AD391

Land to the west of George Washington Hotel and Country Club, Washington, Tyne & Wear

Archaeological Geophysical Survey

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EXECUTIVE SUMMARY

AD Archaeology Ltd was commissioned by Taylor Wimpey to carry out a geophysical survey (magnetometry) in advance of the construction of a proposed housing development on land to the west of George Washington Golf Course, Washington. The objective of the geophysical survey was to evaluate the presence of sub-surface archaeological remains on the site by means of the location and interpretation of geophysical anomalies.

The geophysical survey has produced good results and it has been possible to distinguish anomalies relating to modern disturbance and geology from other magnetic anomalies of possible archaeological origin.

The survey has identified a series of magnetic anomalies suggestive of a system of ridge and furrow cultivation in the eastern portion of the development site suggestive of a medieval date. It is probable that the area of ridge and furrow detected represents a portion of a larger agriculture field of medieval date associated with the village of Great Usworth.

The geophysical survey has also detected several further magnetic anomalies, though none of these are suggestive of a clear archaeological origin or indicate the likely presence of a settlement site. Given the recent land-use of the site it is considered likely that the majority of these features are of modern origin.

1 INTRODUCTION

1.1 The Project

1.1.1 AD Archaeology Ltd was commissioned by Taylor Wimpey to carry out a geophysical survey (magnetometry) in advance of the construction of a proposed housing development on land to the west of George Washington Hotel, Washington (Fig 1).

1.1.2 The site is located on land west of the George Washington Hotel and Country Club, Washington, Tyne & Wear (centred on NGR NZ 2969 5878). It is irregular in plan, and covers an area 3.65ha. To the north is a golf course, to the west is the A194(M), to the south is Stone Cellar Road, and to the east is the George Washington Hotel and Country Club and a residential estate.

1.1.3 The proposed development area comprises two grassed scrubland fields which are separated by hedgerow. The eastern part of the proposed development area is currently part of the George Washington Hotel and Country Club golf complex and is bounded by dense bands of mature trees. There are also several clusters of trees and single trees dispersed across the centre of the site. The ground of the proposed development area slopes up to 100m OD in the southwest, from 90m OD in the north-east.

1.1.4 The geophysical survey was carried out in week commencing 25th October 2021. During the survey it became obvious that the small western field could not be surveyed due to a concentration of deep wheel ruts across the area and obstructive vegetation and as such this area was excluded.

1.2 Aims and Objectives

1.2.1 The objective of the geophysical survey was to evaluate the presence of sub-surface archaeological remains on the site by means of the location and interpretation of geophysical anomalies.

1.3 Archaeological and Historical Background

1.3.1 A desk-based assessment covering the area of the site was undertaken in 2018 (ASDU 2018). The earliest evidence for occupation in the wider study area dates to the early period with a background scatter of artefactual finds of prehistoric date. By the later prehistoric period evidence for occupation in the study area is more substantial with a rectilinear enclosure (HER 328) visible on aerial photography 550m to the north-east of the proposed site. The enclosure appears to be a later prehistoric/Iron Age settlement and contains possible internal hut circles.

1.3.2 There is no recorded evidence for Roman period activity in the proposed development area. It is probable that any later prehistoric occupation would have

continued into the Roman period.

1.3.3 Evidence for possible early medieval occupation in the study area comes from place names. Usworth is Old English in derivation, combining the personal name 'Osa' with 'worth' meaning enclosure, suggesting settlement in the area in the early medieval period.

1.3.4 Great Usworth Village is first recorded in the Boldon Buke of 1183 (a survey of the holdings of Bishop of Durham) as *Magna Osseworth* with *Parva Vseworth* (Little Usworth) also noted. At Great Usworth, the Boldon Book records the presence of a mill, with villeins and a lord. The medieval village of Great Usworth with its regular two-row layout and its central green (HER 303) was situated 200m to the south of the proposed development area. It is likely that during the medieval period that the proposed development area would have been agricultural land associated with this village.

1.3.5 The Hilton family had owned the Great Usworth manor since the 14th century until 1750, when the estate was sold. William Peareth bought two of the Great Usworth farms and built Peareth Hall (Usworth House) around 1750 immediately to the west of the proposed development area. The proposed development site would have been within the grounds of the hall, which were landscaped with trees and drives.

