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archaeological surveys

GEOPHYSICAL (GRADIOMETER) SURVEY

LAND TO THE EAST OF OWTORPE LANE
KINOULTON, NOTTINGHAMSHIRE

CENTRED AT APPROXIMATELY NGR 468900 331150

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JUNE 2019

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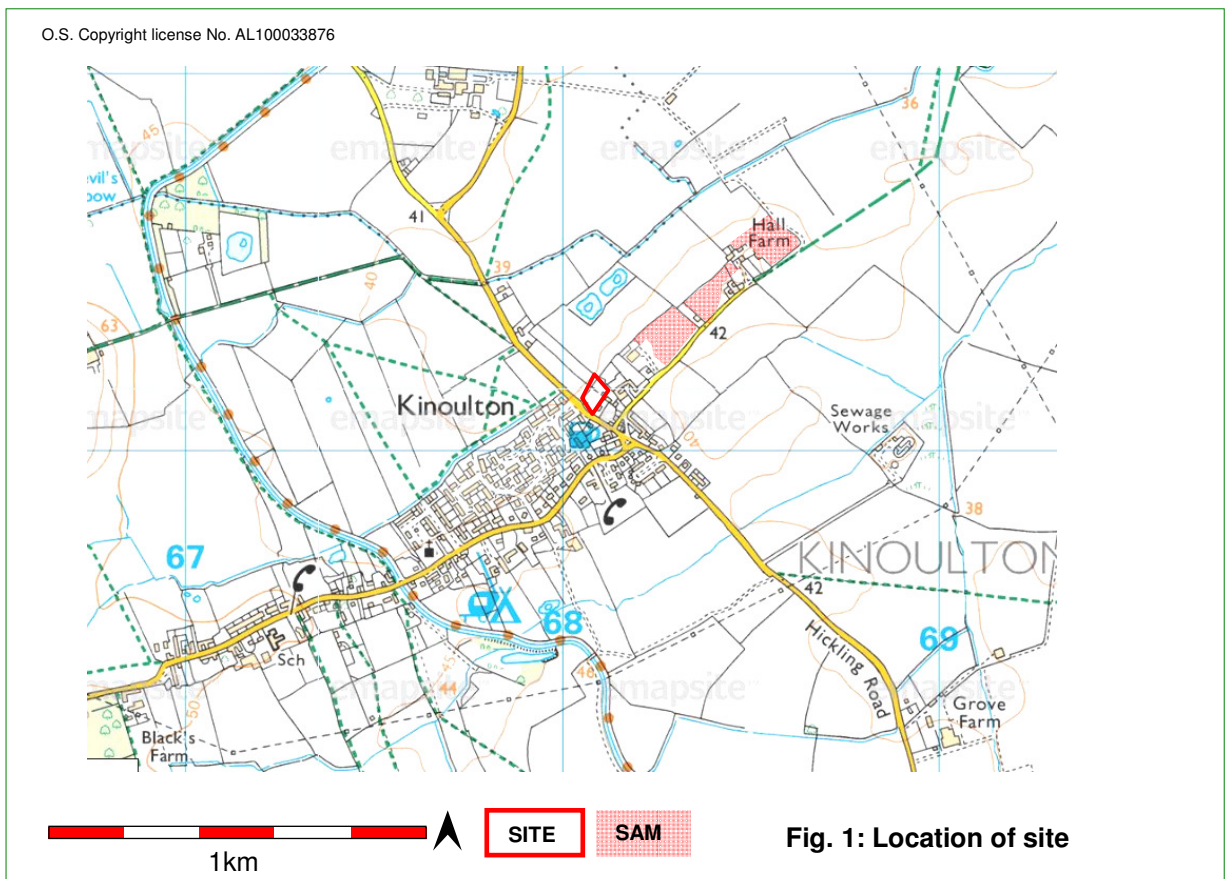
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Non-technical summary

- A fluxgate gradiometer survey was undertaken on land to the east of Owthorpe Lane, Kinoulton, Nottinghamshire.
- Whilst it is likely that much of the recorded magnetic variation relates to some form of human activity, it has not been possible to attribute a specific origin/interpretation for a group of anomalies recorded in the eastern part of the survey.
- The strongest variation is clearly associated with modern boundaries.



1.0 Introduction

Acting for Mr Norman Davill, PCAS Archaeology Ltd commissioned a fluxgate gradiometer survey of land at Kinoulton, Nottinghamshire (site centred at NGR c.468900 331150), where planning permission is sought from Rushcliffe Borough Council for the construction of five dwellings.

2.0 Location and description (Figs. 1 – 2)

The proposed development site is situated at the north-western edge of the village. It encompasses two small parcels of land; the westernmost currently utilised for grazing and that to its immediate east densely vegetated (and hence unsuitable for survey). The surveyed area is bordered to the south-west by Owthorpe Lane, to the south-east by a dwelling, and to the north-west by open grassland (beyond a stock fence). A pond, flanked by trees, lies in the western part of the site.

