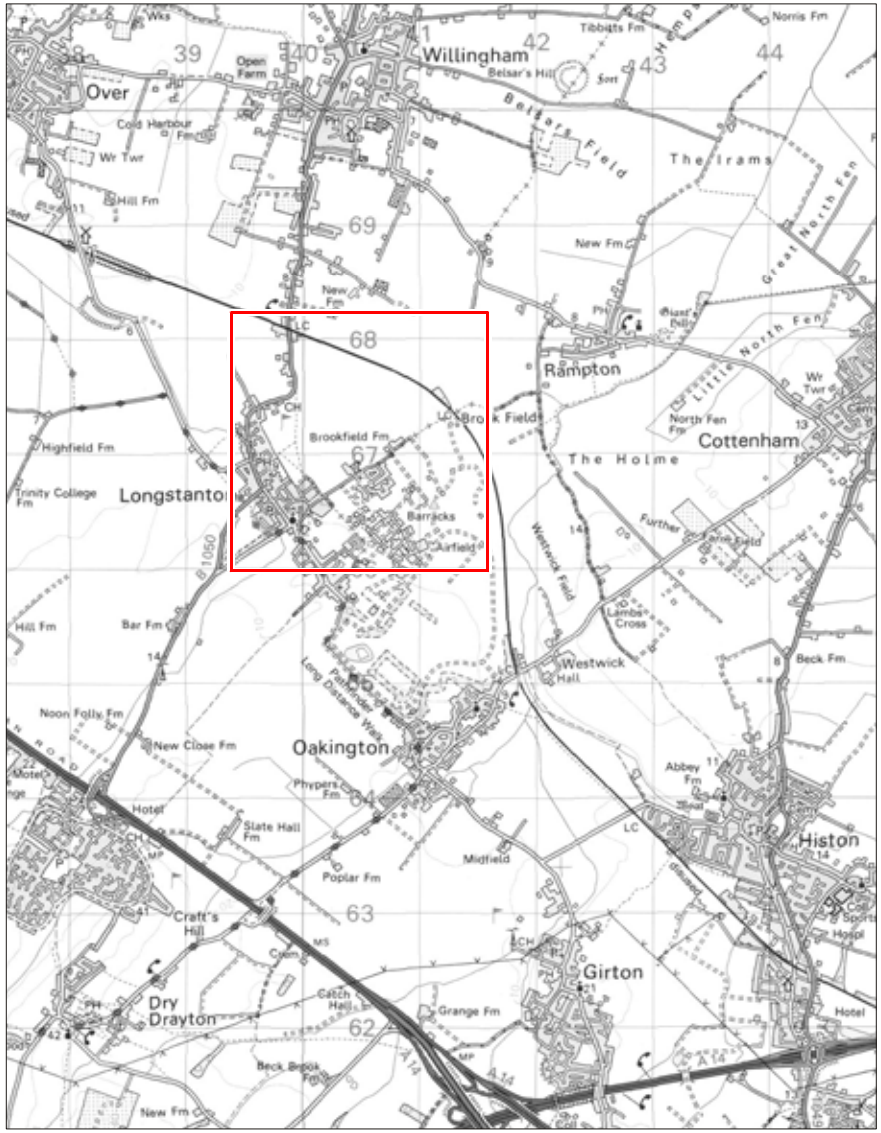
CD (digital information)

Cambridge Golf Course & Land North of Rampton Road, Longstanton

Archaeological geophysical survey: magnetometer (gradiometer) survey

Survey area & land use

Location



OXFORD ARCHAEOTECHNICS

Fig. 1

Cambridge Golf Course & Land North of Rampton Road, Longstanton

Aerial photograph showing survey area

(David Lock Associates Sept. 2001)

OXFORD ARCHAEOTECHNICS

Fig. 2

Cambridge Golf Course & Land North of Rampton Road, Longstanton

Gradiometer Survey
Overview

OXFORD ARCHAEOTECHNICS

Fig. 3

Cambridge Golf Course & Land North of Rampton Road, Longstanton

Gradiometer Survey Index

300m grids (10x10 30m gradiometer grid matrices)

