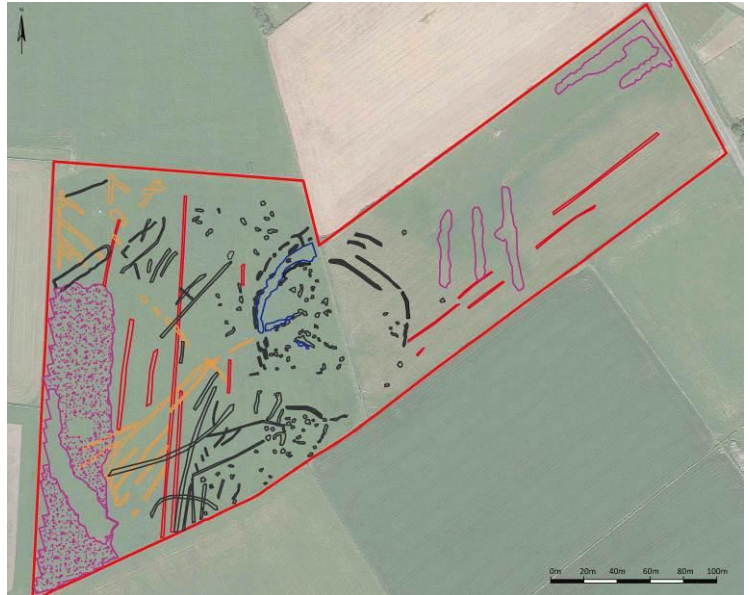


Geophysical Survey of Land at Roughbirchworth, Oxspring, South Yorkshire



ARS Ltd Report 2020/157
December 2020

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December 2020



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Prepared on behalf of: Roughbirchworth Community
Excavation Group

Date of fieldwork: June to December 2020

Date of report: December 2020

Compiled by: Richard Durkin ACIfA and
Adrian Jacklin PCIfA

Checked by: Roger Doonan

Planning Reference: N/A

Local Authority: Barnsley Metropolitan Council

Site central NGR: SE 18730 14480

EXECUTIVE SUMMARY

This report presents the results of a geophysical survey undertaken on land at Roughbirchworth, Oxspring in South Yorkshire. The survey was commissioned by Barry Tylee on behalf of the Roughbirchworth Community Excavation Group with funding from the Yorkshire Archaeology and Historical Society. The survey was carried out in June and December 2020 to investigate a reputed later prehistoric/ Roman enclosure and the two fields within which it is thought to be located.

The northern section of the enclosure has been detected in both fields although in the eastern field the feature is barely visible in the results. More detail has been revealed in the western field where there is clear evidence of a c. 25m long section of ditch with evidence of two further concentric ditches to the north. There is also evidence of a possible terminus and entrance and the possible presence of internal features.

A considerable number of anomalies have been recorded elsewhere, particularly in the western field, but these are generally weak and difficult to interpret with any certainty. The results revealed subtle evidence of two more, possibly circular, enclosures (anomalies 7 and 8), the northern part of another circular enclosure that is predominantly located in the field to the south of field G (11) and a rectilinear enclosure (21) all amongst land drainage, modern disturbance and probable agricultural disturbance and cultivation remains.

In summary, a significant number of anomalies have been recorded in addition to the ones which are most likely to be associated with the putative enclosure and although many of these may prove to be agricultural or modern they are all accurately geo-referenced and can be targeted with confidence during any further investigations.

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Figure 6: Trace - plot field B

1 INTRODUCTION

1.1 Project Background

1.1.1 Archaeological Research Services Ltd (ARS Ltd) was commissioned by Barry Tylee on behalf of the Roughbitchworth Community Excavation Group to undertake a geophysical survey on land at Roughbitchworth. The survey was conducted to investigate a feature, shown on the 1854 Ordnance Survey (OS) map and aerial photographs and suspected of being a later prehistoric/ Roman enclosure, and the surrounding land. An initial survey was carried out in June 2020 to test the response of the local geology and to ensure that the feature could be detected. Following this, funding was obtained from the Yorkshire Archaeology and Historical Society to complete the survey of the two fields which lie to the east and the west of the enclosure.

1.2 Site Location and Topography

1.2.1 The boundary of the geophysical survey area (hereafter survey area) is depicted by a red polygon on Figure 1 and encompasses a total area of c.6.3 hectares (ha). The survey area is centred at Ordnance Survey (OS) grid reference SE 25710 01344.

1.2.2 The survey area is located to the west of the hamlet of the Roughbitchworth, to the south-west of Oxspring in South Yorkshire. The survey area is bounded by open agricultural fields on all sides except in the north-east where it abuts Cross Lane. The survey area comprises two fields, G and B (Fig. 1), named to correspond to the supporting documents and as detailed below;

- ◆ Field G (c.3.75 ha) – containing the majority of the enclosure and the land to the west thereof. The field slopes from a high point of c. 274m above Ordnance Datum (aOD) in the south-west to c. 260m aOD in the north-east. A subtle earthwork is visible in the location of the putative enclosure otherwise the field is flat and featureless,
- ◆ Field B (c.2.55ha) – containing the eastern part of the enclosure and the land to the east thereof. The field slopes from a high point of c. 265m above Ordnance Datum (aOD) in the south-west to c. 249m aOD in the north-east. The field is flat and featureless.

1.3 Geology

1.3.1 The underlying solid geology of the majority of survey area comprises “Pennine Lower Coal Measures Formation - Mudstone, Siltstone and Sandstone. Sedimentary Bedrock formed approximately 318 to 319 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas” (BGS 2020). A small area in the north of field B and south of field G is located on “Grenoside Sandstone - Sandstone. Sedimentary Bedrock formed approximately 318 to 319 million years ago in the Carboniferous Period. Local environment previously dominated by rivers” (BGS 2020). No overlying superficial deposits are recorded (ibid).

