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GEOPHYSICAL (GRADIOMETER) SURVEY

LAND TO THE NORTH OF CRICKET GROUND
NORTHAMPTON ROAD, BRIXWORTH,
NORTHAMPTONSHIRE

CENTRED AT NGR SP 74780 69380

REPORT PREPARED BY DAVID BUNN

ON BEHALF OF

HCUK GROUP AND DR D BURSTON

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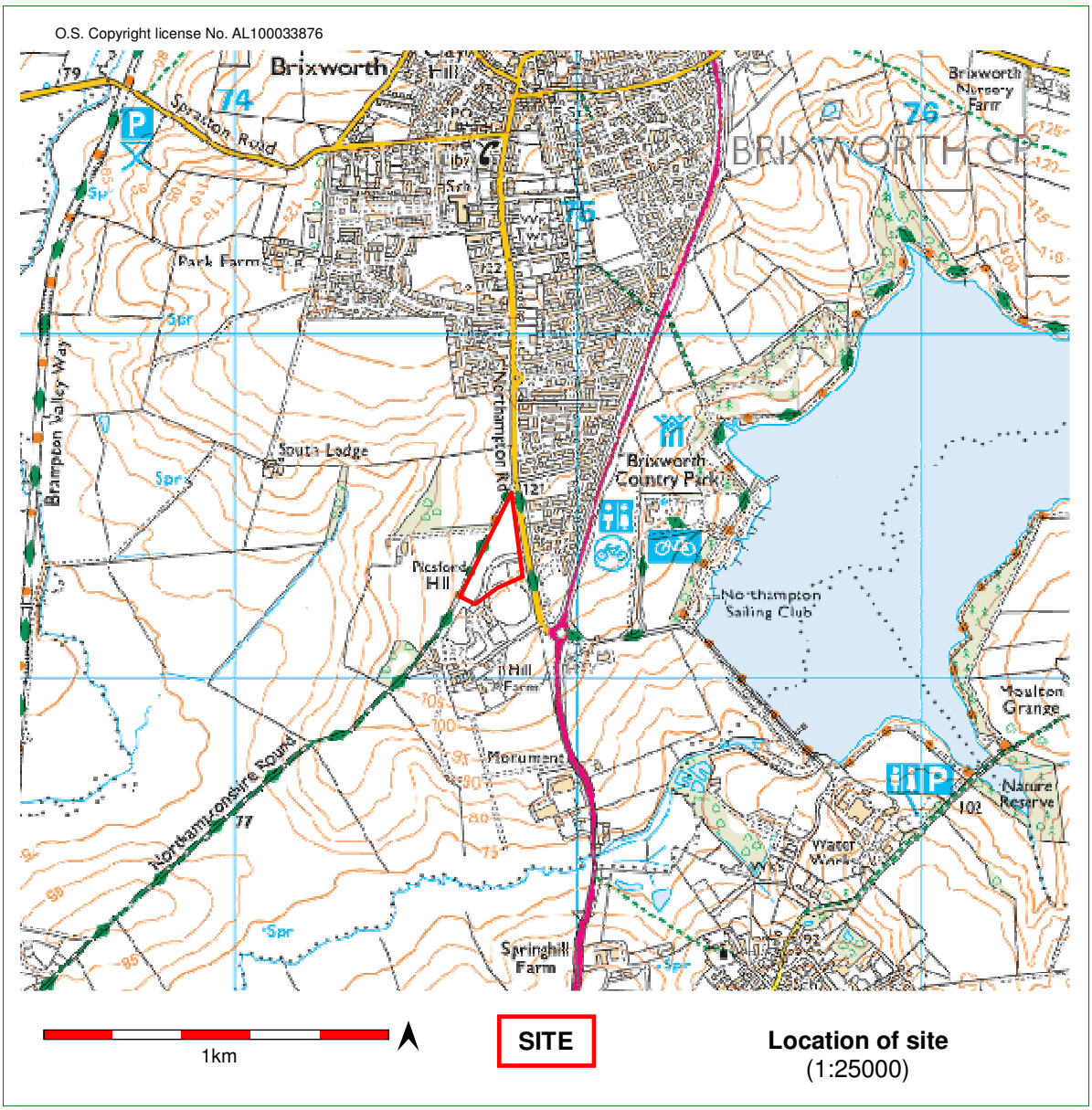
Non technical summary

