



LAND NORTH OF BRAMPTON PARK GOLF CLUB, BRAMPTON HUNTINGDONSHIRE

GEOPHYSICAL SURVEY

commissioned by CgMs Consulting on behalf of Abbey Properties Cambridgeshire Ltd

April 2018





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PROJECT INFO:

HA Project Code BPGC18 / NGR TL 2124 6992 / Parish Brampton / Local Authority Huntingdon District Council / OASIS Ref. headland5-314989

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PROJECT TEAM:

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PROJECT SUMMARY

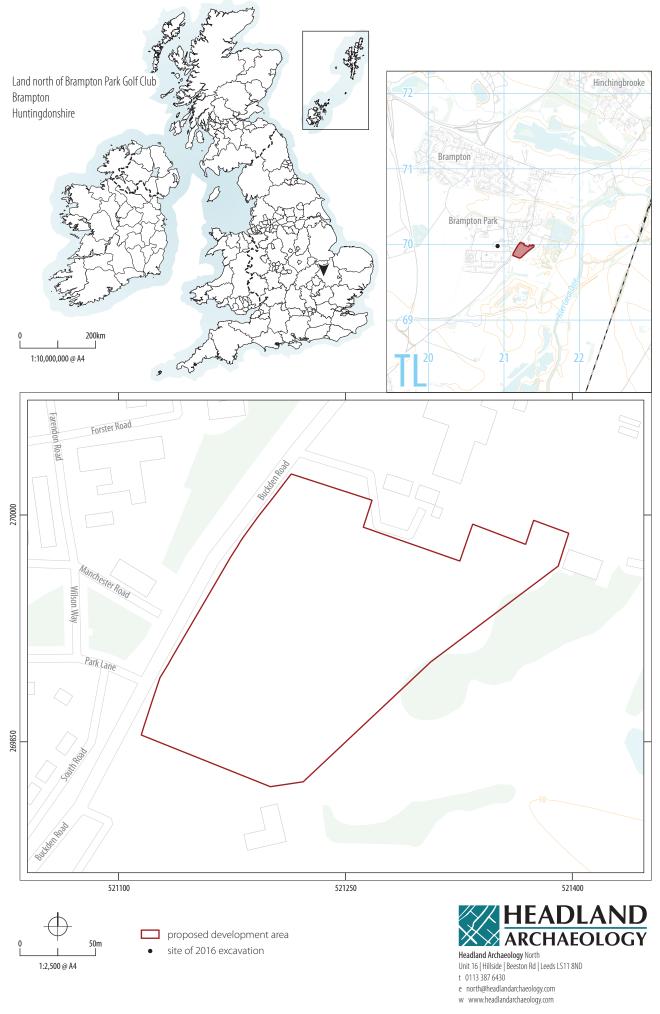
Headland Archaeology (UK) Ltd, undertook a geophysical (magnetometer) survey, covering an area of approximately 2.7 hectares, on land north of Brampton Park Golf Club, Brampton, Huntingdonshire, in advance of the submission of a planning application for a residential development. The survey has identified linear anomalies which are consistent with former agricultural land-use (ploughing and drainage) and modern activity (pipes). One rectilinear anomaly is possibly indicative of a burnt feature, possibly a brick clamp or a kiln; several Roman pottery kilns have been identified recently less than 0.5km west of the site. A cluster of discrete magnetic anomalies in the centre of the site have also been interpreted as possibly archaeological as has a slightly curving linear anomaly which is on a slightly different alignment to the ploughing trends and former field boundary. It should be noted, however, that all of the anomalies interpreted as possibly archaeological could also be of relatively modern origin. Therefore, on the basis of the geophysical survey, the proposed development area is assessed as having a low archaeological potential corroborating the conclusions of an earlier desk based assessment

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GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by CgMs Consulting on behalf of Abbey Properties Cambridgeshire Ltd (the Client), to undertake a geophysical (magnetometer) survey on land north of Brampton Park Golf Club, Brampton (Illus 1), where an application for a residential development is being considered. The results of the survey will inform future archaeological strategy at the site.

The work was undertaken in accordance with a Written Scheme of Investigation (Harrison 2018) which was submitted to Andy Thomas (Historic Environment Team Growth and Economy, Cambridgeshire County Council), and with guidance contained in the National Planning Policy Framework (DCLG 2012). All work was undertaken in line with current best practice (Chartered Institute for Archaeologists 2014, English Heritage 2008).

The survey was carried out on 7th March 2018.