1.3.2 The soils are recorded as “freely draining, slightly acidic and loamy soils” (CU 2020).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 The 1854 Ordnance Survey (OS) map depicts a 'camp' which is illustrated as having three concentric earthwork banks. The camp is recorded on the South Yorkshire Sites and Monuments Record (02173/01) as an Iron Age Enclosure that is described as "vague unsurveyable ground swellings but visible on APs". The enclosure spans two fields and is approximately 100m in diameter (Crossland 2017, 2).

2.2 Aerial photographs show multiple cropmarks within the nearby fields close to the Iron Age enclosure. Just south of the Iron Age enclosure, a rectangular crop mark was identified, possibly comprising of a bank and ditch (Crossland 2017, 5). However, the northern extent of the rectangular cropmark is not depicted on the aerial photograph, and so the definitive shape of the cropmark cannot be ascertained. However, the cropmark potentially covers an area of c.8 acres (Crossland 2017, 5). Just west of the rectangular cropmark, lies a number of fainter cropmarks, one of which is represented by two linear features protruding westwards from the rectangular enclosure (*ibid*, 5). It is postulated that this could be a road or droveway (*ibid*, 5).

2.3 Three Roman coins and a bronze fragment were identified in the field immediately to the south of the Iron Age enclosure (*ibid*, 7). A well, once present within the same field, has since been backfilled (*ibid*, 7). Archaeological evidence for a Roman Road was discovered in Longdondale (Hargreaves 2017), which is postulated to have ran between Malandra and the camp/fort at Roughbirchworth, before carrying on eastwards towards Rossington and Templeborough via Finkle Street.

2.4 The transformation of the economic and political landscape of Britain during the 15th to 18th centuries resulted in planned enclosures and the intensification of agricultural activity. The area of Roughbirchworth and Snowden Hill Commons were enclosed in 1826 (Crossland 2017, 3). The parish boundary of Oxspring and Hunshelf, follows the southern field boundary of the fields that contain the camp, and is orientated on a north-east to south-west axis. This boundary links onto Cranberry Road, which follows the ancient salt-way between Cheshire and Rotherham, at Throstle Nest (Crossland 2017, 3; Hay 2001).

2.5 In the field to the south of the Iron Age enclosure, two 1m² trenches were excavated to target anomalies shown on a geophysical survey, which was carried out in the field in 2017. Trench 2 revealed a stone deposit which, taken with evidence of linear features identified in the geophysics and aerial photographs, could represent a possibly roadway or track. A metal detecting survey was undertaken within the field of the camp. Despite the metal detecting being hampered by modern, metal dairy waste spread over the field, metal detecting at the nearby Heath Hall led to the discovery of a Roman brooch and a potential lead stylus, suggesting a possible Romano-British presence in the area.

3 METHODOLOGY

3.1 Magnetometry is a non-intrusive scientific prospecting technique that is the preferred geophysical technique used to determine the presence or absence of buried archaeological features when site and geological conditions are favourable. It is an efficient and effective method for locating anomalies corresponding with archaeological features. The instrument chosen for this survey was a Bartington Grad 601 dual sensor fluxgate

gradiometer which can detect weak changes in the Earth's magnetic field caused by buried features.

3.2 All fieldwork and reporting was undertaken following Historic England's (2008) *Geophysical Survey in Archaeological Field Evaluation* and The Chartered Institute for Archaeologists (CIfA) *Code of Conduct* (CIfA 2019) and *Standards and Guidance for Archaeological Geophysical Survey* (CIfA 2020).

3.3 The 30m by 30m survey grids were located to cover the entire survey area as shown in Figure 3. In total 78 survey grids (including partial grids) were set out and accurately positioned using a Leica Zeno 20 GNSS which was connected to Leica Smartnet to receive corrections resulting in an accuracy of typically better than 0.5m. Each grid was then surveyed at 1m traverse intervals with the sampling at 0.25m (4 readings per metre) intervals. The survey was carried out in 'zig-zag' mode with each alternate traverse walked in opposite directions. The range of the instrument was set at 100nT (0.01nT resolution).

3.4 The survey was carried out by ARS Ltd in June and November when the weather was mild with occasional light rain. At the time of the surveys field G was under pasture and field B was under a low a crop. The fields were free of obstructions with the exception of an item of farm equipment in the north of field G. There was some concern that the dairy waste, which hampered the metal detecting surveys, might contain sufficient ferrous contaminants to also adversely affect the geophysical survey so it was agreed to carry out some pre-survey checks to investigate this potential problem. Other than this the ground was predominantly firm with low grass/ crop and was largely ideal for geophysical survey.

3.5 Prior to commencing the survey the gradiometer was balanced and calibrated to the local conditions and this was repeated regularly throughout each day. Upon completion of the survey, the data was downloaded, checked and archived on the ARS Ltd server. The data was downloaded using Bartington Instruments' *Grad 601 Communication Application*.

4 GEOPHYSICAL SURVEY RESULTS

4.1 Introduction

4.1.1 The geophysical survey was successful and the objectives of the survey have been achieved. For analysis the data was minimally processed using Geoplot software. Data processing included clipping with clipping parameters selected on the mean and standard deviation data values, de-staggering and de-stripping. De-stripping was undertaken to remove visual contrasts that often appear in gradiometer data and inhibit interpretation. Striping was removed by utilising the "zero mean traverse" function with thresholds applied. Finally, the data was interpolated in both the x and y axes. To enhance the visibility of subtle features the data was plotted and examined under a number of different clip plotting parameters.