- *A geophysical survey was undertaken on land to the north of Cricket Ground, Northampton Road, Brixworth in Northamptonshire.*
- *The survey identified traces of archaeological ditches and pits, particularly prevalent in the south-west part of the site where magnetic variation might represent in situ remains of a small farmstead with at least one an adjacent agricultural enclosure. These potentially date from at least the Romano-British Era.*
- *It is tentatively suggested that a relatively small oval ditch in the mid eastern region might reflect remains of a ploughed out barrow.*
- *A relatively large zone of magnetic variation in the central part of the site has been highlighted as evidence of former quarrying that has partially eradicated earlier traces of occupation.*
- *Well-defined remnants of north to south aligned ridge and furrow were detected in the northern part of the site.*



1.0 Introduction

Acting for Dr D Burston, HCUK Group commissioned a fluxgate gradiometer survey of land to the north of Cricket Ground, Northampton Road, Brixworth, Northamptonshire (centred at NGR SP 74780 69380).

The objective of the geophysical survey is to provide information relating to potential archaeological resources within the site, forming part of a heritage assessment designed to inform an outline planning application for mixed development comprising business and service use.

A pre-determination archaeological evaluation, including geophysical survey, has been recommended by the Archaeological Advisor for West Northamptonshire Council Planning Department.

2.0 Site Description (Fig. 1)

The c.2.7ha proposed development area is situated to the immediate east of Northampton Road and the southern edge of the modern settlement of Brixworth.

It encompasses two areas of uncultivated land (Areas A & B) separated by a private road that links Northampton Road and Brixworth Cricket Club, the northern edge of which abuts the southern part of the site in Area B. It is bordered to the south by the cricket club, to west and north by open land.

Area A comprises a rectangular unit of apparently undisturbed grassland. Area B, to the south and east of the track, appears to have undergone some landscaping and contains a recently built c.40m x 40m castellated wall structure at its eastern side.

3.0 Geology and topography

The solid geology comprises Northampton Sand Formation (Ironstone, ooidal) - sedimentary bedrock formed between 174.1 and 170.3 million years ago during the Jurassic Period (BGS, 2023).

No superficial geological deposits have been identified within the site.

The northern region is situated c.120m AOD, falling slightly to c.115 AOD at the southern boundary.

4.0 Archaeological Context

Whilst there are no known monuments within the proposed development area, Northamptonshire online HER[1] lists a probable Late Iron Age and Roman farmstead on land to the immediate east (beyond Northampton Road, where geophysical survey and subsequent trial trenching identified enclosure and boundary ditches (HER No. 5592/0/11). Subsequent excavation identified traces of Neolithic to early Iron Age, in addition to Iron Age and Roman settlement remains, probably associated with an adjacent farmstead that has also been identified by geophysical survey and excavation to the east of the A508 (HER No. 6214). The excavation also unearthed likely traces of crop processing/drying ovens, with later remains including dating from the later Roman period and possibly associated with brewing.

Cropmarks and fieldwalking in the field to the immediate north of the site suggest occupation in this area, with finds including flint and Roman pottery (HER No. 4413).

5.0 Methodology

5.1 The survey methodology is based on 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).

5.2 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).
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 green field sites. The detection of anomalies requires the use of highly sensitive instruments; in this instance the Bartington 601 Dual Fluxgate Gradiometer. This is accurately calibrated to the mean magnetic value of each survey area. Two sensors mounted vertically and separated by 1m measure slight, localised distortions of the earth's magnetic field, which are recorded via a data logger.

This technique only records magnetic variation in relation to natural background levels, established by careful selection of magnetically 'quiet' zones where instrument sensors are calibrated to 0nT. As such, the magnetic response of archaeological remains will vary according to geology/pedology, with a possibility that buried features could remain undetected should their magnetic susceptibility closely match that of the surrounding soils. Additionally, some remains may be buried beyond the effective 1m - 2m range of the instrumentation; for example beneath alluvium. Back-filled shallow pits or ditches might also exhibit minimal variation.

5.3 The fieldwork was undertaken on the 21st of August, 2023. The zigzag traverse methodology was employed, with readings taken at 0.25m intervals along 1.0m wide traverses.

