AD330

Land to the West of Moorland View/ Valley Dene, Chopwell, Gateshead

Archaeological Geophysical Survey

Author	W. Muncaster
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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 was commissioned by Gleeson Homes to carry out a geophysical survey (magnetometry) in advance of a proposed residential development. The geophysical survey was carried out during the week commencing the 29th July 2019.

The geophysical survey identified one principal area of archaeological sensitivity at the northern end of the site within Field 1 which consists of a series of anomalies that potentially represent a hitherto unknown settlement of possible late prehistoric date and its associated ditched enclosures. In Field 2, with the exception of two likely boundary features of possible antiquity, there were only a limited number of anomalies of lower archaeological potential. No anomalies of archaeological interest were identified within Field 3 other than those associated with ridge and furrow systems which were detected throughout the survey.

Although the general extent of the possible settlement in Field 1 has been broadly established by the survey its precise layout remains uncertain. The exact character, extent and likely date of these anomalies can only be established through a trenching evaluation which will represent the next stage of archaeological investigation of the site.

1 INTRODUCTION

1.1 The Project (Fig. 1)

1.1.1 AD Archaeology Ltd was commissioned by Gleeson Homes to carry out a geophysical survey (magnetometry) in advance of a proposed residential development.

1.1.2 The survey was conducted over three agricultural fields (Fields 1-3) which lie on the southwest periphery of Chopwell village on the North side of the Derwent valley with the ground sloping southwards towards the river. The site is bounded to the east by the streets Valley Dene and Moorland View on the western side of Mill Road, the main road through the village. The site is centred on NGR NZ 1166 5756 and measures 7.61ha in area (Fig 1). The geophysical survey was carried out in the week commencing the 29th July 2019.

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 Geology

1.3.1 The bedrock geology of the area consists of the Pennine Lower Coal Measures Formation with deposits of mudstone, siltstone and sandstone. Resting on this the superficial geology consists of Devensian-Diamicton till (BGS).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND (Fig. 1)

2.1 Prehistoric Period

2.1.1 A likely Bronze Age round barrow burial mound (HER 337) survives as an earthwork 1.5km north-east of the site located on higher ground. Although to date no prehistoric settlement has been found in the locality there is evidence of activity with a scatter of flints tools (Northumberland HER 25700) recovered during a watching brief in 1993 600m south-west of the site.

2.1.2 Recent archaeological work in the North-East has led to a rapid increase in the known density of prehistoric sites. This has been particularly apparent in the later prehistoric period with a significantly higher density of rectilinear settlements being identified through aerial photography, geophysical survey and excavation.

2.2.1 Early-Medieval Period

There is little specific evidence for early medieval activity in the area, although Chopwell as a place name is thought to have an Anglo-Saxon root (Ekwall. E 1960 in AD Archaeology 2018) possibly meaning "the spring where commerce was conducted" therefore the settlement may have had an early-medieval origin.

2.3 Medieval Period

2.3.1 In 1153 a manor is referred to as "*Ceoppa's weille*" and in 1278 as "*Cheppewell*." A medieval grange (HER 496) is recorded in the Historic Environment Record to the east of the development site. The term grange (*grangia*) is generally used to describe larger, important monastic holdings consolidated to form individual farms or estates.

2.3.2 The location of the built core of the grange, which was granted to Newminster Abbey in the mid-12th Century, is assumed to lie at the site of the later Chopwell Hall 1km to the north-east of the site. However, typically a grange would utilise a considerable area of land for agricultural and other purposes. A grant dating to 1315 by the Bishop of Durham refers to the Cistercian monks having quarries and coal mines at Chopwell. The area of the site itself is likely to have been used for agriculture during the medieval period.

2.3.3 Chopwell Woods (HER 6970) lies 500m to the east of the site and from the medieval period onward is known to have been utilised as a resource for timber.