4.1.2 Occasionally, processing the data to compensate for directional sensitivity or to remove iron spikes caused by miscellaneous ferrous objects can also inadvertently disguise anomalies that may be of archaeological origin, particularly long linear features in the

direction of the traverses. The data has, therefore, been analysed in a number of different formats and at each stage of processing.

4.1.3 Not all anomalies have been included in the results and discussion. Dipolar anomalies with no clustering or pattern to their distribution are common on most sites and almost certainly relate to natural variations in the soils and geology, agricultural disturbance and miscellaneous ferrous litter on the surface of the field. This type of anomaly is ubiquitous in field B and these anomalies have not been analysed further in either field.

4.1.4 The data analysis is presented graphically in Figures 3 to 10. Greyscale shade plots of the processed gradiometer data are presented in Figures 3 to 5. Interpretative plans are presented in Figures 6 to 8, and trace plots in Figures 9 and 10.

4.2 Anomalies (refer to Figs. 6 to 8 for anomaly numbers)

4.2.1 Field G

4.2.1.1 In the eastern half of the field the putative enclosure has been clearly detected although the intermittent response suggests that the monument is truncated. The clearest response is in what would be the north-western quadrant of the enclosure where a c. 25m long curvilinear anomaly (1) almost certainly indicates a section of ditch with a possible terminus (2) and entrance (3) at the southern end. (2). A broad band of magnetic reduction (negative anomaly) (4) is likely to represent bank or up-cast spoil. To the north of (1) there is intermittent evidence of the surviving remains of two further concentric ditches.

4.2.1.2 It is notable that within the enclosure and immediately to the north there is a higher concentration of anomalies than outside and this may indicate general anthropogenic activity and the possible presence of truncated internal features. The anomalies are of varying size and form and are of mixed polarity and cannot be interpreted with any certainty without further investigation. Anomalies 5 and 6, which also contain negative components, could be of particular interest.

4.2.1.3 To the south of the enclosure there is a subtle hint of a further, possibly circular, enclosure of c.40m diameter (7) although as the response is so weak, any interpretation is somewhat speculative. On the west of this possible feature a stronger penannular response tentatively suggests the remains of a smaller circular feature of c. 8m diameter (8). This area and the area to the south-west (9), which is tentatively bounded in the north by weak linear anomaly 10, also contains a higher concentration of anomalies which could be investigated to differentiate any anomalies which are of archaeological interest from any that are natural. In this part of the survey area satellite images indicate the possible presence of a circular enclosure which, although predominantly located in the field to the south of field G and therefore outside the survey area, may survive within field G in the location of weak curvilinear anomaly 11.

4.2.1.4 A clearly defined, yet weak, linear anomaly which extends the full length of the field (12), on an alignment that appears to respect the alignment of the extant western field boundary, and a parallel linear anomaly that was only recorded intermittently in the southern half of the field (12a), are most likely to indicate the remains of cultivation; possibly ridge and furrow or more modern agricultural activity. Weak evidence of further

anomalies on the same alignment (13 to 17) was recorded to the east and west of (12) and this may support this interpretation of cultivation remains. Immediately to the east of the southern end of (12a) a weak curvilinear anomaly (18) and approximately parallel anomalies (19 and 20) are aligned towards the possible entrance to the monument and could be of archaeological interest.

4.2.1.5 Towards the north-west of the field, a subtle hint of a rectilinear enclosure was detected (21) but, again, the response is so weak that it is difficult to be confident in any interpretation. Further weak anomalies to the west and the north appear to be on a similar alignment and may be contemporary. To the south of this a large regular shaped area of c. 40m wide by c.180m long of concentrated magnetic disturbance (22) is indicative of modern tipping; possibly the aforementioned dairy waste. Interestingly a clear soil mark on the 2003 Google Earth image corresponds with this area of magnetic disturbance. In the south of this area a broad linear/ curvilinear anomaly contains an erratic mix of responses (23) which is indicative of the presence of ferrous contaminants, possibly a rubble drain or an in-filled depression.

4.2.1.6 Several groups of linear anomalies were recorded in the western half of the field and the response and arrangement of the anomalies suggest the presence of land drainage. In the north-west groups (24, 25 and 26) can be confidently interpreted as land drainage. In the south, the arrangement of the anomalies in group (27) still suggest land drainage but the response is less characteristic and therefore more difficult to distinguish from linear anomalies which could have alternative origins. Anomaly 28 appears to extend across much of the field and continues as far as the enclosure towards the possible entrance at (3) and then respects the alignment of (5). Whilst this may all be fortuitous it is worthy of note.

4.2.1.7 The eastern half of the putative enclosure in field B is less clear in the results but has nonetheless been detected along part of its length. In the north there is evidence of two, and possibly two further, concentric ditches (29). Only a small number of anomalies were recorded within the confines of the enclosure and this, as well as the weak response associated with the ditches, indicates that any archaeological remains in this field are likely to be heavily truncated.

4.2.1.8 Two groups of linear anomalies on an alignment that respects the alignment of the extant field boundaries (30 and 31) are most likely to be a result of agricultural activity but whether this is modern or historical cannot be determined with any certainty and they may be worthy of further investigation. Three broad linear anomalies which cross the field diagonally on an approximate north to south alignment (32-34) are of unknown origin but it is very likely that they are a result of modern activity possibly, as with anomaly (23) in field G, rubble filled drainage trenches or in-filled depressions. Two similar anomalies (35 and 36) are aligned with the extant north-western field boundary. These anomalies may be joined along the north-eastern boundary and should be understood as having similar origins to (32-34). Information from the farmer or further investigation may help to clarify these further.