The survey grid was established by Global Positioning Satellite using a Leica GS015 RTX, to an accuracy of +/- 0.1m.

The data were processed by using *Terrasurveyor V3*.

The raw data set is presented as a greyscale image on Fig. 2 (data clipped to +/-20nT).

The trace plot image is presented on Fig. 3 (processed unclipped data).

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 data were clipped to +/-5nT on the greyscale images of the processed data (Fig. 4).

Anomalies in excess of +/-10nT are highlighted pink and blue on the interpretive figure (Fig.5). These are characterised magnetically as dipolar 'iron spikes', often displaying strong positive and/or negative responses, which reflect ferrous-rich objects. 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 the interpretive image). Collectively, concentrations of such anomalies typically 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 be noted that the strong responses of modern features can mask those of underlying archaeological remains.

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.

A digital archive of the geophysical data and report will be retained by PCG.

6.0 Results and discussion (Figs. 2 – 5)

The survey recorded a widespread array of ditches and potential pits that largely situated in the southern/south-western part of the site (Fig. 5: red). These include the western, northern and southern extents of a square enclosure in the south-west corner of Area A (**1**), with an east to ditch abutting its western edge. Its southern edge shares the northern extent of a smaller enclosure (**2**). Further traces of both features appear to extend into Area B, where there are definitive indications of the eastern side of enclosure **2** and probable partial remains of the eastern edge of enclosure **1** (**3**)**.** The modern road clearly extends across the enclosures and it is possible that further remains survive relatively undisturbed beneath it.

A relatively dense array of potential pits and short sections of ditches were registered within, and in close proximity, to enclosure **2**, including a potential ditch that extends to the west from its south-western corner. These almost certainly signify traces of a small settlement, with the larger enclosure to its immediate the north serving as agricultural function, such a stock enclosure. The lack of potentially significant anomalies within the latter reinforces this hypothesis. Collectively, these conceivably represent the remains of a small farmstead that (feasibly) share contemporaneity with known Iron Age – Romano activities remain to the east of Northampton Road and the A 508.

Elsewhere, of particular note is an oval ditch recorded in close proximity to the eastern boundary of Area A (**3**). Measuring approximately 7m wide and 12m long and seemingly isolated (at least to the north, south and west), a specific origin cannot be wholly determined by non intrusive investigation. With that in mind, there are no clear indications of any access, possibly implying that this might be remnants of a ploughed out barrow rather than associated with domestic or agricultural use.

A relatively large zone of predominantly moderate magnetic variation was recorded to the north of the track in Area 1, with suggestions of a southerly continuation into Area B, including ithe walled structure (zone broadly described by red dotted line). Clearly of anthropogenic origin, it is speculated that this might reflect the backfill of a former quarry, albeit of uncertain date, though no corresponding feature is depicted on historic O.S. maps[2]. One of two ditches abuts its northern extent (**4**). These are probably associated with the putative farmstead, with any former southerly continuation of **4** (and the north-east corner of enclosure **1**) conceivably eradicated by subsequent quarrying.

An isolated ditch and adjacent potential pit were detected at the northern tip of Area A (**5**) and a relatively large pit (and a small number of others) was recorded on land between the putative large quarry and the oval ditch (**6**). It is speculated that this, at least, might indicate a small area of quarried ground.

Clearly defined traces of north-south aligned ridge and furrow cultivation were registered in the northern part of Area A, with slight suggestions of further examples elsewhere in this field, some aligned east to west (orange lines).

Whilst It is likely that the majority of stronger responses potentially reflect ferrous-rich objects and materials, some were recorded among putative remains at the western side of Area B (pink and blue). Not withstanding that elements of these might reflect magnetically stronger buried remains (such as hearths and ovens), it is likely that some signify modern near surface debris associated with recent groundworks and the construction of the wall enclosed structure. An example in the south-corner of the walled structure corresponds to the location of a recent bonfire (**7**). Stronger responses within the putative quarry site might also reflect relatively modern ferrous-rich objects and materials.

Anomalies discussed above were recorded against a background of predominantly natural variation (greenscale). However, not withstanding that the site clearly contains potentially significant remains, it has not been possible in all cases to confidently differentiate between potential archaeology and natural inconsistencies.