1.3.6 The tithe plan of the Great Usworth township of 1849 records the two portions of the site as being fields forming part of Usworth Farm, situated to the west of Peareth Hall (Usworth House). A track or drive is depicted leading into the western field of the site from Usworth House (visible also in the LiDAR data), which joins with a north-west /south-east drive, now a tree lined strip separating the western and eastern portions of the site.

1.3.7 The industrial revolution brought rapid development of the area with collieries, waggonways and the growth of villages. Usworth House was demolished sometime between the late 19th century and 1919. In the 1970s, the A194 was built dividing the former Usworth House estate. The 1980s edition Ordnance Survey shows a hotel and golf course built to the north-east of the proposed development area, and a new road built to the south of the site boundary with the proposed development area becoming part of the golf course.

1.4 Geology

1.4.1 The underlying solid geology of the area comprises Carboniferous period sandstone of the Grindstone Post Member, which are overlain by Quaternary deposits of clay of the Pelaw Clay Member (British Geological Survey 2021).

2 THE GEOPHYSICAL SURVEY

2.1 Technique

2.1.1 Geophysical survey is a method by which examination of the Earth's physical properties takes place using non-invasive ground survey techniques in order to reveal buried sub-surface features and anomalies (Gaffney and Gater 2004). A hand-held magnetic fluxgate gradiometer records differences in electromagnetic field to a depth of approximately 1 metre into the ground. Differences or disturbances in sub-soil magnetic susceptibility can be the result of archaeological features, geology or modern intrusions.

2.1.2 This geophysical survey was conducted in line with all professional guidelines (CIfA 2014a, b) and recommendations as laid out and presented in *Geophysical survey in archaeological field evaluation* (David, Linford and Linford 2008), *Geophysical Data in Archaeology* (Schmidt 2001), and discussed in, *Revealing the Buried Past: Geophysics for Archaeologists* (Gaffney & Gater 2004).

2.2 Methodology

2.2.1 The magnetometer survey was carried out using a *Bartington Grad 601-2* fluxgate gradiometer, which scanned and stored all magnetic data. The sample interval was set at 0.25m and the traverse interval at 1m using a east-west traverse direction in a zigzag scheme. The data was then downloaded onto a laptop computer on site for assessment, and later processed on a PC.

2.2.2 The survey comprised 20 full and partial 30m by 30m grids (see Fig.2) which were set out using a Trimble R6 GNSS GPS system.

2.2.3 All grid locations have been accurately tied in to Ordnance Survey mapping and NGR co-ordinates.

2.3 Post-Processing

2.3.1 *TerraSurveyor version 3.0.27* software was used to process all of the data recorded. AutoCAD software was used for the presentation of the figures.

2.3.2 The post-processing of the recorded raw data includes the application of certain functions in order to aid both the presentation and interpretation of the results. In this instance, data has been '*de-striped*' to remove striping effects that can be caused by directional effects inherent in magnetic instruments; '*clipped'* to limit it to specified minimum and maximum values; thus removing extreme data point values, '*despiked*' to remove data spikes caused by small surface iron anomalies usually the result of metal 'rubbish'; 'Destagger' to adjust the displacement of geomagnetic anomalies caused by alternate zig-zag traverses. The data presentation includes two formats: Greyscale Plots (demonstrating processed data) and Magnetic

Anomaly Interpretation Plans (identifying possible archaeological features, modern features and other anomalies). Trace plots of the raw survey data were not informative and as such are not included in this report.

3 SURVEY RESULTS (Figs. 3-4)

3.1 Magnetic Anomaly Interpretation

3.1.1 The data displays three different types of magnetic anomalies:

Positive magnetic anomalies identifiable through darker grey shades on the greyscale images, which can be suggestive of soil-filled pit and ditch type features representing high magnetic susceptibility.

Negative magnetic anomalies are identifiable through lighter grey shades on the greyscale images, which can be suggestive of wall footings and other stone concentrations or features representing low magnetic susceptibility.

Dipolar magnetic anomalies identifiable through concentrations of mixed dark and light grey shades on the greyscale images which can be suggestive of fired and ferrous materials and structures; and/or modern intrusion and disturbance, representing paired positive and negative magnetic susceptibility.

3.2 Services, modern disturbance and geological features

3.2.1 Across the survey area scattered isolated dipolar responses (red on Fig. 4) probably represent metallic surface debris and/or modern ferrous and fired objects within the upper soil horizons of the site or localised variations in the natural subsoil. Some of the larger dipolar responses probably relate to surface features noted during the survey such as areas of astro turf matting and other elements associated with the golf course.

