

AD229

**Land at Palace Row,
Hart Village, Hartlepool**

Archaeological Geophysical Survey



Author	J. Scott
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For further information please contact:

AD Archaeology Ltd.

South Shields Business Works,
Henry Robson Way,
South Shields,
NE33 1RF

Tel: 0191 603 0377

Email: info@adarchaeology.co.uk

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EXECUTIVE SUMMARY

AD Archaeology Ltd. were commissioned by Pre-Construct Archaeology to carry out a geophysical survey (magnetometry) in advance of a proposed housing development at land at Palace Row, Hart Village, Hartlepool.

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 from other magnetic anomalies of possible archaeological origin. The geophysical survey has identified two areas of probable post-medieval ridge and furrow and the line a former field boundary observed from modern aerial photography. The survey has identified areas of dipolar anomalies the origin of which cannot be determined, but a modern origin cannot be immediately assigned on the basis of the survey results alone. The survey has identified a concentration of positive and negative anomalies and dipolar anomalies in the northern area of the site and a separate concentration of positive anomalies in the south-eastern area of the site. Though in both of these cases it is not possible to identify a clear archaeological site on the basis of the geophysical survey results.

It is recommended that any future archaeological evaluation taking place on the site be targeted on these concentrations of anomalies in order to clarify their origin and also target blank areas of the site in order to record the probable ridge and furrow cultivation identified and in order to confirm the validity of the survey results.

1 INTRODUCTION

1.1 The Project

1.1.1 AD Archaeology Ltd. were commissioned by Pre-Construct Archaeology to carry out a geophysical survey (magnetometry) in advance of a proposed housing development at land at Palace Row, Hart Village, Hartlepool.

1.1.2 The development area lies to the west of Hart Village on the south side of Palace Row (see Figure 1). The site centred on NGR NZ 466 347, has a total area of 1.47 hectares and comprises the northern portion of an agricultural field which at the time of survey was used for pasture.

1.1.3 The geophysical survey was carried out in w/c 24th April 2017.

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 Whilst there are no known prehistoric sites within the development area the site does lie in an area with a density of known archaeological sites. Archaeological investigations undertaken in recent years in the wider area indicate that the coastal plain was densely occupied during later prehistory.

1.3.2 A number of archaeological features were excavated approximately 300m to the north-east of the proposed development during evaluation trenching along the proposed route of a sewer main for Northumbrian Water (ASDU 1995 & 1996 in Vance 2017). The features identified included slots and trenches for wooden structures and ditched boundary features. Although no pottery was recovered from the site, it is likely that some of the features may be prehistoric as flint artefacts were found during the works. A cropmark feature located c.300m to the east of the proposed development was visible on aerial photographs.

1.3.3 A number of prehistoric artefacts have been located at Hart. These include prehistoric flint tools, Early Bronze Age pottery and an Iron Age beehive quern. In the wider area Hartlepool Bay and the surrounding area was a significant focus of Mesolithic and Neolithic activity.

1.3.4 There are no HER entries from the Roman period within the boundaries of the study site and only one sherd of Roman pottery from excavations in the area of Hart.

1.3.5 There is evidence to suggest that Hart Village was a focus for early-medieval settlement activity. Documentary evidence suggests that Hart was the administrative centre of a large royal early medieval estate from at least the seventh century (Daniels 2012, 10 in Vance 2017). As centre of an estate, a settlement of some size must have existed at Hart and this would certainly have contained the residence of a noble of some standing, administering or holding the land on behalf of the Northumbrian royal family.

1.3.6 Excavations within Hart have confirmed the presence of early-medieval settlement activity. A number of gullies and ditches associated with human burials were located 750m east of suite. The graves are thought to date to the early medieval period given the orientation of one of the graves and the inclusion of small quartz pebbles in several of the grave fills. Excavation around the site of Hart Manor 500m to the north-east of the proposed development revealed features that may have been a precursor to the medieval manor house. The earliest phase consisted of gullies, post-holes, trenches and pits of timber buildings and enclosures that were ceramically dated to the 10th and 11th centuries.