2.4 Post Medieval to Modern Periods

2.4.1 After the Dissolution of the Monasteries the lands of the Chopwell estate were split up and passed through the hands of several families, settlement probably becoming focused on a small number of farmsteads. By the middle of 17th Century the majority of the estate had passed into the hands of the Clavering family who were instrumental in developing the exploitation of coal in the area, constructing a waggonway known as the Chopwell Way in 1661 running north-west toward Greenhead. The colliery at Chopwell comprising of a number pits was one of the largest on Tyneside at this time, as 50 years later it was reaching quotas of 1400 tonnes. In the Chopwell area the Maria pit was sunk in 1756, the Whitefield pit in 1759, Good Luck and Speedwell pits in 1781, followed by smaller workings like Bankside, Betty, Catherine, Convulsion, Dyke, Earl, Fortune, John, King, Lee, Nanny, North, Main, Snowball and Taylor. During the latter part of the first half of the 18th century, upstream collieries such as Chopwell were becoming deliberately rundown in favour of collieries closer to the staithes. The Consett Iron Company opened new coke ovens at Westwood in 1872 and excavated a series of boreholes in the Chopwell district, before beginning full scale mining from two shafts at the northern

end of the village which gave further impetus to the development of Chopwell as a mining community (AD Archaeology 2018).

2.4.2 In addition to mining the other main economic activity was agriculture with the main foci of development being at Chopwell Hall 1km north-east of the site. Chopwell Hall is thought to have been constructed around 1615 with a large house or tower being shown on a map of 1721, possibly incorporating the remnant of grange buildings. The hall went through several remodelling's and alterations until its demolition. During the 19th Century the main focus for the development of Chopwell Village lay between 800m-1km north-east of the site.

2.4.3 Chopwell Mill (HER 3386) is depicted on the first edition Ordnance Survey and was located 100m to the north-east of the site. A number of post-medieval farmsteads were located within the environs of the site. Whinny Leas farmstead (HER 6100) was located 75m west of the site. Other farmsteads located within 500m of the site were West Carr House (HER 16727), Tongue Burns farmstead (HER 6104), the site of Milkwell burn hamlet (HER 5195), Black Hall Manor House (HER 10867) and Pear Tree Farm (HER 1674).

2.4.4 The sequence of Ordnance Survey maps from the first edition of 1862 shows the site as series of enclosed fields that remains unchanged. Chopwell itself developed further throughout the twentieth century and by the later part of the 20th Century housing expanded up to the eastern boundary of the site.

3 THE GEOPHYSICAL SURVEY

3.1 Technique

3.1.1 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.

3.1.2 This geophysical survey was conducted in line with all professional guidelines (CIfA 2014a, b) and recommendations as laid out and presented in *EAC Guidelines for the use of geophysics in archaeology* (Schmidt et al. 2015) *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).

3.2 Methodology

3.2.1 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 north-south 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.

3.2.2 The survey comprised 74 full and partial 30m by 30m grids (see Fig. 2) which were set out using a Trimble R6 GNSS GPS system. A small portion of land in Field 1 was unsuitable for survey, as was the small area of the field to the west of Field 3 that lies within the site.

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

3.3 Post-Processing

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

3.3.2 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; '*despiked*' to remove data spikes caused by small surface iron anomalies usually the result of metal 'rubbish'; 'interpolate' to increase the number of data points in ratio between the sample and traverse intervals was applied to the Field 1 survey; A 'low pass' filter was applied to Fields 1 & 3 surveys to smooth the data; 'clipped' to limit it to specified minimum and maximum values, thus removing extreme data point values. '*clipped'* to limit it to specified minimum and maximum values; thus removing extreme data point values. The data presentation includes three formats: Greyscale Plot (demonstrating processed data); Magnetic Anomaly Interpretation Plan (identifying possible archaeological features, modern features and other anomalies); Trace plot of minimally processed survey data.

4 SURVEY RESULTS (Figs. 3-12)

4.1 Magnetic Anomaly Interpretation

4.1.1 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.

4.2 Services, modern disturbance and geological features

Field 1 (Figs. 5, 6, 11)

4.2.1 Strong magnetic disturbance (grey hatch on Fig. 6) was detected along the eastern boundary of the site. Very strong magnetic disturbance was produced by a metal animal feeder in the northwestern corner of the field.

4.2.2 A scatter of isolated positive and dipolar magnetic responses (red on Fig. 6, smaller anomalies not marked) throughout the field are likely to relate to disturbance and stray ferrous objects from agricultural activity.

Field 2 (Figs. 7, 8, 11)

4.2.3 A very strong magnetic response (grey hatch on Fig. 8) was caused by vehicles and farm machinery in the northwestern corner of Field 2. Another strong anomaly of modern origin was detected along the southern edge of the eastern field boundary with further magnetic disturbance detected along the northern portion of this boundary.