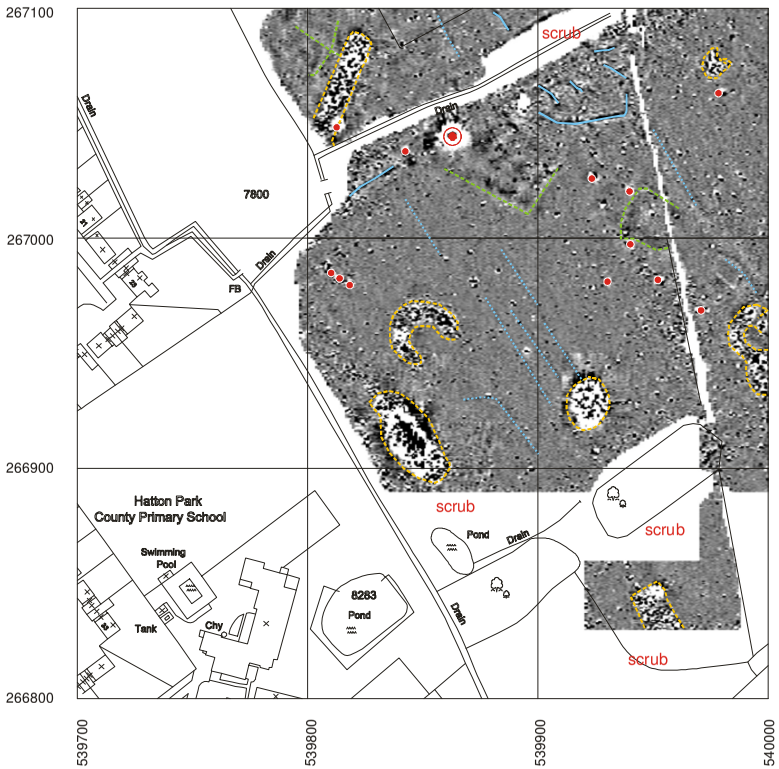
Grid X3: Figs 5 & 6
Grid X4: Figs 7 & 8
Grid X5: Figs 9 & 10
Grid X6: Figs 11 & 12
Grid Y2: Figs 13 & 14
Grid Y3: Figs 15 & 16
Grid Y4: Figs 17 & 18
Grid Y5: Figs 19 & 20
Grid Y6: Figs 21 & 22
Grid Z2: Figs 23 & 24
Grid Z3: Figs 25 & 26
Grid Z4: Figs 27 & 28
Grid Z5: Figs 29 & 30
Grid Z6: Figs 31 & 32
Grid A3: Figs 33 & 34
Grid A4: Figs 35 & 36
Grid A5: Figs 37 & 38
Grid A6: Figs 39 & 40
Grid B4: Figs 41 & 42
Grid B5: Figs 43 & 44
Grid C4: Figs 45 & 46
Grid C5: Figs 47 & 48

Cambridge Golf Course & Land North of Rampton Road, Longstanton

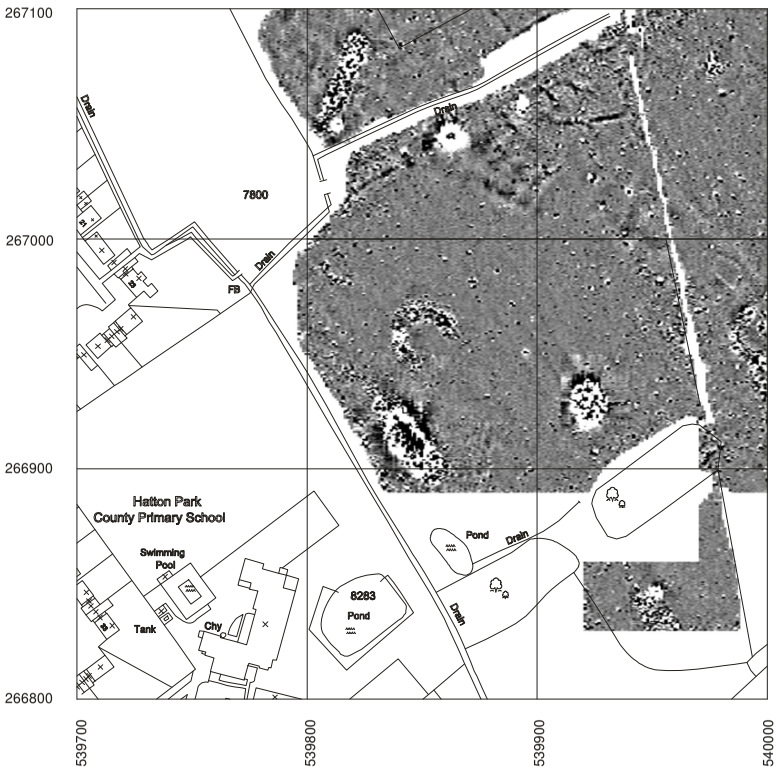
Archaeological geophysical survey: magnetometer (gradiometer) survey

Grid X3

Interpretation



Grey Shade



Linear & curvilinear features

Weak linear & curvilinear features

Linear & curvilinear features (negative)

Current & former services (pipes & cables)

Debris/ disturbed ground

Clusters of ferrous material (on surface & buried)

Substantial ferrous anomalies of similar character

Strong ferrous anomalies of variable character

-3 0 +3 nT

N

Scale 1:2500

OXFORD ARCHAEOTECHNICS

Fig. 5