1.3.7 The present church of St. Mary Magdalene is considered to be Norman in date; the foundation charter of Gisborough Priory (c. 1119 AD) demonstrates that there was a church at Hart at this time and it seems plausible that it was the present one. However, the church does contain several fragments of Anglo-Saxon sculptured stone dating from the eighth, late ninth to early tenth, mid tenth and eleventh centuries, suggesting that there was a church at Hart prior to the Norman Conquest (Cramp 1984; Daniels 2012 in Vance 2017).

1.3.8 Chance finds of early-medieval date from Hart include an incomplete ninth century AD crosshead, an Anglo-Saxon brooch and two Anglo-Saxon silver coins.

1.3.9 St. Mary Magdalene's Church is Grade I listed and lies c. 550m to the north-east of the proposed development. It was traditionally thought to be pre-conquest although Ryder (1997), in the most recent re-assessment, suggests it may be early Norman. The remainder of the church is of 12th, 13th, and 15th centuries with additions and rebuildings c.1600 & 1806. Situated 50m west of St Mary Magdalene's Church is the Scheduled Monument known as the Great House which includes the buried and fragmentary upstanding remains of a manorial complex of late Saxon date and medieval date. Excavation of the site in 1965-7 and 1972-3 revealed the site plan and a 2.5m wide enclosure ditch surrounding the complex was excavated. The first medieval stone phase of the manor consisted of two rectangular stone buildings with a garden that survived until the middle of the 13th century. The late 13th/early 14th century saw the establishment of a manorial complex layout with three main buildings. The first and southernmost building had a south wall that survives above ground for 12.2m in length and 5.5m in height. The main hall of the manor complex consisted of a rectangular building orientated north-south. Two small chambers at the northern end of the building have been interpreted as a

chapel and parlour. To the east of this building was a large three bay aisled hall and during the 15th century the aisled structure was extended, a moat was added to the manor and the main hall went out of use. The manor declined in the 16th century and the site was taken over by Manor Farm.

1.3.10 The medieval core of Hart is located to the south of St. Mary Magdalene church, c. 600m east of the proposed development area. Three more rows of medieval occupation have been identified to the east of Hart Village centre. Two are on either side of the Hart Beck and one lies on the south side of the main street. The site of the proposed development area was probably agricultural land during the medieval and post-medieval periods.

1.4 Geology and Topography

1.4.1 The bedrock geology of the area is comprised of Roker Formation Dolostone formed approximately 251 to 271 million years ago in the Permian Period. These rocks were formed in warm shallow seas with carbonate deposited on platform, shelf and slope areas; often rich in corals and shelly faunas (British Geological Survey website).

1.4.2 The superficial deposits within the development boundary are comprised of Devensian-Diamicton till formed up to two million years ago in the Quaternary Period. These deposits were formed in cold periods with Ice Age glaciers scouring the landscape and depositing moraines of till with outwash sand and gravel deposits from seasonal and post glacial meltwaters (ibid).

1.4.3 The southern section of the development site is flat forming a slight plateau above the northern section of the site where the land slopes gently down towards the line of Palace Row.

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 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 an 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 28 full and partial 30m by 30m grids which were set out using Trimble R6 GPS surveying equipment.

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 3.0.25.0* 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 negate the effect of a zig-zag traverse a cause of striped data; ‘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’ in the topmost surface layers and ‘de-staggered’ where necessary. 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

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 negative magnetic susceptibility.

3.2 Services, modern disturbance and geological features

3.2.1 Around the edges of the development area modern fences with metal elements and features off the site such as the line of the modern road and the buildings which bound the site to the east and west have caused areas of dipolar magnetic disturbance (marked in blue on Figure 4).

3.2.2 Across the site the survey detected a scatter of small dipolar anomalies which relate probably relate to stray ferrous objects in the topsoil of the site or from small localised variations within the subsoil. Where larger dipolar anomalies occur or where a concentration of dipolar anomalies coincide with other anomalies these have been individually marked (red circles on Figure 4).