4.2.4 A scatter of small isolated positive and dipolar magnetic responses (red on Fig. 8, smaller anomalies not marked) were detected throughout the field (refer 4.2.2).

Field 3 (Figs. 9, 10, 12)

4.2.5 Magnetic disturbance (grey hatch on Fig. 10) was detected along a small portion of the eastern boundary of the site.

4.2.6 A scatter of isolated positive and dipolar magnetic responses (red on Fig. 10, smaller anomalies not marked) were detected throughout the field (refer 4.2.2).

4.3 Ridge and furrow

Field 1 (Figs. 5, 6, 11)

4.3.1 A series of positive linear responses throughout most of the field almost certainly represents a ridge and furrow system orientated N-S in the eastern portion and NNW-SSE in the western area (green on Fig. 6). The anomalies were spaced at intervals of mainly between 7 and 4m distance apart. There was also occasional weak linear magnetic responses orientated NW-SE that may represent other later ploughing regimes.

Field 2 (Figs. 7, 8, 11)

4.3.2 A series of positive linear responses throughout the field represent a ridge and furrow system orientated NNW-SSE (green on Fig. 8). The anomalies were spaced at intervals of mainly between 5m - 4m distance apart.

Field 3 (Figs. 9, 10, 12)

4.3.3 A series of mainly widely spaced positive linear responses throughout the field may represent a ridge and furrow system orientated NNW-SSE (green on Fig. 10). The anomalies were spaced at intervals of mainly between 9m - 6m distance apart.

4.4 Magnetic anomalies of possible archaeological origin

Field 1 (Figs. 5, 6, 11)

4.4.1 A series of anomalies concentrated mainly on flatter ground in the northern portion of Field 1 may represent the remains of a system of ditched enclosures associated with a settlement. Anomalies from ridge and furrow that cut across this area make interpretation of the various anomalies more difficult. The 'settlement' appears to be focused upon an enclosure, the northern portion of which was visible as an almost continuous positive anomaly (1a, magenta Fig 6) perhaps representing a rectilinear ditch circuit measuring 65m E-W. The position of the southern side of this 'enclosure' is unclear; the origin of a curvilinear linear negative anomaly (1b) lying 66m to the south is uncertain and may be natural in origin rather than the southern side of the enclosure. The negative anomaly also had a positive response of uncertain origin on the northern side of its western extent. There is a distinct gap on the eastern side of the circuit of anomaly1a, which may represent an entranceway (an E or SE facing entrance is characteristic of many late prehistoric settlements) this is supported by the presence of two discontinuous linear anomalies (1c) that appear to join it and funnel together from 25m apart alongside anomaly 1a to only 8m over a distance of 42m heading east to the edge of the survey. A curvilinear anomaly (1d) located immediately west of anomaly 1a may represent an annex to it. Two positive linear anomalies (1e) to the north of anomaly 1a are of uncertain origin although potentially may represent another annex to the north. The origin is uncertain of a short curvilinear anomaly (1f) within the 'interior' of the enclosure though it potentially may represent a drainage ditch associated with a roundhouse. Two fragmentary linear positive anomalies (1g and 1h) in the southeast portion of the

field could represent ditches associated with further sub- divisions of the wider landscape associated with the possible settlement or instead may simply represent later drainage. Several positive anomalies (magenta hatch) of unknown origin were identified in the southwest portion of the survey in Field 1 which may simply represent enhanced magnetic material within the topsoil or natural features.

Field 2 (Figs. 7, 8, 11)

4.4.2 Two fragmentary curvilinear linear positive anomalies (2a,2b) that lay close together, broadly parallel, and extended E-W across the centre of Field 2, may represent infilled ditches associated with a former boundary. The northern anomaly (2a) extended across the full width of the field whilst the other (2b) lay up to 5m to the south in the western portion of the field. It is notable that they do not respect the anomalies associated with ridge and furrow perhaps indicating their relative antiquity.

4.4.3 Four separate short linear positive anomalies (2c, d, e, f) of uncertain origin were identified throughout the field. These anomalies may not be of archaeological significance and may have resulted from agricultural activity.

Field 3 (Figs. 9, 10, 12)

4.4.4 No anomalies of potential archaeological significance were identified within Field 3.

5 DISCUSSION (Fig. 1, 3, 4, 13)

5.1 The geophysical survey identified one principal area of potential archaeological sensitivity within Field 1 where anomalies possibly associated with a settlement and ditched enclosures of late prehistoric date. With the exception of two likely boundary features in Field 2 there were only a limited number of anomalies of low archaeological potential in this field. No anomalies of archaeological interest were identified within Field 3 other than those associated with ridge and furrow.