3.0 Geology and topography

The solid geology of the survey area comprises Branscombe Mudstone Formation (BGS, 2019). This is overlain by River Terrace Deposits (undifferentiated) of sand and gravel - formed up to 3 million years ago during the Quaternary Period in a local environment previously dominated by rivers.

The land is predominantly level at an elevation of c.40m AOD.

4.0 Archaeological context

Nottinghamshire HER online resources do not list any heritage assets within the proposed development site¹.

Whilst there are no recorded heritage assets within the site¹, the land unit lies in close proximity to three areas situated to the north-east of the site that are scheduled under the Ancient Monuments and Archaeological Areas Act 1979 (List entry Number: 1019634, Fig. 1)².

An extract of The Historic England entry describes the three scheduled areas as:

'The abandoned areas of Newbold medieval settlement survive as a series of earthworks and buried remains which are defined by three areas of protection, all lying on the north side of Hall Lane. In the area of protection between Ashgate House and Manor Farm a series of three rectangular enclosures or crofts are aligned with, and adjacent to, Hall Lane. These are defined by a number of low banks which survive up to a height of approximately 0.75m. At the northern ends of the crofts the ground rises and is slightly terraced. On the terrace another series of banks define two smaller rectangular features which are interpreted as the remains of medieval buildings, or crofts, with the low banks representing the buried remains of walls. Running along the northern boundary of this area of protection is a wide, narrow gully which is interpreted as a sunken track. This is most clearly evident from an aerial photograph, which also shows that the feature has been partly infilled since the photograph was taken in 1991. At the north eastern end of this area of protection is part of the medieval open field system which is visible as part of one furlong (a group of lands or cultivation strips). The cultivation strips collectively form ridge and furrow which survive to a height of approximately 0.5m.

The remains of the open field system continue into the second area of protection, between Ashgate House and Hall Farm. Here the remains are visible as parts of two furlongs, one at the south western end and the other at the north eastern end of the field. Between the two areas of ridge and furrow and situated towards the northern edge of the field is a large, raised, oval terrace. On the terrace a series of low banks are evident and from aerial photographs it is possible to identify the position of a building platform. Separating the terrace and building platform from the ridge and furrow at the south western end of the field is a wide gully which runs roughly north west to south east across the field. This is interpreted as a

sunken track and would presumably have provided access to the open fields originally surrounding the settlement.

The third area of protection, to the north east of Hall Farm, contains a series of tofts which are laid out at right angles to the public footpath. It is understood that the existing Hall Lane originally continued across the fields to Colston Bassett, which lies approximately 2km to the north east of Hall Farm. This line is still marked by a public right of way.

The tofts which measure approximately 30m by 15m are situated on a platform which slopes down steeply towards the public footpath. This suggests the path was originally a sunken track and that the platform has been terraced at some time in the past. Areas of exposed stone on the platform indicate that the buried remains of walls survive beneath the ground surface.

At the north western end of each of the tofts are a series of rectangular building platforms indicating at least four crofts. Approximately 30m north of the crofts is a wide gully which runs south west to north east across the area of protection. This survives to a depth of 0.4m and is interpreted as a sunken track which may originally have linked with the example identified in the area of protection between Ashgate House and Manor Farm. This would have provided a back lane to the settlement. Parts of the gully have been levelled and its full length is difficult to determine on the ground surface and from aerial photographs.'

The archaeological potential of the undated pond at the western edge of the site is currently unknown.

5.0 Methodology

The survey methodology was prepared with reference to relevant heritage industry guidance and best practice advice, including the *EAC Guidelines for the use of Geophysics in Archaeology* (Schmidt et al. 2016), and the 'Standard and Guidance for Archaeological Geophysical Survey' (Chartered Institute for Archaeologists, 2014).

5.1 Fluxgate Gradiometry is a non-intrusive scientific prospecting tool that is used to determine the presence/absence of some classes of sub-surface archaeological features (e.g. pits, ditches, kilns, and occasionally stone walls).

Gradiometry should help to establish the presence/absence of buried magnetic anomalies, which may indicate sub-surface archaeological features, and may therefore form a basis for subsequent archaeological trenching, where required.

The use of magnetic surveys to locate sub-surface ceramic materials and areas of burning, as well as magnetically weaker features is well established, particularly on large greenfield sites. The detection of anomalies requires the use of highly sensitive instruments; in this instance the Bartington 601 Dual Fluxgate Gradiometer, calibrated to the mean magnetic value of the survey area. Sensors mounted vertically and separated by 1m, measure slight, localised distortions of the earth's magnetic field, which are recorded by a data logger.