1.1 SITE LOCATION, LAND-USE AND TOPOGRAPHY

The proposed development area (PDA) comprises the former practice area attached to, and located directly north of, Brampton Park Golf Club, centred at TL 2124 6992. It is bound to the west by the B1514 Buckden Road, to the south by Brampton Park Golf Club, club house and car park, to the east by the golf course and to the north by a garden centre. At the time of the survey the site was under short grass (see Illus 2). Parts of the PDA were not suitable for survey due to the presence of contractors' plant and welfare and the PDA was secured with Heras fencing necessitating leaving a 5m exclusion zone around the periphery of the PDA.

The site slopes gently down from south-west to north-east, from 16m Above Ordnance Datum (AOD), to 12m AOD.

1.2 GEOLOGY AND SOILS

The bedrock geology comprises mudstone of the Oxford Clay Formation, which is overlain by River Terrace Deposits – sands and gravels (NERC 2018). The soils are classified in the Soilscape 6 association, characterised as freely draining, slightly acid, loams (Cranfield University 2018).

2 ARCHAEOLOGICAL BACKGROUND

An archaeological desk based assessment (DBA – CgMs Consulting 2016), concluded the archaeological potential of the PDA to be low with only a single find spot (a Roman coin) recorded within the 1km search area around the PDA. However, the discovery of eight early Roman pottery kilns less than 300m west of the PDA (Oxford Archaeology 2016) has led to the PDA now being considered to have a new (higher) archaeological potential.

The excavation focused on a small area inside RAF Brampton, roughly 300 metres to the west of the PDA where eight Early Roman pottery kilns, clustered in the south-east corner of the site, were excavated. The pottery kilns contained in situ pedestals alongside clay plates, spacers and large quantities of Roman pottery including wasters. These kilns date to 60–80 AD and were largely producing lid seated jars with their lids. In addition ditches associated with early Roman settlement activity were also present as well as a large number of pottery sherds ranging in date from late Bronze Age to Early Roman. Early Iron Age ditches and pits were also identified.



ILLUS 2 Survey area, looking west

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide sufficient information to establish the presence/absence, character and extent of any archaeological remains within the survey area. This will therefore enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, if present.

The specific archaeological objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- > to therefore model the presence/absence and extent of any buried archaeological features; and
- > to prepare a report summarising the results of the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths

(Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Terrasurveyor V3.0.32.4 (DWConsulting) software was used to process and present the data.

3.2 REPORTING

A general site location plan is shown in Illus 1 at a scale of 1:2,500. Illus 2 shows the site conditions. Illus 3 is a 1:2,500 scale survey location plan showing the GPS swaths overlying the 1888–1913 six inch OS map. The fully processed (greyscale) data, minimally processed data (XY traceplot) and accompanying interpretative plot are presented at a scale of 1:1,000 in Illus 4 to Illus 6 inclusive.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the



composition and location of the site archive. Data processing details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Harrison 2018) and guidelines outlined by Historic England (English Heritage 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All illustrations from Ordnance Survey mapping are reproduced with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.

4 RESULTS AND DISCUSSION

The ground conditions across the PDA were generally good (see illus 2) and accordingly the data quality is good throughout although as previously noted parts of the PDA were unsuitable for survey.

A variable magnetic background has been identified across the site. Against this background, numerous anomalies have been identified. All are discussed below and cross-referenced to specific anomalies on the interpretative drawings, where appropriate.

4.1 FERROUS ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious clustering to these ferrous anomalies which might indicate an archaeological origin. Far more probable is that the 'spike' responses are likely caused by the random distribution of ferrous debris in the upper soil horizons.

Two intersecting high magnitude anomalies, one running north-north-west/south-south-east (SP1), and the other running north-east/south-west (SP2), can be seen in the south of the dataset. These anomalies are caused by modern services pipes and are of no archaeological importance. SP1 is laid along a former boundary recorded on the first edition Ordnance Survey map. Any low magnitude anomalies of archaeological potential, if present, may be masked in the affected areas, although there is no reason to suspect that this is the case.

Magnetic disturbance around the edge of the survey area, particularly to the south of the PDA, is due to the proximity of contractors' plant and welfare. The magnetic effects of the Heras fencing is also intermittently visible in the data despite the 5m stand-off.

4.2 AGRICULTURAL ANOMALIES

A series of faint linear, parallel trends are identified on a north-north-west/south-south-east alignment, parallel with the sub-service pipe, SP1. These are probably due to post-medieval or more recent ploughing. Alternatively they may be due to field drains laid to improve drainage across what was until recently the practice area for the golf club.