3.2.3 Towards the north of the site where a concentration of positive and negative anomalies have been identified (see 3.4.1) several large areas of dipolar in this area have been individual marked (red hatch on Figure 4). These areas of dipolar disturbance could represent sub-surface archaeological features. Alternatively, these may represent modern features or areas of disturbance which could suggest that some of the other features in this area may share this origin. Similarly an area of dipolar anomalies in the centre of the site has been individual marked though its origin cannot be determined at this stage.

3.3 Ridge and Furrow & former fields systems

3.3.1 In the northern area of the site a series of positive and negative parallel linear anomalies can be seen running roughly east to west (green on Figure 4). These magnetic anomalies probably represent the sub-surface remains of ridge and furrow agricultural cultivation on the site, and correlate closely with earthworks observed from modern aerial photography (GoogleEarth 2017). The survey results suggest that if these anomalies were to represent ridge and furrow it has a wavelength of 3.2m to 5.4m, probably representing narrow rigg cultivation of post-medieval date and probably relates to the later enclosure of the land in the post-medieval period as its layout corresponds with the existing field boundaries.

3.3.2 In the southern area of the site a second series of parallel linear anomalies can be seen running roughly north to south probably representing a different system of ridge and furrow cultivation again the results of the survey correlate closely with earthworks observed from aerial photography. The survey suggest that this second system of ridge and furrow has a wavelength of 3.6m to 6.1m and again corresponds with existing field systems suggesting a probably post-medieval date.

3.3.3 A broad linear positive anomaly (**1**; magenta on Figure 4) which crosses the site running roughly east to west between the two probable ridge and furrow systems represents a relict field boundary. This feature is visible on the site as a slight earthwork and can be seen on modern aerial photography.

3.4 Other Anomalies

3.4.1 Towards the centre of the northern area of the site a concentration of magnetic anomalies can be seen which may form a roughly rectilinear shape. Fragmentary linear and curvilinear positive anomalies (**2**; magenta on Figure 4) have been identified, the magnetic response of which suggests these may represent soil-filled cut features such as ditches, pits or gullies. In the same concentration the survey has also detected curvilinear negative anomalies (**3**; orange on Figure 4). As discussed earlier (3.2.3) large areas of dipolar anomalies in this area may also be associated with this collection of anomalies. It is important to note however that none of these anomalies have a form or layout that is immediately suggestive of a specific archaeological origin and that a geological or modern origin cannot be ruled out and that the sloping nature of the topography of this area may also suggest that an archaeological origin is less likely.

3.4.2 Towards the south-eastern edge of the survey area a concentration of fragmentary curvilinear positive anomalies can be seen forming a roughly ovoid shape with two fragmentary positive linear anomalies to the west (**4**; magenta on Figure 4). The nature of the magnetic response suggests these may represent soil-filled cut features such as ditches or gullies. Again however none of these anomalies have a form or layout that is immediately suggestive of an archaeological origin and a geological or modern origin cannot be ruled out.

4 DISCUSSION

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

4.2 The geophysical survey has identified two areas of probable post-medieval ridge and furrow and the line a former field boundary observed from modern aerial photography.

4.3 The survey has identified areas of dipolar anomalies the origin of which cannot be determined, but a modern origin cannot be immediately assigned on the basis of the survey results alone.

4.3 The survey has identified a concentration of positive and negative anomalies and dipolar anomalies in the northern area of the site, and a separate concentration of positive anomalies in the south-eastern area of the site. Though, in both of these cases it is not possible to identify a clear archaeological site on the basis of the geophysical survey results alone.

4.4 It is recommended that any future archaeological evaluation taking place on the site be targeted on these concentrations of anomalies in order to clarify their origin and also target blank areas of the site in order to record the probable ridge and furrow cultivation identified and in order to confirm the validity of the survey results.