5.2 The fieldwork was undertaken on 17th of June 2019. The zigzag traverse method was used, with readings taken at 0.25m intervals along 1.0m wide traverses.

The survey grid was established by Global Positioning Satellite using a Leica GS08 RTK, to an accuracy of +/- 0.1m.

The data were processed by *Terrasurveyor V3*.

The greyscale of the unprocessed data is presented on Fig. 2 (clipped to +/-10 nT to enhance resolution). A 'Despike' function was applied to reduce the effect of extreme readings induced by metal objects, and 'Destripe' to eliminate striping introduced by zigzag traversing. The processed data were clipped +/-5nT and presented as a greyscale image on Fig. 3.

Anomalies in excess of +/-10nT are highlighted pink and blue on the interpretive image (Fig. 4). These are characterised magnetically as dipolar 'iron spikes', often displaying strong positive and/or negative responses, which reflect ferrous-rich objects (particularly apparent on stacked trace plots). Examples include those forming/deposited along current or former boundaries (e.g. wire fencing), services and random scatters of horseshoes, ploughshares etc across open areas. Fired (ferro-enhanced) material, such as brick/tile fragments (often where the latter are introduced during manuring or land drain construction) usually induce a similar though predominately weaker response, closer to c+/-5nT (highlighted in pink/blue on interpretive images). Collectively, concentrations of such anomalies indicate probable rubble spreads, such as backfilled ponds/ditches and demolished buildings. On a cautionary note, fired clay associated with early activity has the same magnetic characteristics as modern brick/tile rubble. As such, the interpretation of such variation must consider the context in which it occurs. It should also be noted that this technique only records magnetic variation (relative to natural background levels). As such, the magnetic response of archaeological remains will vary according to geology/pedology. Additionally, remains may be buried beyond the effective 1 - 2m range of the instrumentation.

The interpretation of geophysical survey results should only be regarded as an aid to establishing the nature and origin of buried features. This can only be fully clarified by intrusive investigation.

6.0 Results and discussion (Figs. 2 - 4)

The survey recorded a relatively dense zone of moderate, predominately 'positive' anomalies in the mid south-eastern region (Fig. 4: zone circled red). Whilst these undoubtedly reflect anthropogenic activities, it has not been possible to determine with confidence if these reflect modern or earlier occupation.

Beyond this zone, all stronger variation is considered to be of modern origin; reflective of ferrous-rich objects within topsoil or boundary fences and the likes (pink and blue).

The recorded anomalies featured against a backdrop of natural sub-surface subtle variations (greenscale).

7.0 Conclusions

Whilst it is likely that all distinctive variation relates to human activity, it has not been possible to confidently attribute a specific interpretation/origin for a group of anomalies that were recorded in the eastern part of the survey area.

For the most part, strongest variation is clearly associated with modern boundaries.

8.0 References

British Geological Survey. 2019. Geology of Britain viewer, 1:50,000 geological mapping, bedrock and superficial - <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

CIFA 2014 *Standard and Guidance for Archaeological Geophysical Survey*. Chartered Institute for Archaeologists.

Schmidt, A; Linford, Linford, P; N; David, A; Gaffney, C; Sarris, A; & Fassbinder, J; 2016. *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider. EAC Guidelines 2*. Euopae Archaeologiae Consilium.