3.3 Ridge and furrow

3.3.1 Across the eastern portion of the development site the survey has a series of parallel linear magnetic anomalies (green on Fig. 4) which probably represent the remains of ridge and furrow agriculture. These anomalies run roughly east-west, curving gently to the southwest during their course. This sinuosity is suggestive of broad rigg cultivation of where a reverse S-shape is usually noted over a large area. The average wavelength of the anomalies at 6.6m to 8.1m again strongly suggests broad rigg cultivation of medieval date.

3.4 Other magnetic anomalies

3.4.1 Across the eastern portion of the development area the survey has detected several other positive linear anomalies (orange on Fig. 4) suggestive of soil-filled cut features. While an archaeological origin cannot be entirely ruled out, none of these anomalies have a shape or form a pattern immediately suggestive of a clear archaeological site. It should also be noted that the relative straightness of the linear features could be suggestive of a modern man-made origin associated with the golf course in the form of drainage or irrigation. It is also probable that some of these anomalies may originate from the surface ground disturbance (in the form of deep wheel ruts) noted during the survey.

4 DISCUSSION

4.1 The geophysical survey has produced good results and it has been possible to distinguish anomalies relating to modern disturbance and geology from other magnetic anomalies of possible archaeological origin.

4.2 The survey has identified a series of magnetic anomalies suggestive of a system of ridge and furrow cultivation in the eastern portion of the development site suggestive of a medieval date. It is probable that the area of ridge and furrow detected represents a portion of a larger agriculture field of medieval date associated with the village of Great Usworth.

4.3 The geophysical survey has also detected several further magnetic anomalies, though none of these are suggestive of a clear archaeological origin or indicate the likely presence of a settlement site. Given the recent land-use of the site it is considered likely that the majority of these features are of modern origin.

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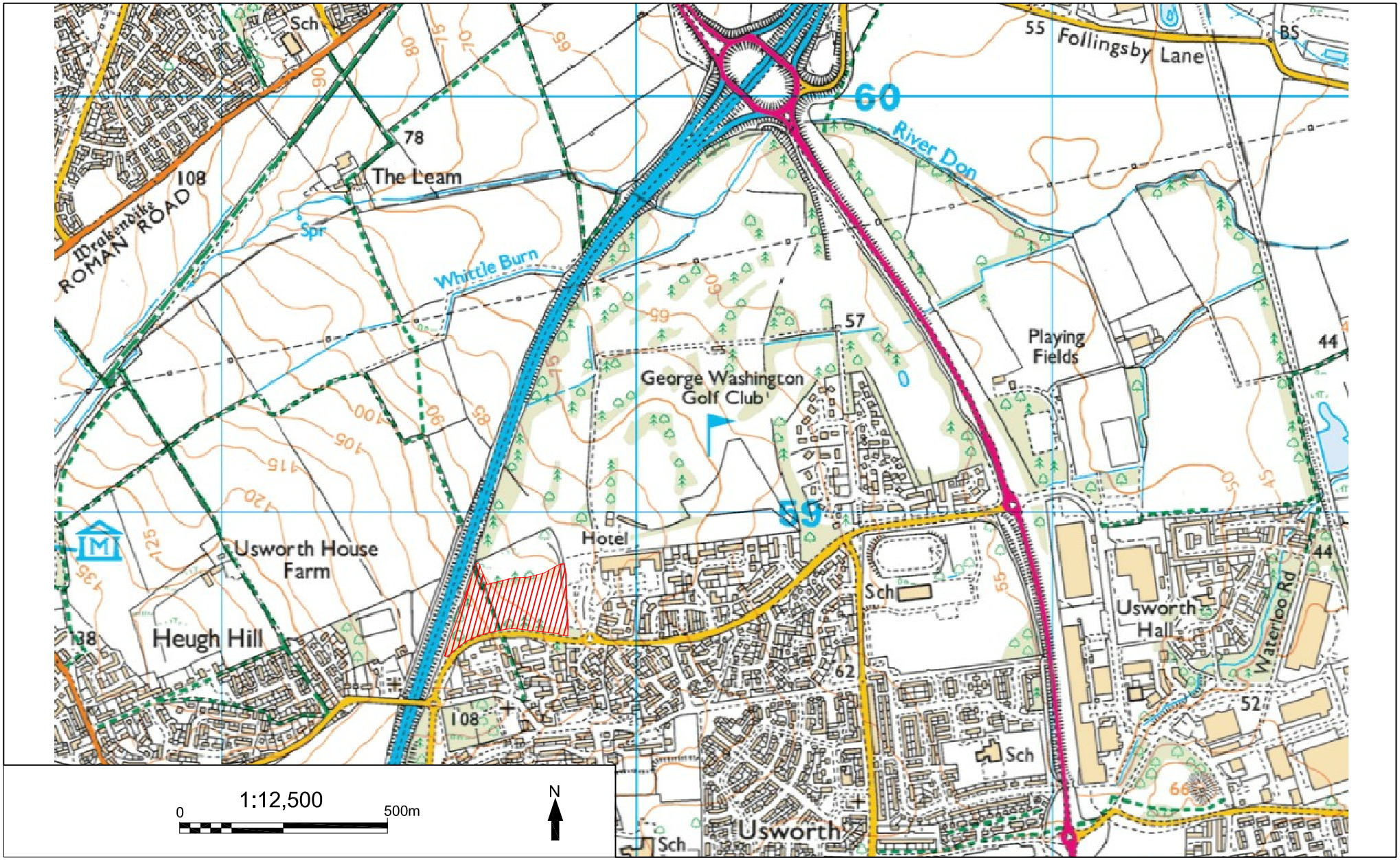