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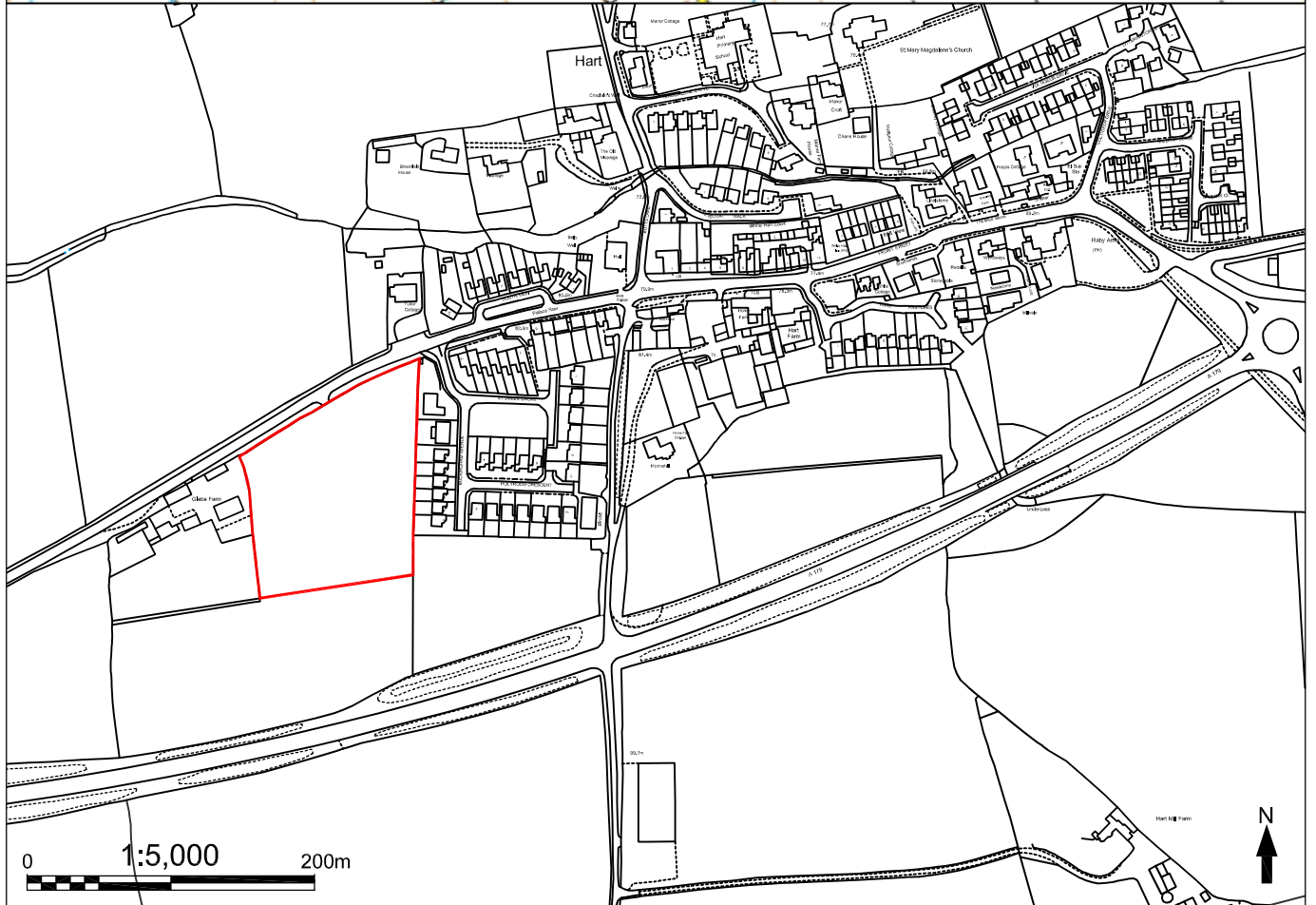