4.3 GEOLOGICAL ANOMALIES

Numerous low magnitude discrete anomalies are identified throughout the PDA. These are generally evenly distributed and are likely to be caused by localised variations in the depth and composition of the soils and river terrace deposits of sands and gravels from which they derive.

4.4 POSSIBLE ARCHAEOLOGICAL ANOMALIES

A rectilinear anomaly, PK1, measuring approximately 10m by 4m, has been identified 40m south of the garden centre. The anomaly exhibits the characteristic 'double peak with a slight 'shoulder' (Illus 5) which can be indicative of a heat affected feature such as an area of burning, brick clamp or kiln. Given the proximity of the Roman kilns an archaeological origin is considered possible. However, it should be considered that the anomaly does align with the direction of ploughing and the former field boundaries which might imply a relatively recent origin.

Approximately 30m south of PK1 is a cluster of discrete anomalies which are slightly higher in magnitude than those assigned a geological origin. There is no pattern to these anomalies. However, they may be indicative of archaeological activity. However, this interpretation is considered tentative and the anomalies might also be due to modern activity or ground disturbance.

A single linear anomaly (D1) has been identified to the south of the PDA. The anomaly is of similar magnitude to the surrounding agricultural trend anomalies but is aligned oblique to the alignment of the ploughing and former boundaries. Again it has tentatively been interpreted as of possible archaeological origin (due to its alignment) but might also have a more recent origin, perhaps connected to the recent use of the area.

5 CONCLUSION

The survey has successfully evaluated the PDA identifying anomalies which are consistent with former agricultural land-use; ploughing and drainage. Two anomalies and a cluster of anomalies of uncertain origin have been interpreted as of possible archaeological potential. However, in each case the interpretation is considered tentative (despite the proximity of significant archaeological activity within 300m of the PDA) and a more prosaic, modern, cause for each is considered equally plausible.

Therefore, on the basis of the geophysical survey, the PDA is assessed as having a low archaeological potential, corroborating the results of the desk-based assessment.

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6 REFERENCES

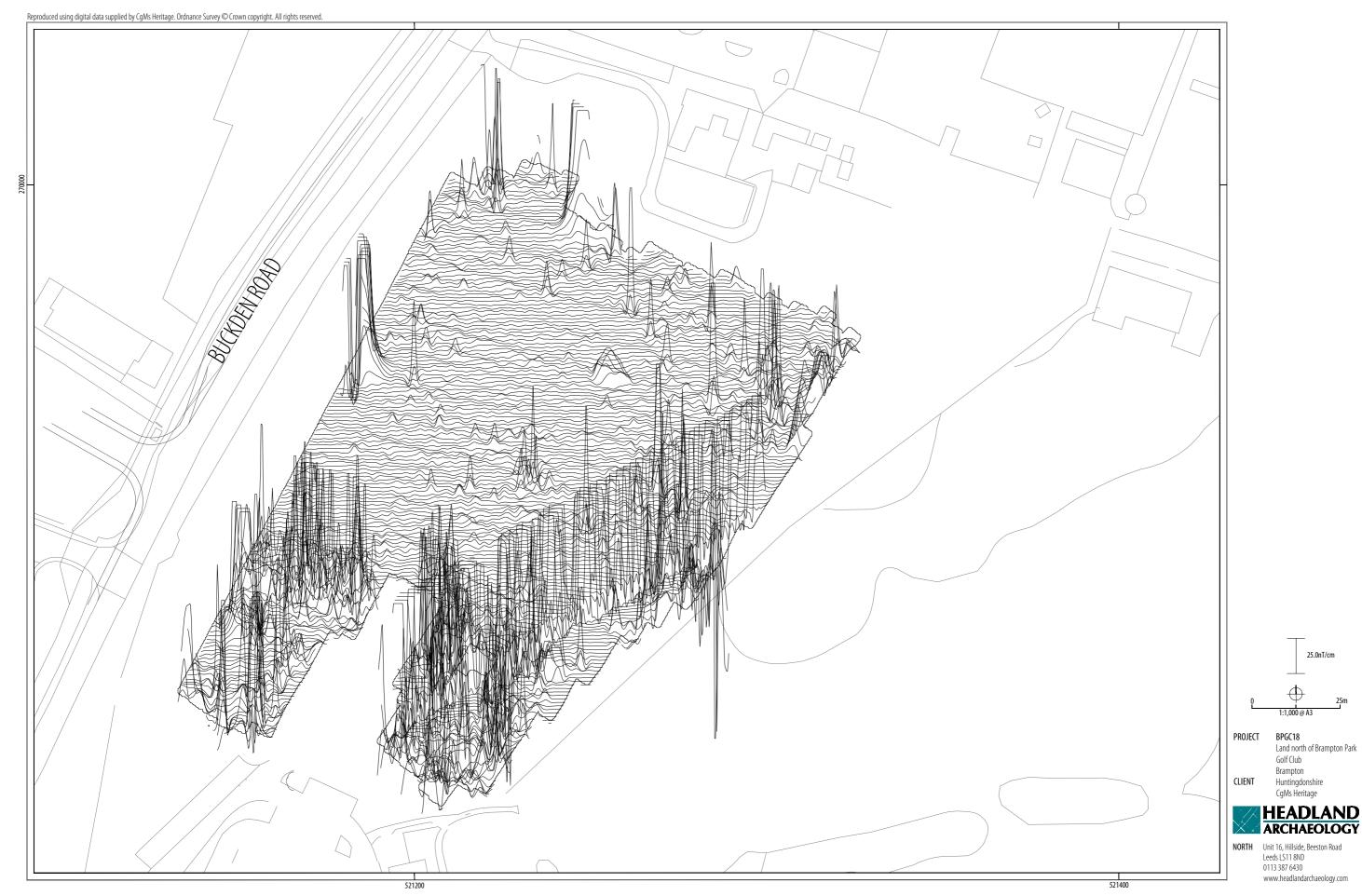
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Brampton Huntingdonshire CgMs Heritage