4.2.1.9 The remainder of field B is devoid of any anomalies of archaeological interest and the discrete anomalies that appear to be randomly distributed across the field are almost certainly natural or a result of modern agricultural activity (4.1.3).

5 DISCUSSION AND CONCLUSIONS

5.1 The geophysical survey has detected the presence of the putative enclosure albeit as discontinuous and sometimes weak anomalies. Results suggest that preservation is better in Field G than that in Field B where the monument is barely visible in the results. The strongest and clearest results are in field G where a c. 25m section of probable ditch and a possible terminus and entrance are discernible. These are good locations with high archaeological potential to target any further investigations.

5.2 The geophysical survey results have also revealed two possible circular features, and part of a third, and an area of possible anthropogenic activity all in the south of field G in addition to a possible rectilinear enclosure in the north-west of the same field. Whilst these anomalies are of archaeological interest any interpretation at this stage is speculative and only field evaluation can confirm the presence or absence of any archaeological features.

5.3 A considerable number of anomalies were recorded elsewhere but these are likely agricultural in origin with a significant amount of land drainage, modern disturbance and areas of modern tipping present. It may be possible to obtain some clarification on the origin of some of these anomalies through discussion with the farmer or landowner.

5.4 Prior to the survey, there was concern that ferrous contaminants in dairy waste had been spread as manure on field G and would compromise the effectiveness of geophysical survey. Generally, with the exception of an area in the southwest of field G, the results do not appear to be have been adversely affected and the data is reliable. A significant number of anomalies have been recorded in addition to the ones which are associated with the known enclosure and although many of these may prove to be agricultural or modern they are all accurately geo-referenced and can be targeted with confidence during any further investigations.

6 STATEMENTS AND ACKNOWLEDGEMENTS

6.1 Archive Deposition

6.1.1 One bound copy of the final report with an attached digital PDF/A copy on disc will be deposited with the relevant Historic Environment Record (HER). The disc will also include a digital archive, consisting of relevant ESRI shapefiles or CAD files, for use of updating the HER database.

6.2 Publicity, Confidentiality and Copyright

6.2.1 Any publicity will be handled by the client. Archaeological Research Services Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

6.3 Statement of Indemnity

6.3.1 All statements and opinions contained within this report arising from the works undertaken are offered in good faith and compiled according to professional standards. No responsibility can be accepted by the author/s of the report for any errors of fact or opinion

resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

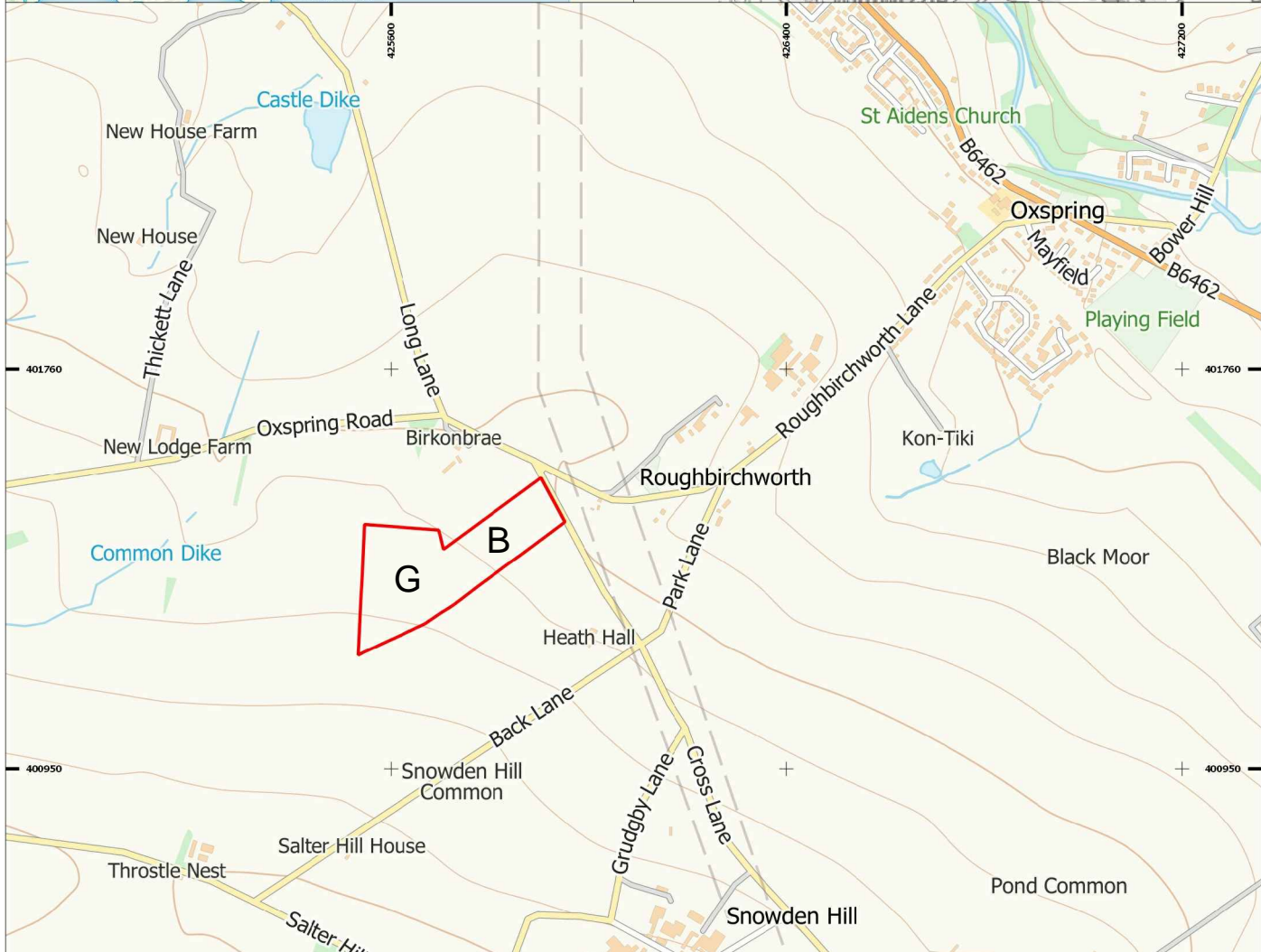
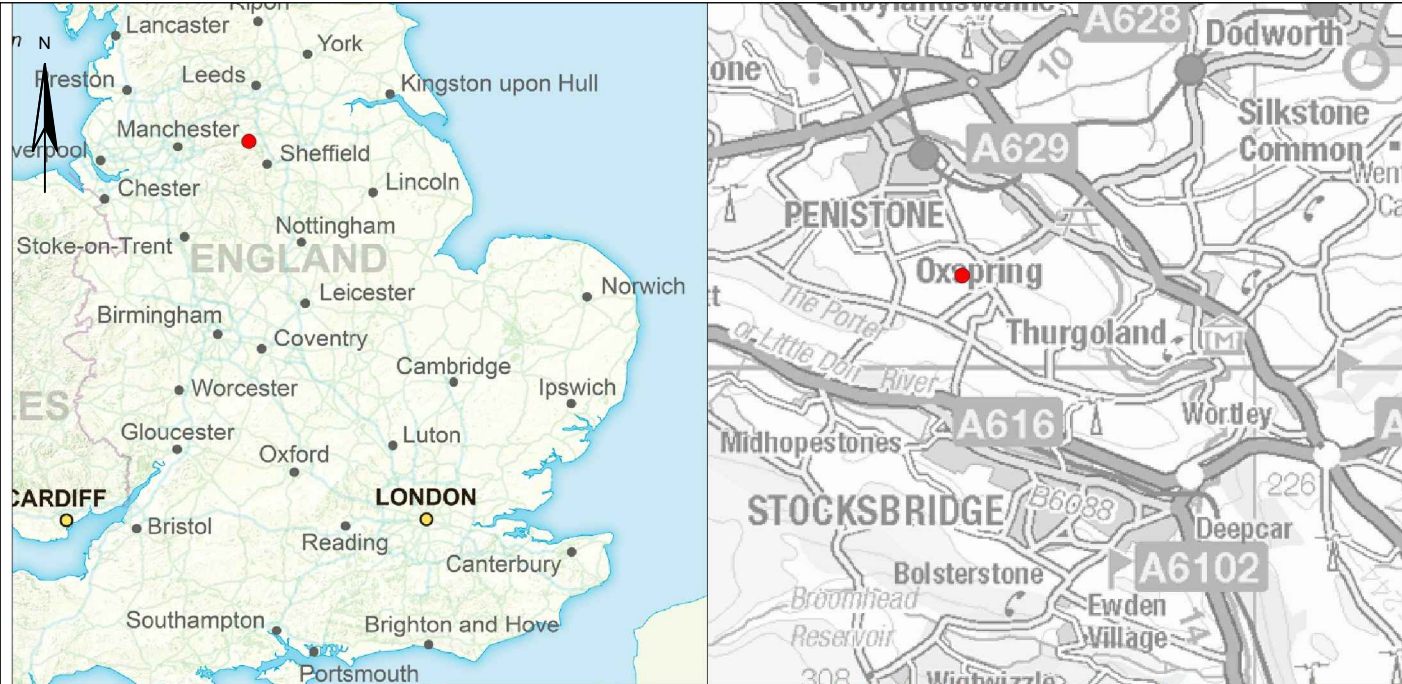
6.4 Acknowledgements

6.4.1 Archaeological Research Services Ltd would like thank Barry Tylee of Roughbirchworth Community Archaeology Group for commissioning this work and for all his help and advice and for arranging access to the fields to carry out the survey and to the Yorkshire Archaeological and Historical Society for the funding.

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APPENDIX 1: FIGURES



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 Date: December 2020
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 Scale: As shown