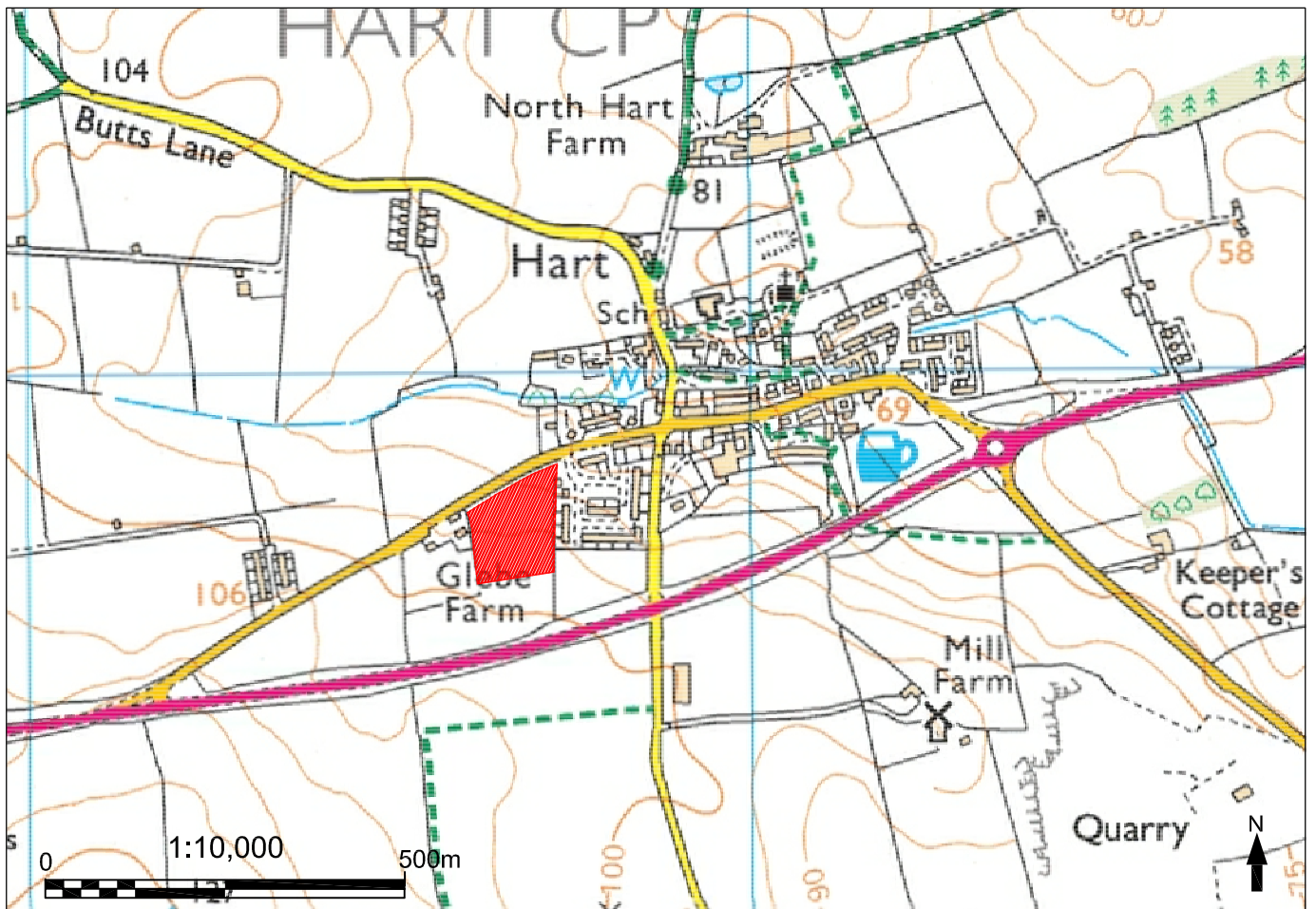
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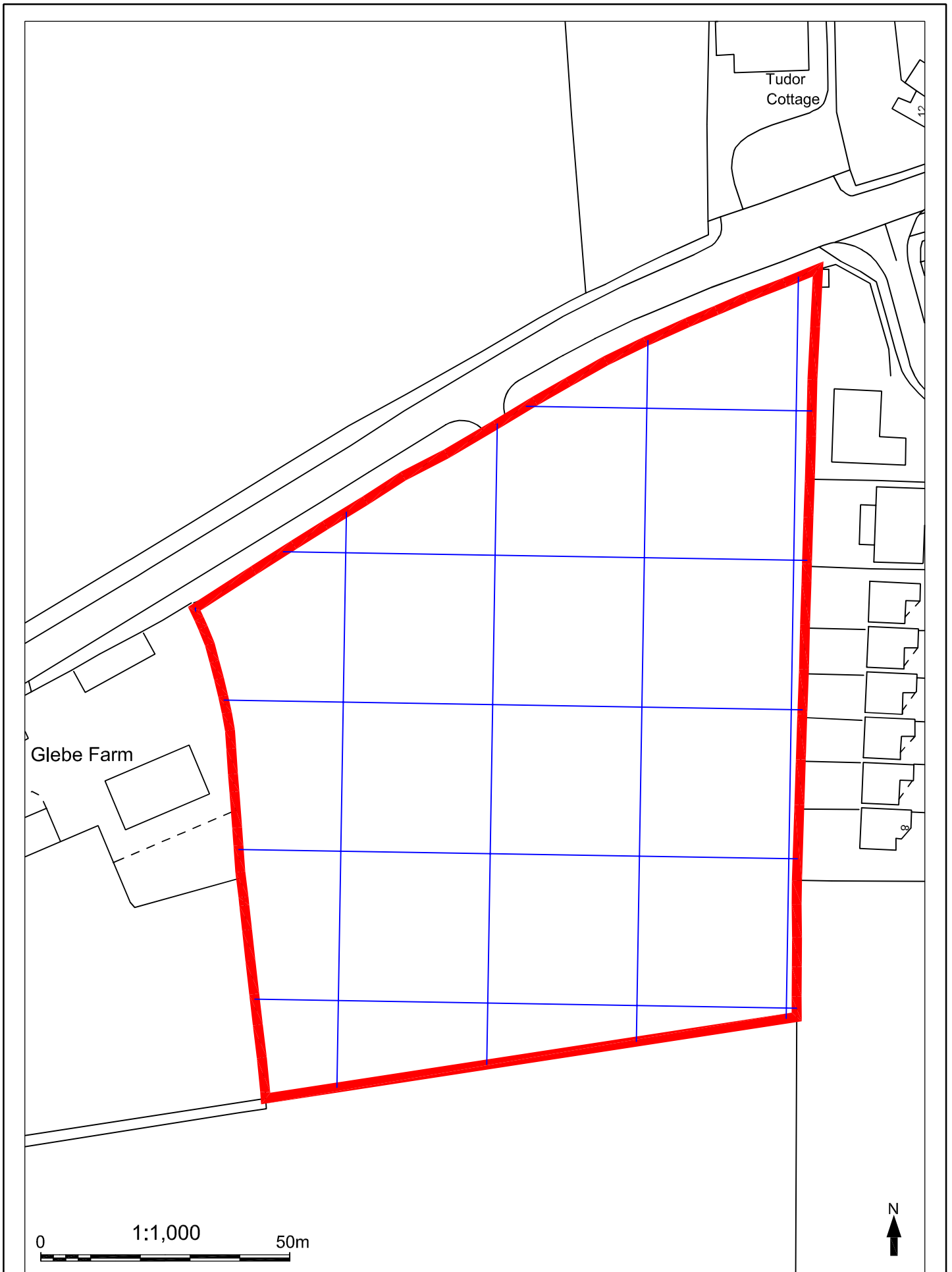
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Figure 1: Site location plans