Figure 1: Location of site

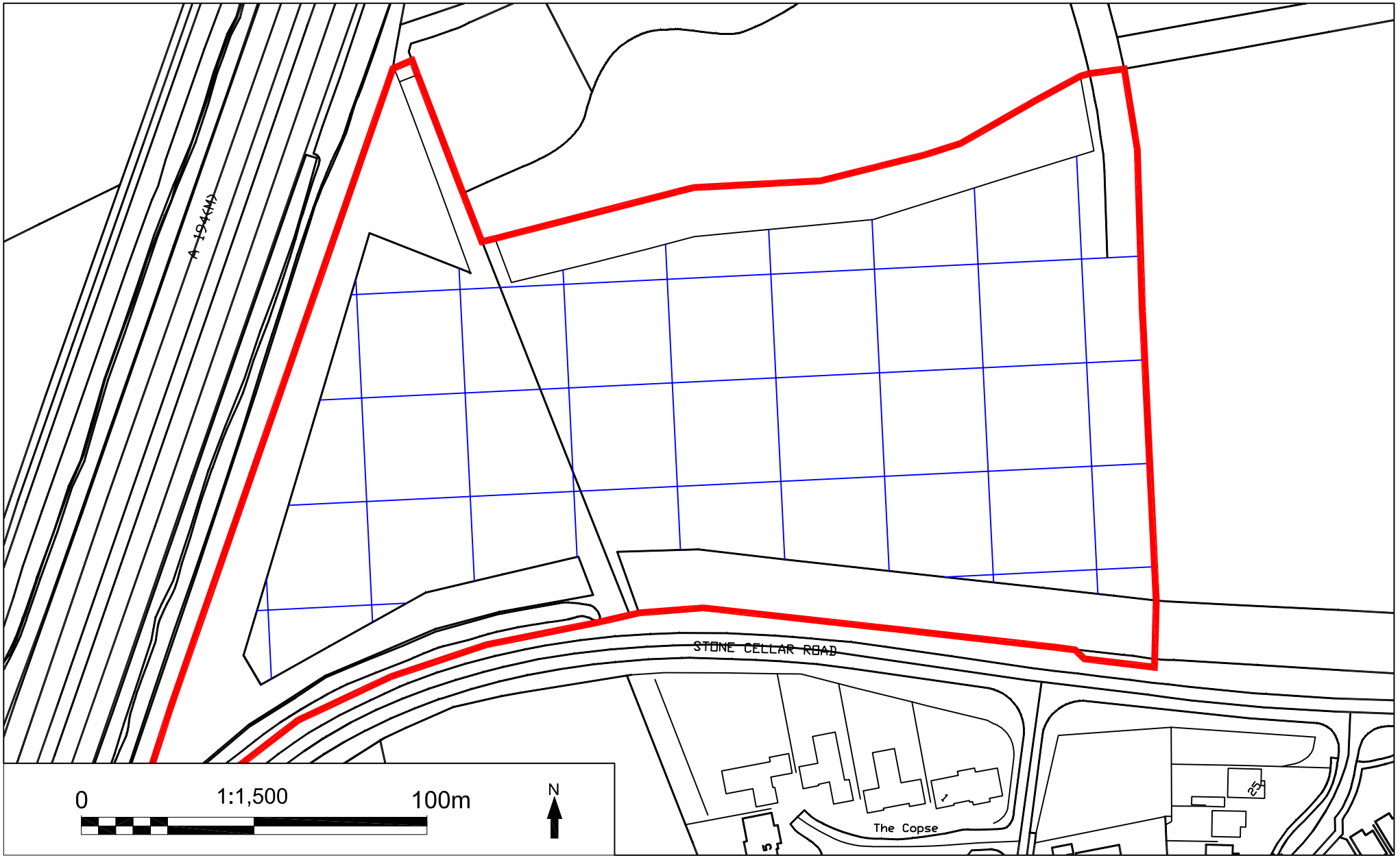

Figure 2: Geophysical survey - grid layout