7.0 Conclusions

The survey identified traces of archaeological ditches and pits, particularly prevalent in the south-west part of the site where magnetic variation might represent *in situ* remains of a small farmstead with at least one an adjacent agricultural enclosure. These potentially date from at least the Romano-British Era.

It is tentatively suggested that a relatively small oval ditch in the mid eastern region might reflect remains of a ploughed out barrow.

A relatively large zone of magnetic variation in the central part of the site has been highlighted as evidence of former quarrying that has partially eradicated earlier traces of occupation.

Well-defined remnants of north to south aligned ridge and furrow were detected in the northern part of the site.

8.0 Acknowledgements

Pre-Construct Geophysics thanks HCUK Group for this commission.

9.0 References

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[1]www.heritagegateway.org.uk

[2]https://maps.nls.uk/os/25inch-england-and-wales/index.html

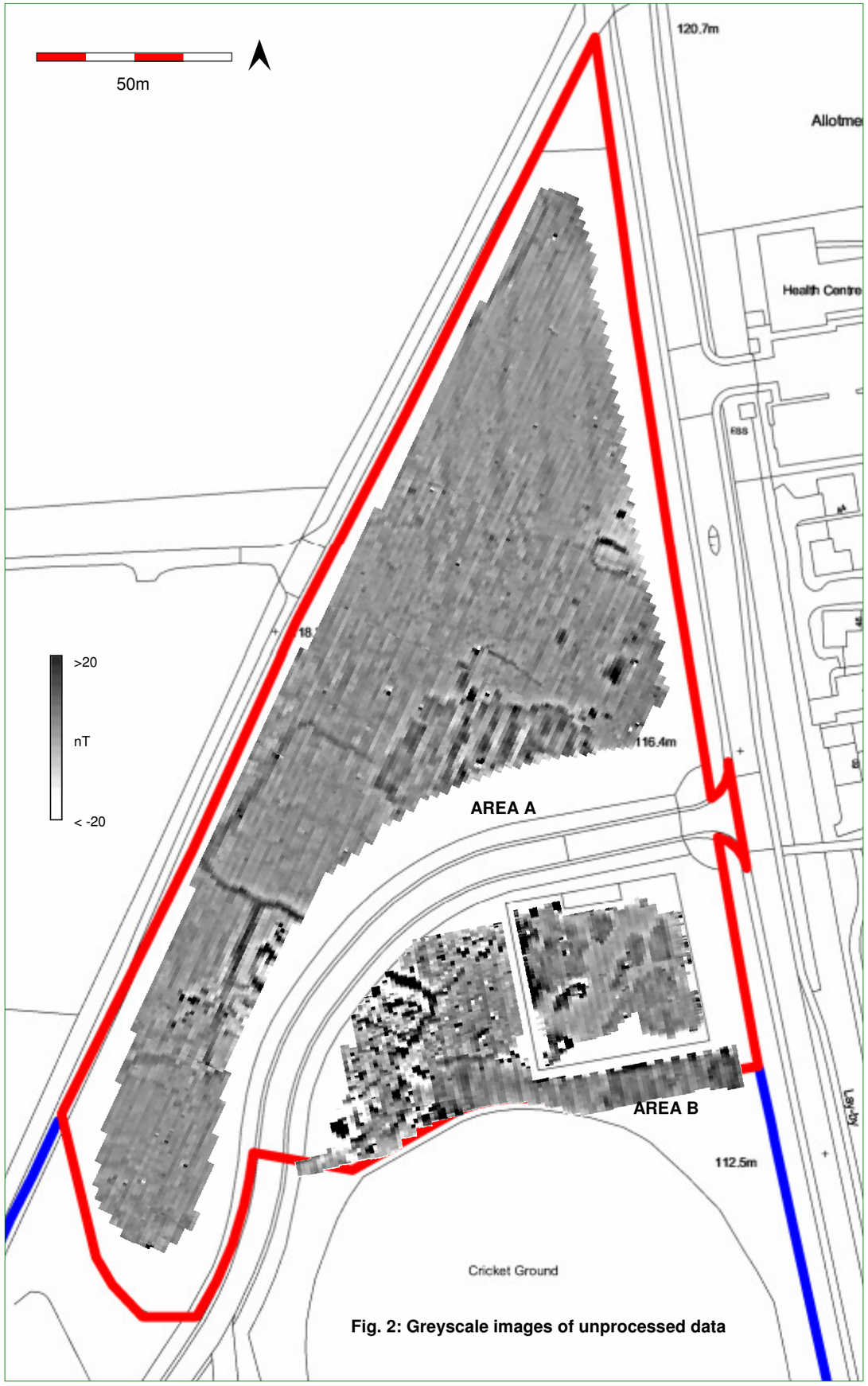

Fig. 2: Greyscale images of unprocessed data

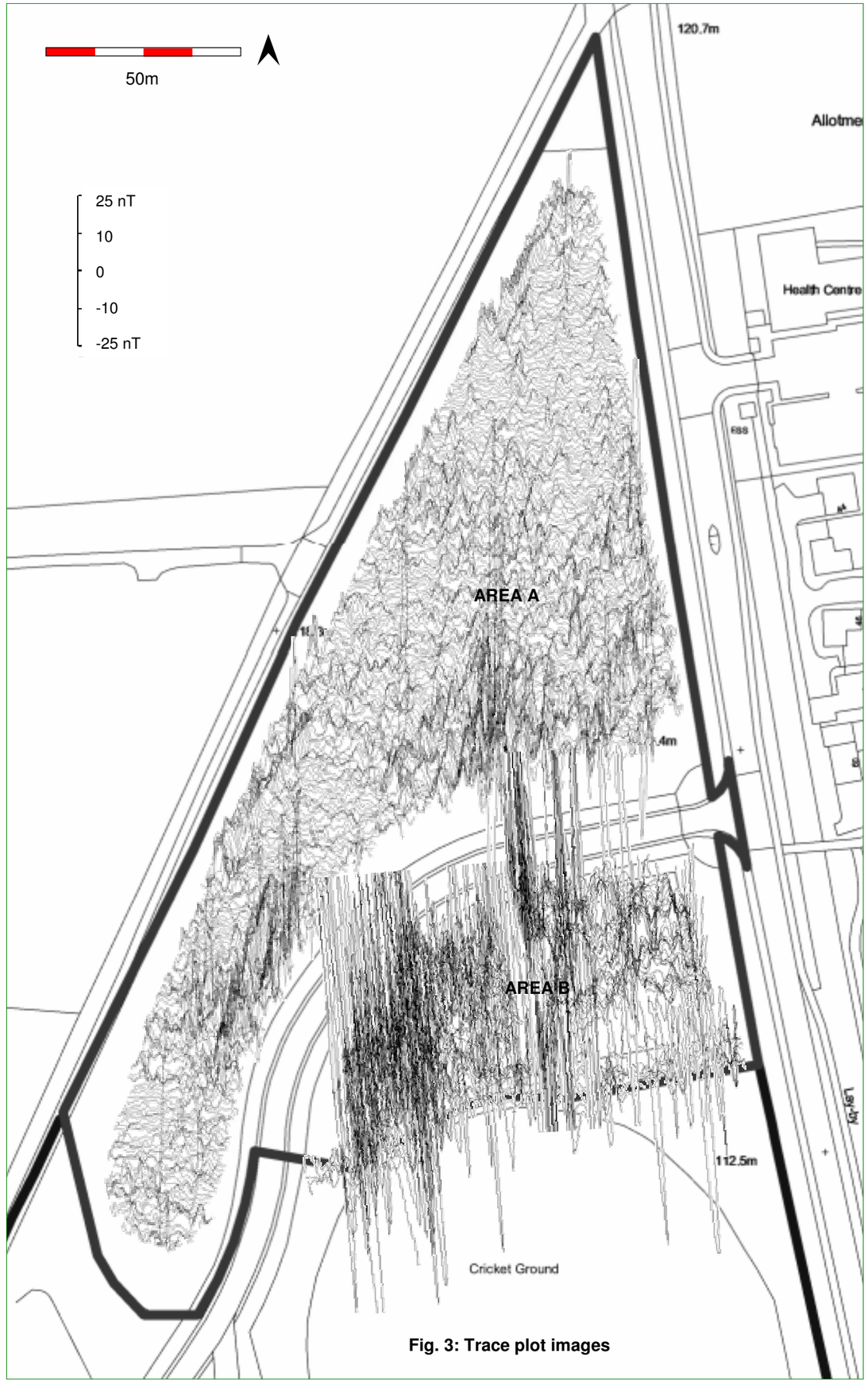

Fig. 3: Trace plot images

Fig. 4: Greyscale images of processed data

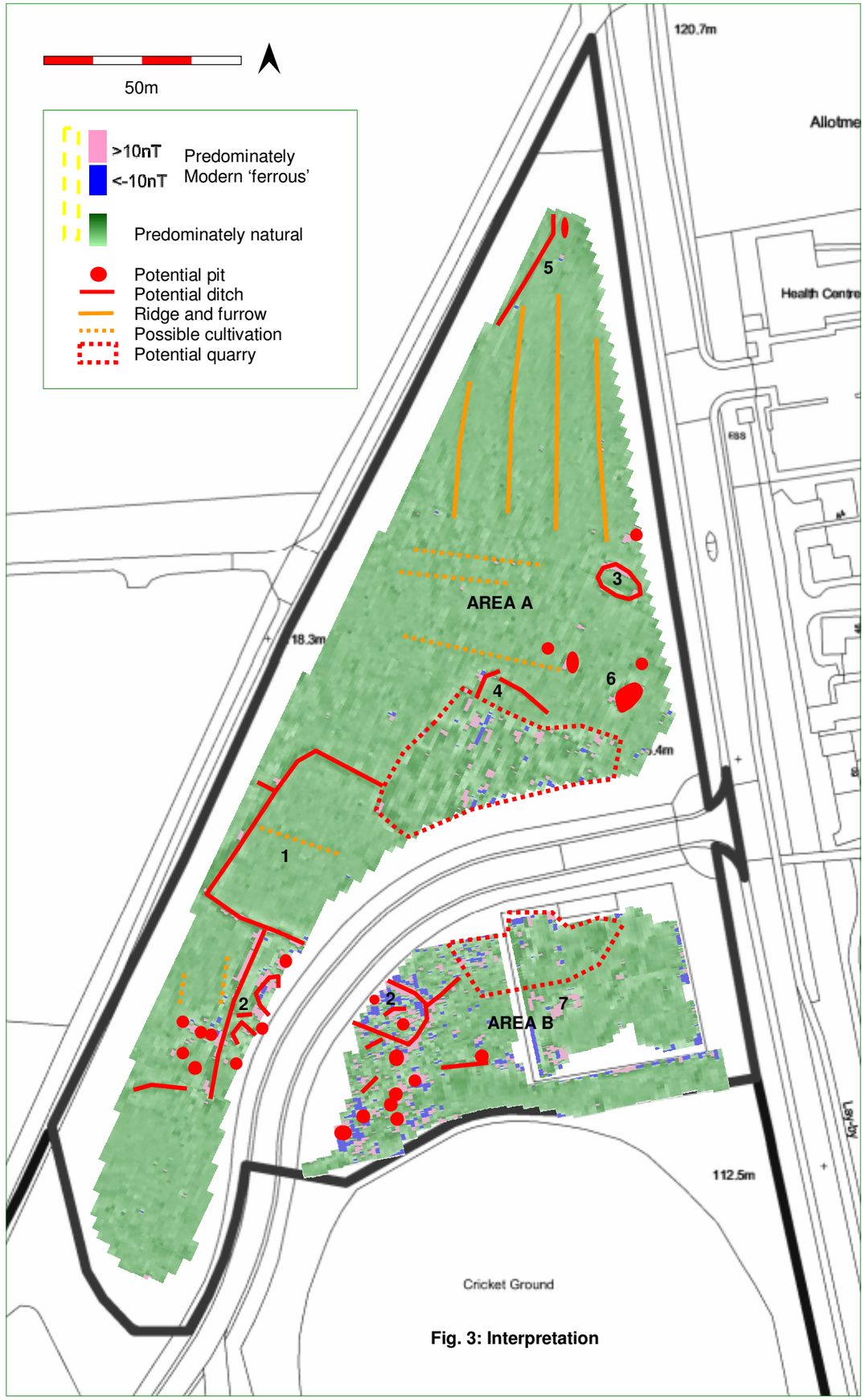

Fig. 3: Interpretation