Figure 1
Site Location

Key: Geophysical Survey Area
● Site location

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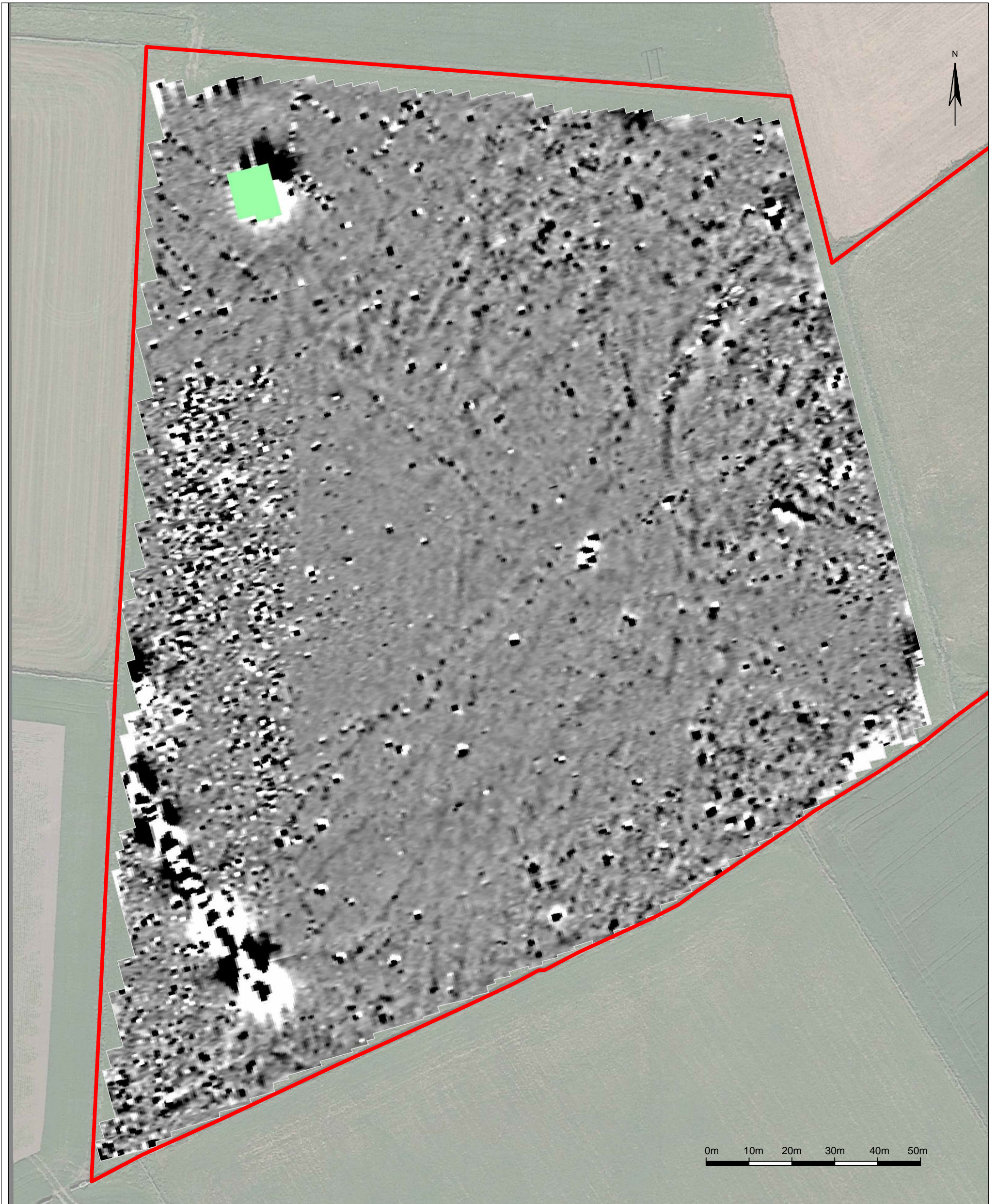
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Site Code: Roughbirchwood
 Drawing Ref. Figure 2
 Date: December 2020
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Location of survey
 grids

Key:
1 30m x 30m
 survey grid

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Greyscale Shade Plot of Processed Gradiometer Data Field G

Site Code: Roughbirchworth
 Drawing Ref: Figure 3
 Date: December 2020
 Drawn: RD
 Scale: As shown

Key:

- Geophysical survey area

Plotting parameters

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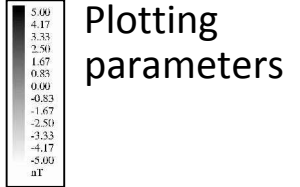


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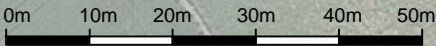
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Drawing Ref. Figure 4
Date: December 2020
Drawn: RD
Scale: As Shown

Greyscale shade plot
of processed
gradiometer data -
field B

Key:
Geophysical
survey area



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Site Code: Roughbirchwood
Drawing Ref. Figure 5
Date: December 2020
Drawn: RD
Scale: As Shown

Greyscale shade plot
of processed
gradiometer data -
fields G and B

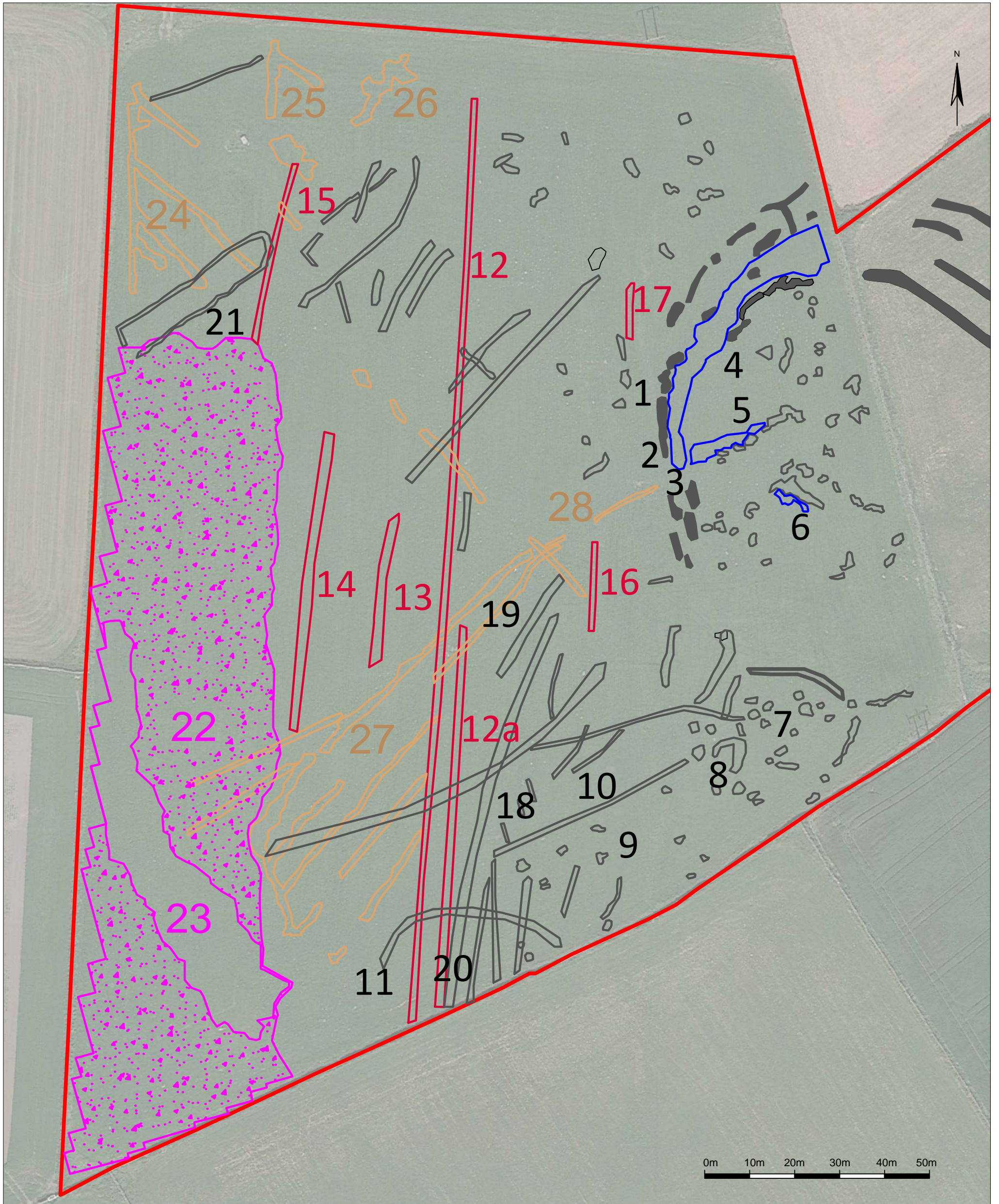
Key:

 Geophysical
survey area

 Plotting
parameters

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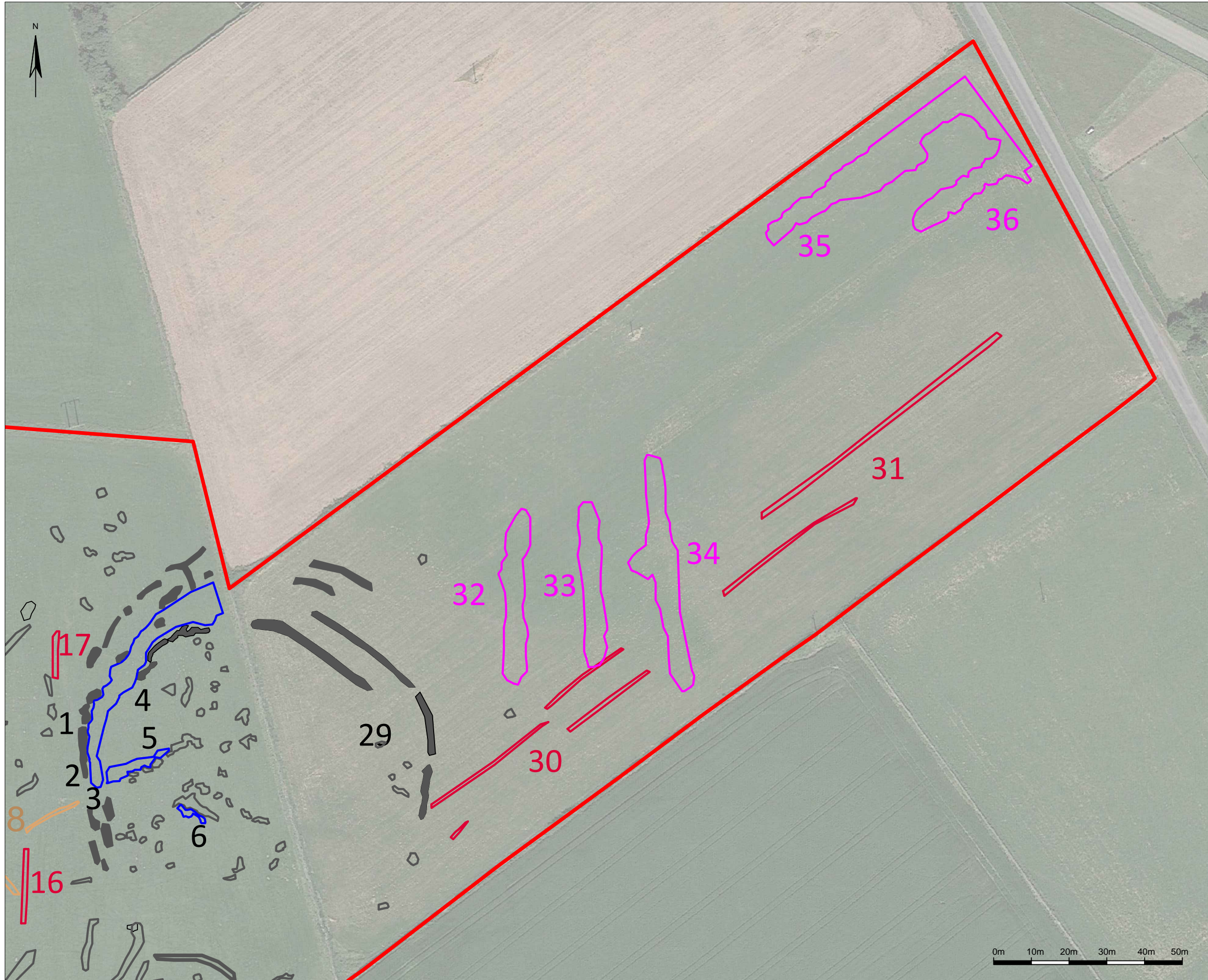
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 Date: December 2020
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Interpretative plan Field G