5.2 The location of the possible settlement centred upon an enclosure represented by anomaly 1a in Field 1 (refer 4.4.1) is well positioned on the crest of an area of level ground occupying the highest portion of the site (Fig. 13). It lies on the south facing side of Derwent valley and is also situated approximately midway between two streams that run south into the river.

5.3 The two linear anomalies (2a, 2b) probably represent boundary ditch or gullys associated with a boundary that predates historic mapping and probably also the ridge and furrow which is evident throughout the survey, and therefore may be prehistoric in date and perhaps even contemporary with the possible settlement identified in Field 1

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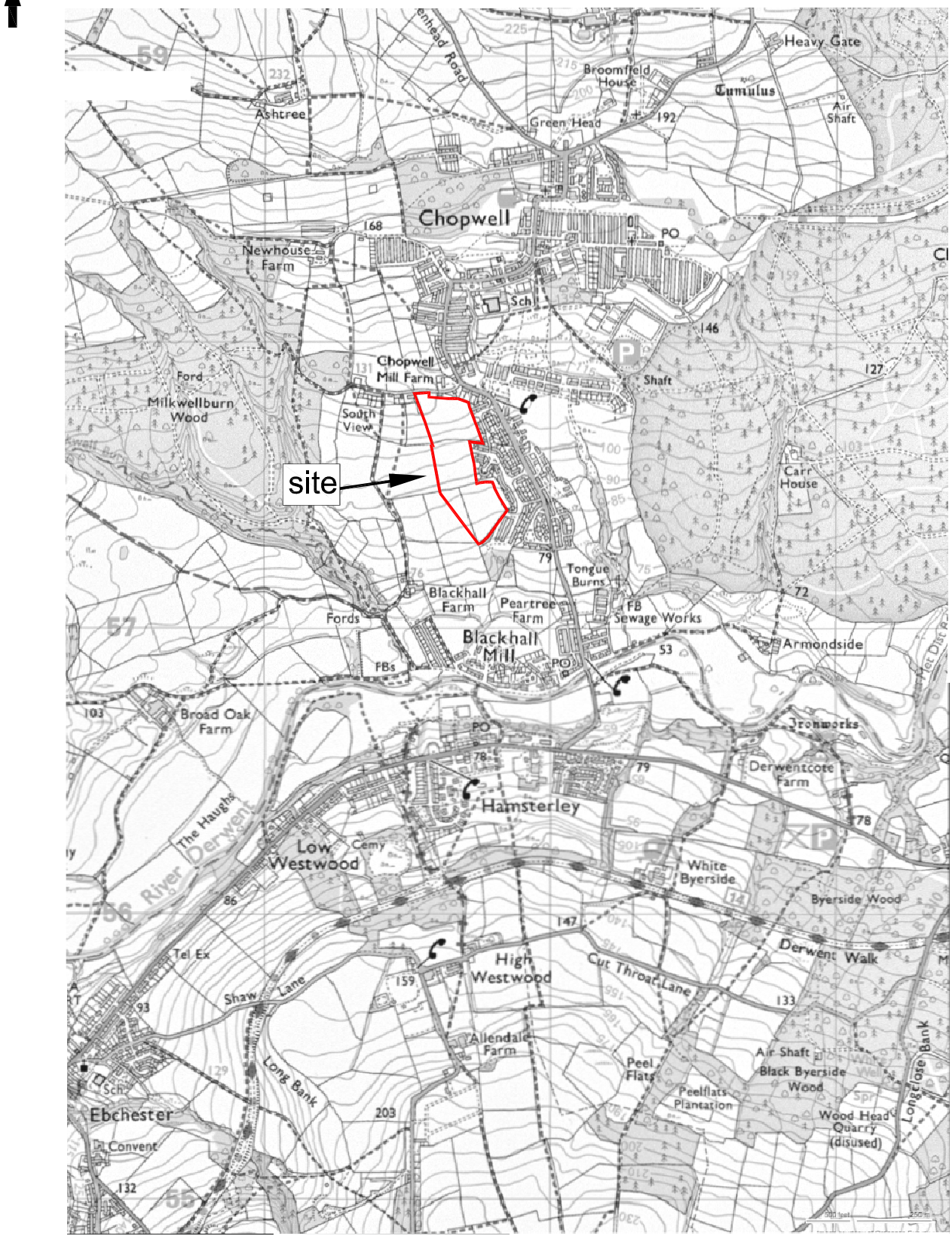
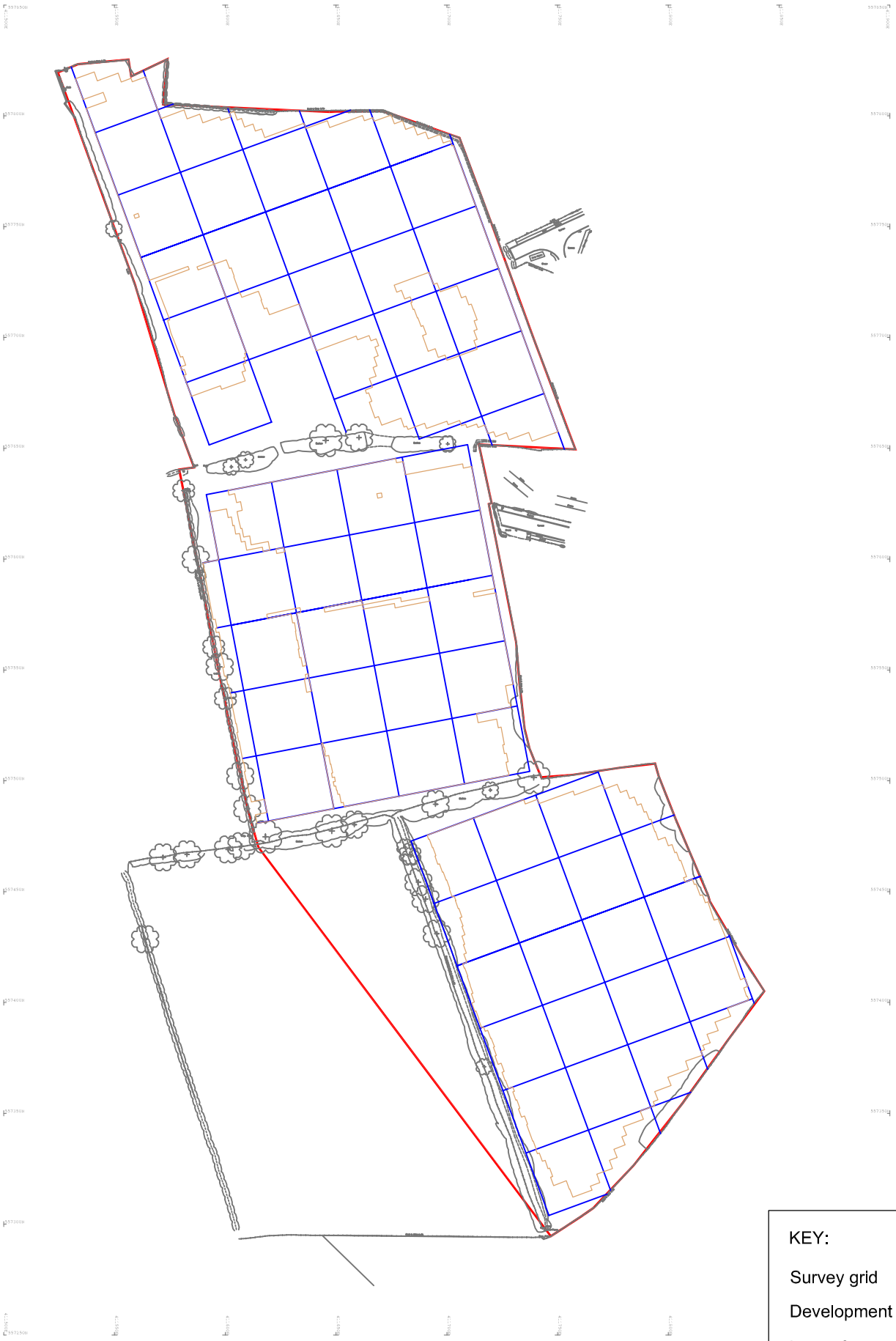


0 1:20,000 at A4 1km

Figure 1: Location of site



KEY:

Survey grid

Development area

Limit of survey

Basemap uses topographical survey produced 21/04/2015 by Landform Surveys

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Figure 2: Plan of geophysical survey grids