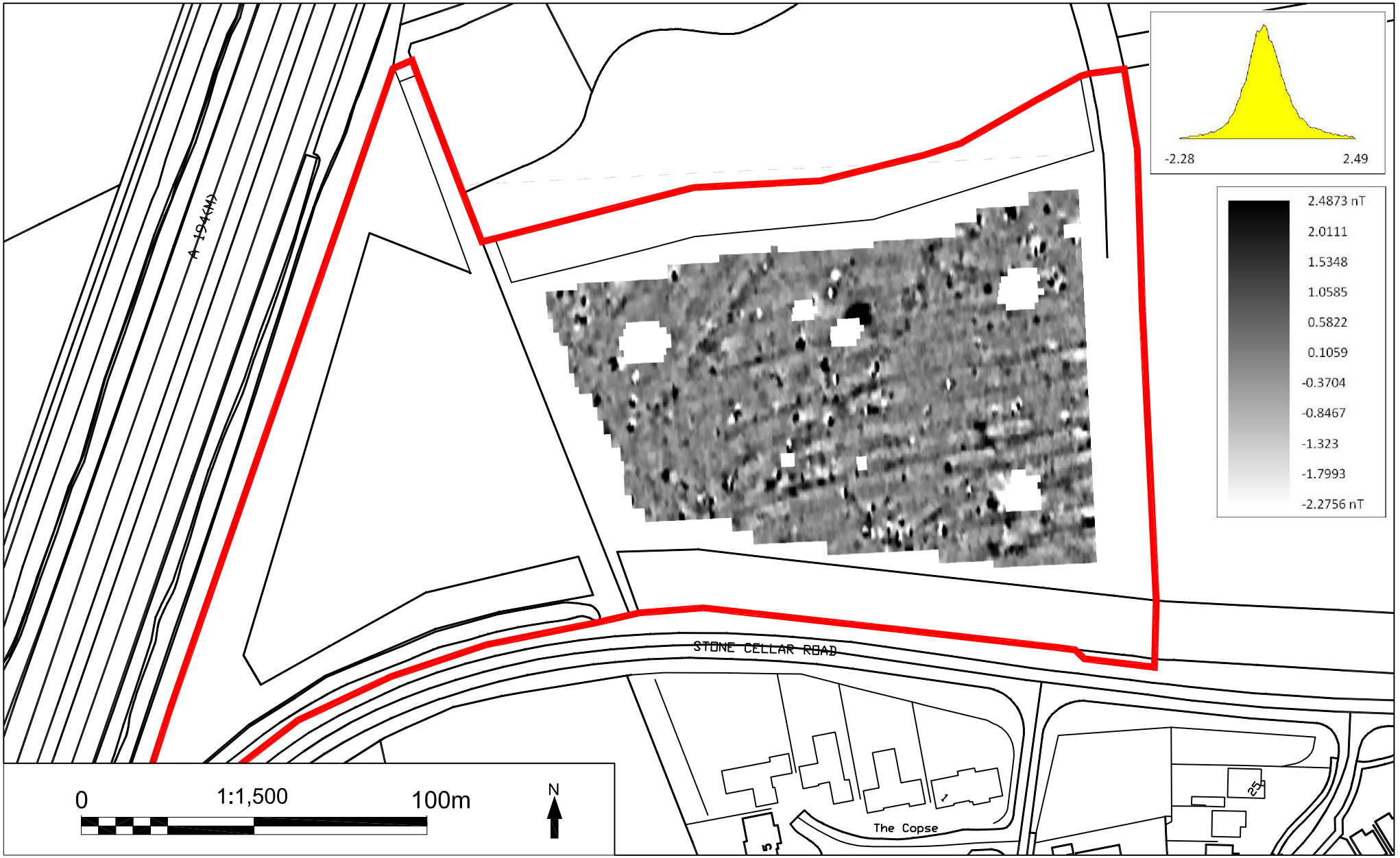

Figure 3: Geophysical survey - greyscale plot (processed data)