Key:

- Geophysical survey area
- Probable archaeology
- Possible archaeology
- Probable agriculture
- Possible archaeology
- Probable modern tipping
- Probable modern activity (unknown)

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Site Code: Roughbirchwood
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Interpretative plan -
 Field B

Key:

- Geophysical survey area
- Probable archaeology
- Possible archaeology
- Possible archaeology
- Probable agriculture
- Probable modern tipping
- Probable modern activity (unknown)

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








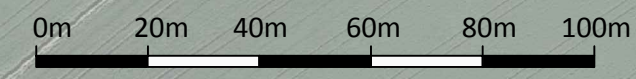
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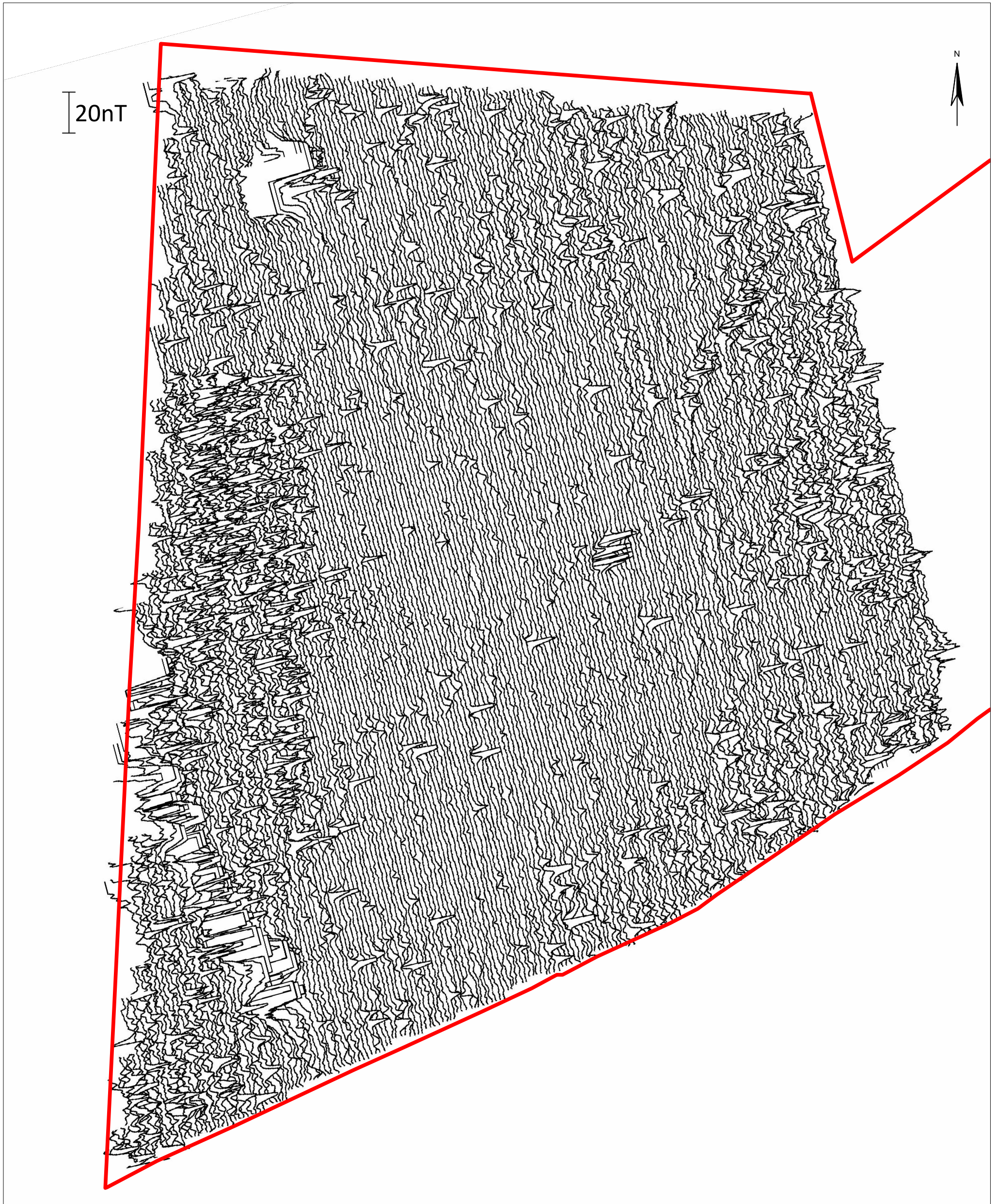
Site Code: Roughbirchwood
Drawing Ref. Figure 8
Date: December 2020
Drawn: RD
Scale: As Shown

Interpretative plan - Fields B and G

- Key:
-  Geophysical survey area
 -  Probable archaeology
 -  Possible archaeology
 -  Possible archaeology
 -  Probable agriculture
 -  Probable modern tipping
 -  Probable modern activity (unknown)

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<p>Archaeological Research Services Ltd Angel House Portland Square Bakewell Derbyshire DE45 1HB</p>	<p>Trace Plot of Processed Gradiometer Data - Field G</p>	<p>Copyright/Licencing: This drawing © A.R.S. Ltd</p>
<p>Site Code: Roughbirchworth Drawing Ref: Figure 9 Date: December 2020 Drawn: RD Scale: As shown</p>	<p>Key: Geophysical survey area</p>	



20nT




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Site Code: Roughbitchworth
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Trace plot of
processed
gradiometer data -
field B

Key:

 Geophysical
survey area

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