¹<http://www.heritagegateway.org.uk/gateway>

²<https://historicengland.org.uk/listing/the-list/list-entry/1019634>

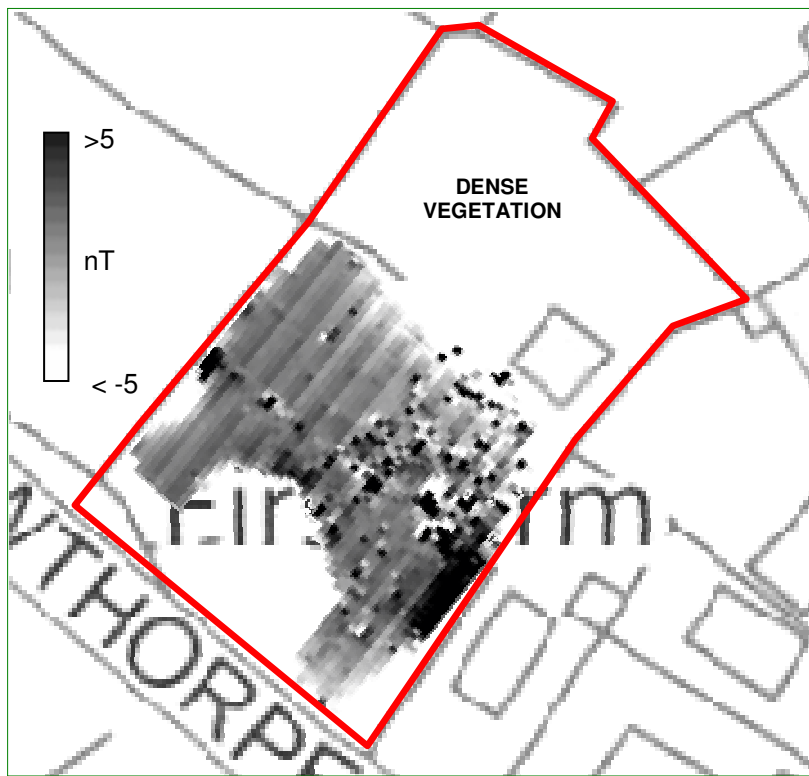


Fig. 2: Greyscale image of unprocessed data

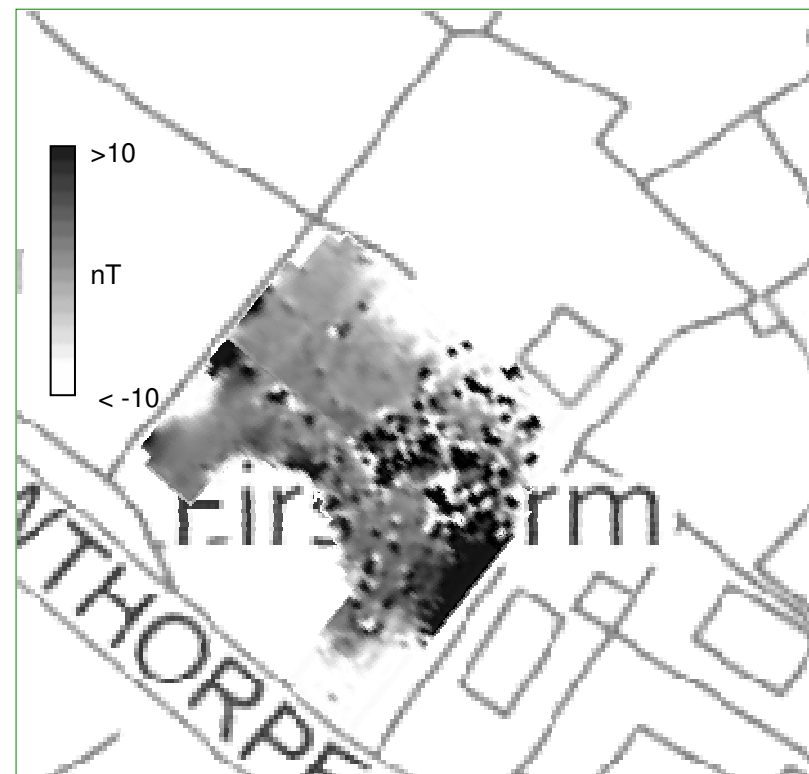
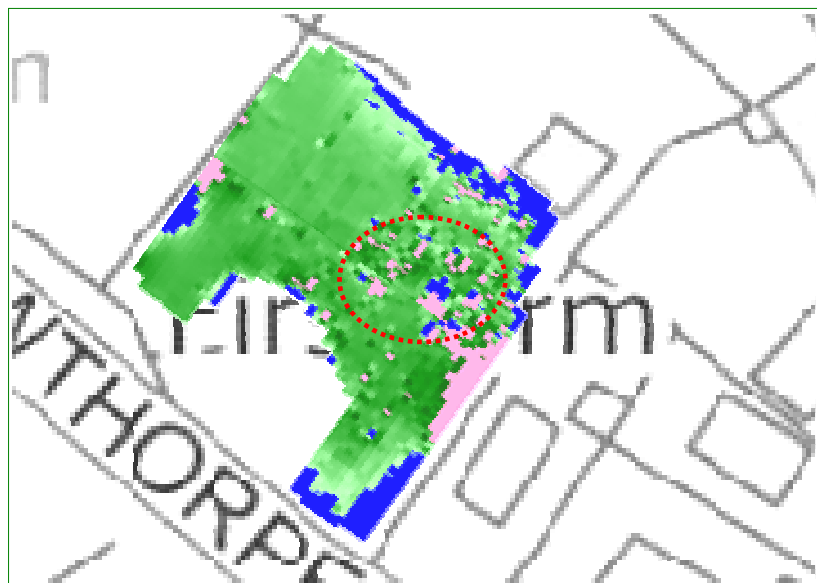


Fig. 3: Greyscale image of processed data



- > Predominantly modern (rubble, metal objects/fencing etc)
- Predominately natural, although archaeological remains typically produce weak magnetic anomalies within this range (e.g. ditches/pits). Exceptions include fired material (e.g. tile/pottery, kilns, hearths and other sites subject to intense heat).
- < Predominantly modern (rubble, metal objects/fencing etc)
- Uncertain origin



Fig. 4: Interpretation