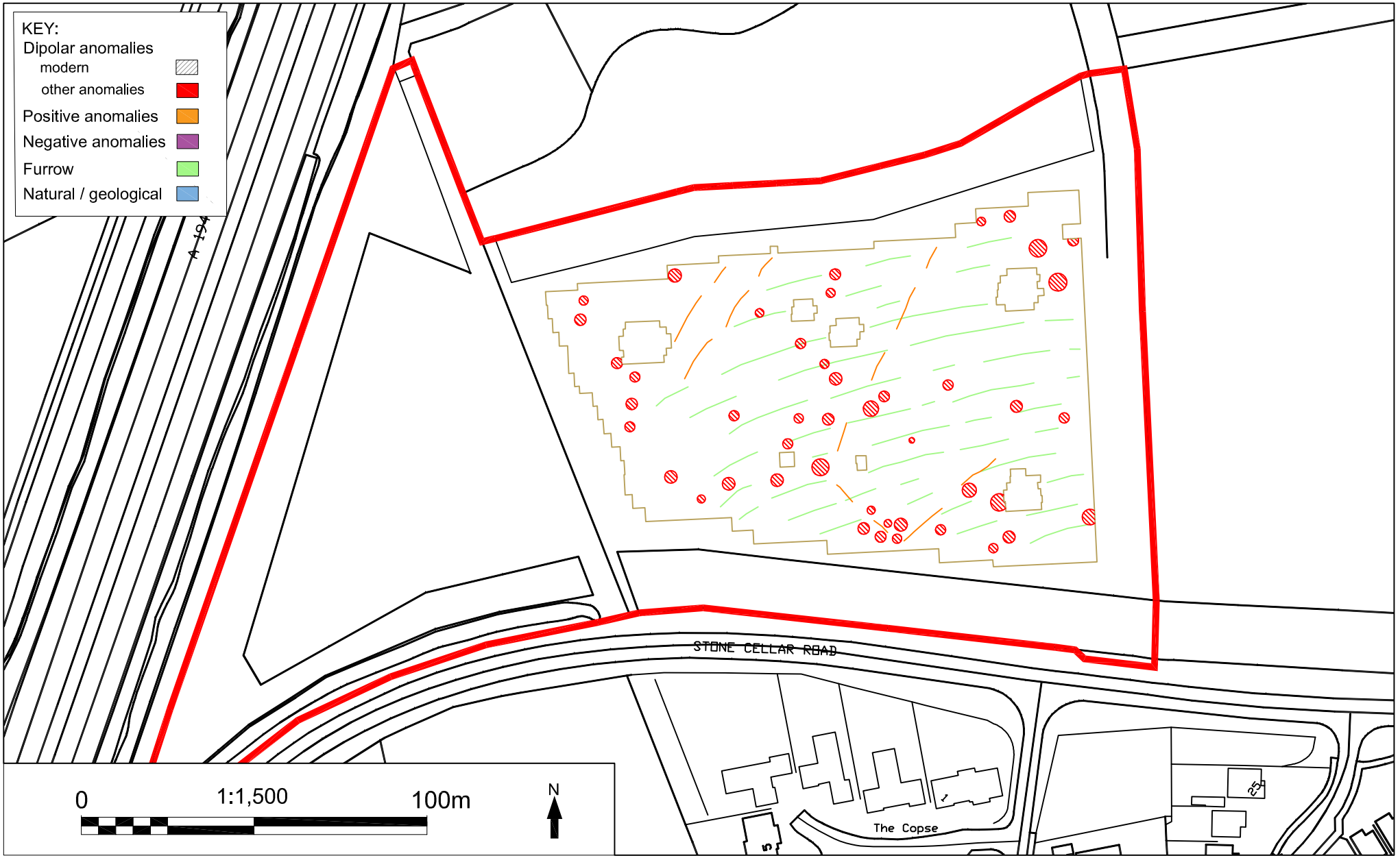

Figure 4: Geophysical survey - magnetic anomaly interpretation plot

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