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7 APPENDICES

APPENDIX 1 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes) These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

APPENDIX 2 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics3). The data will be stored in an indexed archive and migrated to new formats when necessary.

APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

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APPENDIX 5 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-314989

Project details	
Project name	Land north of Brampton Park Golf Club, Brampton
Short description of the project	Headland Archaeology (UK) Ltd, undertook a geophysical (magnetometer) survey, covering an area of approximately 2.7 hectares, on land north of Brampton Park Golf Club, Brampton, Huntingdonshire, in advance of the submission of a planning application for a residential development. The survey has identified linear anomalies which are consistent with former agricultural land-use (ploughing and drainage) and modern activity (pipes). One rectilinear anomaly is possibly indicative of a burnt feature, possibly a brick clamp or a kiln; several Roman pottery kilns have been identified recently less than 0.5km west of the site. A cluster of discrete magnetic anomalies in the centre of the site have also been interpreted as possibly archaeological as has a slightly curving linear anomaly which is on a slightly different alignment to the ploughing trends and former field boundary. It should be noted, however, that all of the anomalies interpreted as possibly archaeological could also be of relatively modern origin. Therefore, or the basis of the geophysical survey, the proposed development area is assessed as having a low archaeological potential corroborating the conclusions of an earlier desk based assessment.
Project dates	Start: 07-03-2018 End: 07-03-2018
Previous/future work	Not known / Not known
Any associated project reference codes	BPGC18 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Grassland Heathland 5 - Character undetermined
Monument type	N/A None
Monument type	N/A None
Significant Finds	N/A None
Significant Finds	N/A None
Methods & techniques	"Geophysical Survey"
Development type	Housing estate
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	Pre-application
Solid geology (other)	Oxford Clay Formation
Drift geology (other)	River Terrace Deposits
Techniques	Magnetometry
Project location	
Country	England

LAND NORTH OF BRAMPTON PARK GOLF CLUB, BRAMPTON, HUNTINGDONSHIRE BPGC18

Site location	CAMBRIDGESHIRE HUNTINGDONSHIRE BRAMPTON Land north of Brampton Park Golf Club, Brampton
Study area	2.7 Hectares
Site coordinates	TL 2124 6992 52.313582191234 -0.221256608491 52 18 48 N 000 13 16 W Polygon
Project creators	
Name of Organisation	Headland Archaeology
Project brief originator	Consultant
Project design originator	Headland Archaeology
Project director/manager	Harrison, S
Project supervisor	Bishop, R
Type of sponsor/funding body	Developer
Project archives	
Physical Archive Exists?	No
Digital Archive recipient	In house
Digital Contents	"other"
Digital Media available	"Geophysics"
Paper Archive Exists?	No
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Land north of Brampton Park Golf Club, Brampton, Huntingdonshire: Geophysical Survey
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Other bibliographic details	BPGC18
Date	2018
Issuer or publisher	Headland Archaeology
Place of issue or publication	Edinburgh
Description	A4 glue bound report and PDF/A
Entered by	Sam Harrison (sam.harrison@headlandarchaeology.com)
Entered on	19 April 2018