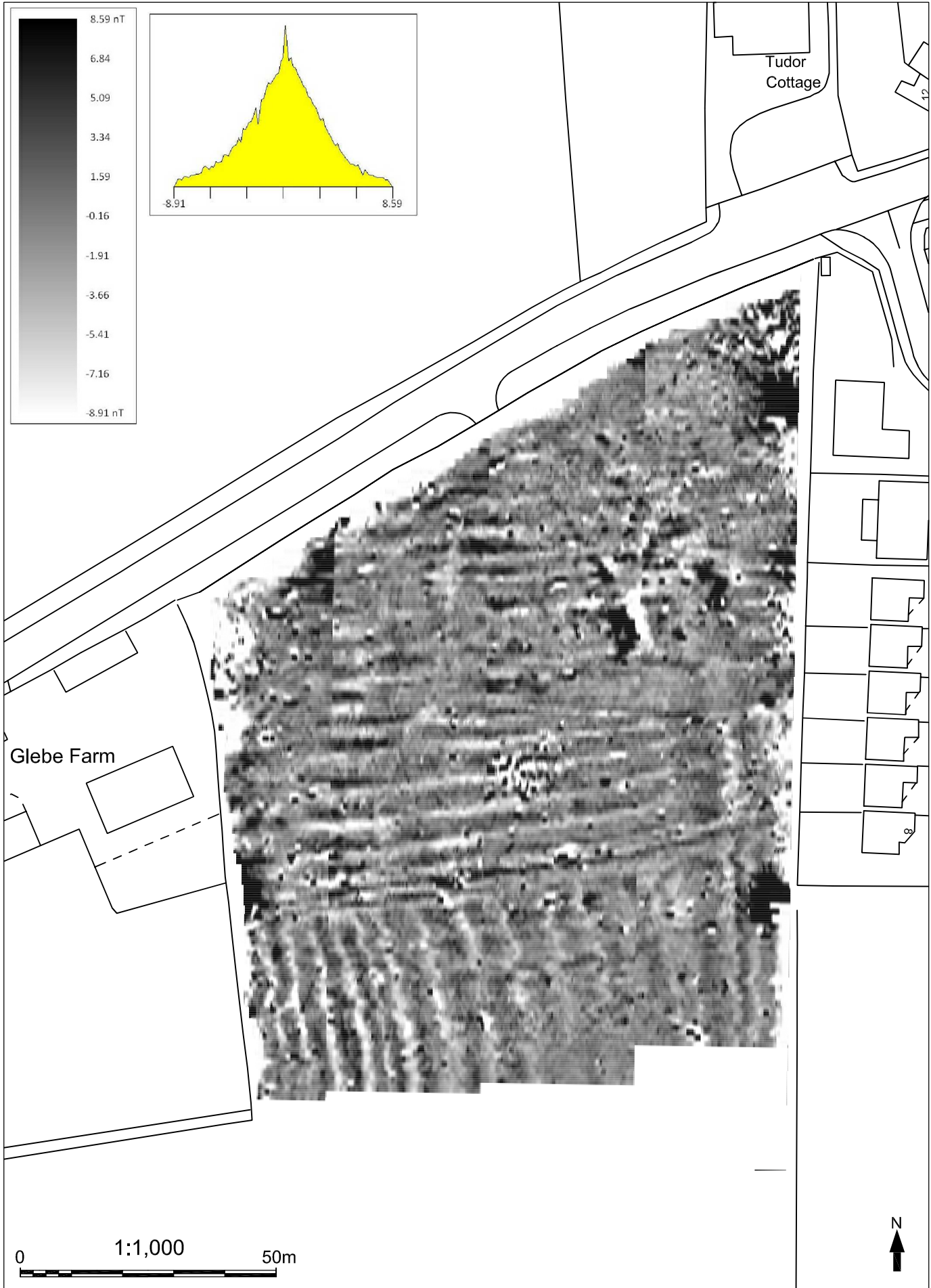




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Figure 2: Geophysical survey grid layout

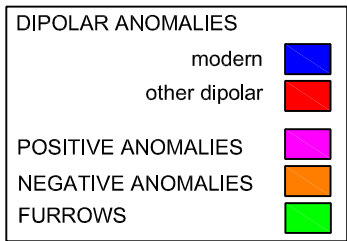




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Figure 3: Geophysical survey greyscale plot





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Figure 4: Geophysical survey interpretation plot





AD Archaeology Ltd.
South Shields Business Works,
Henry Robson Way,
South Shields,
NE33 1RF
Tel: 0191 603 0377
info@adarchaeology.co.uk