N

0 1:2500 at A4 100m

Chopwell, Project number 000

Figure 3: Overall greyscale plot of processed geophysical survey

Chopwell - Project number 330

N

0 1:1250 at A3 75m

Field 1

2.5 nT
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5 nT

Fields 1 & 3

Field 2

3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

Field 2

Field 3

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N

0 1:1250 at A3 75m

Figure 4: Overall interpretative plan of geophysical survey

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KEY:
Dipolar anomalies
modern
other anomalies
Positive anomalies
Negative anomalies
Furrow

Field 1
Field 2
Field 3

1a
1b
1c
1d
1e
1f
1g
1h
2a
2b
2c
2d
2e
2f

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N

0 1:1250 at A3 75m

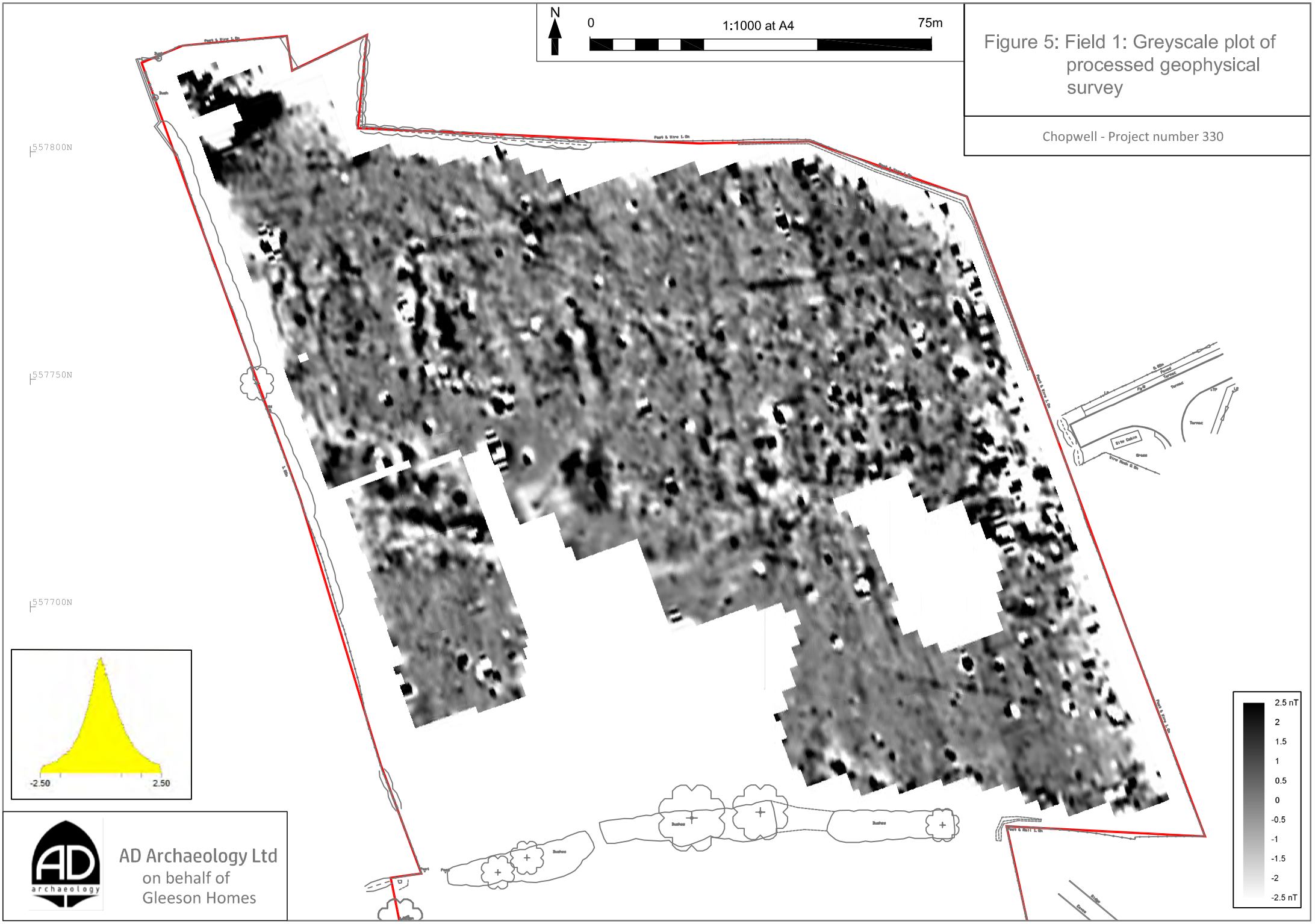

Figure 5: Field 1: Greyscale plot of processed geophysical survey

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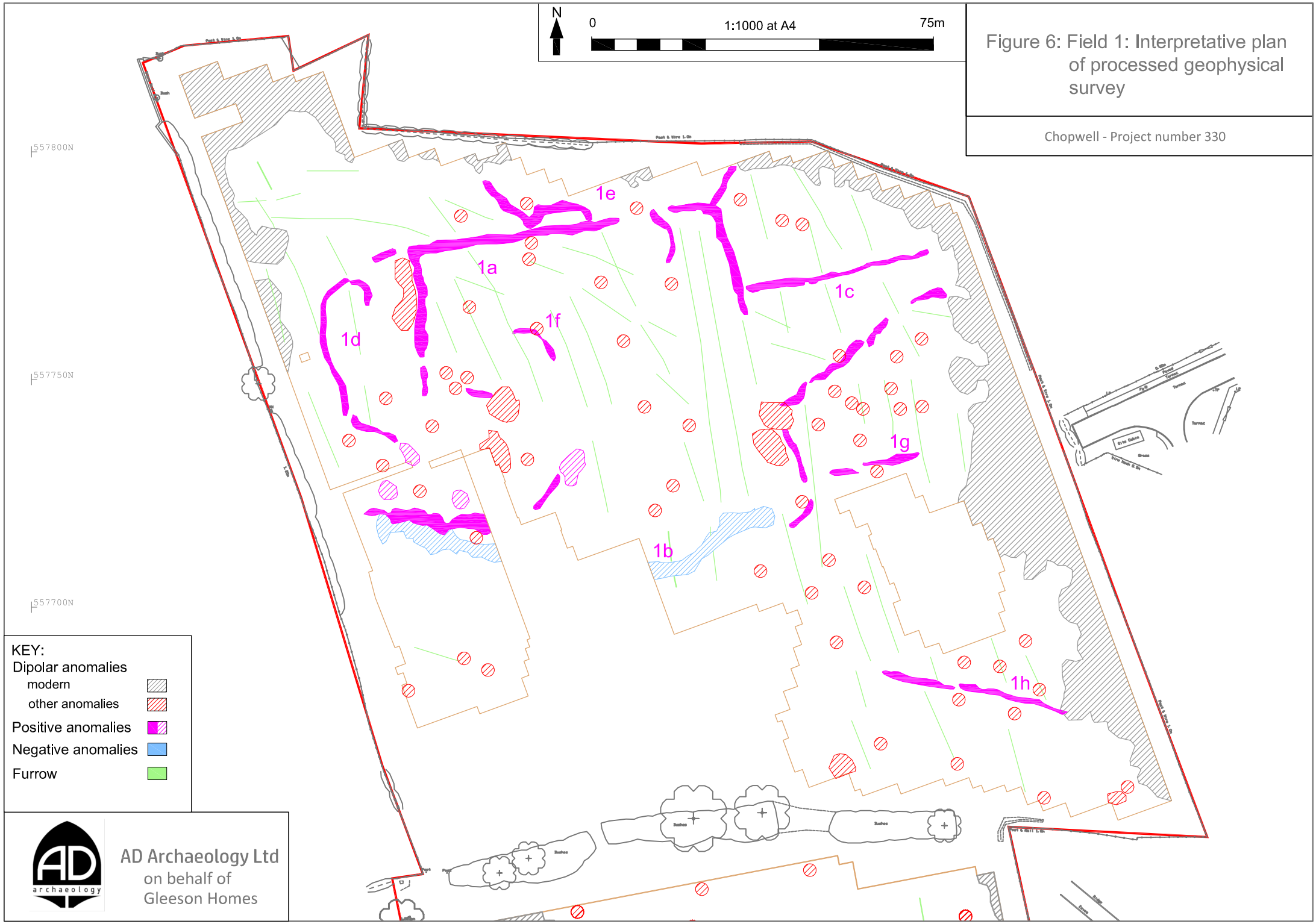

Figure 6: Field 1: Interpretative plan of processed geophysical survey

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Figure 7: Field 2: Greyscale plot of processed geophysical survey

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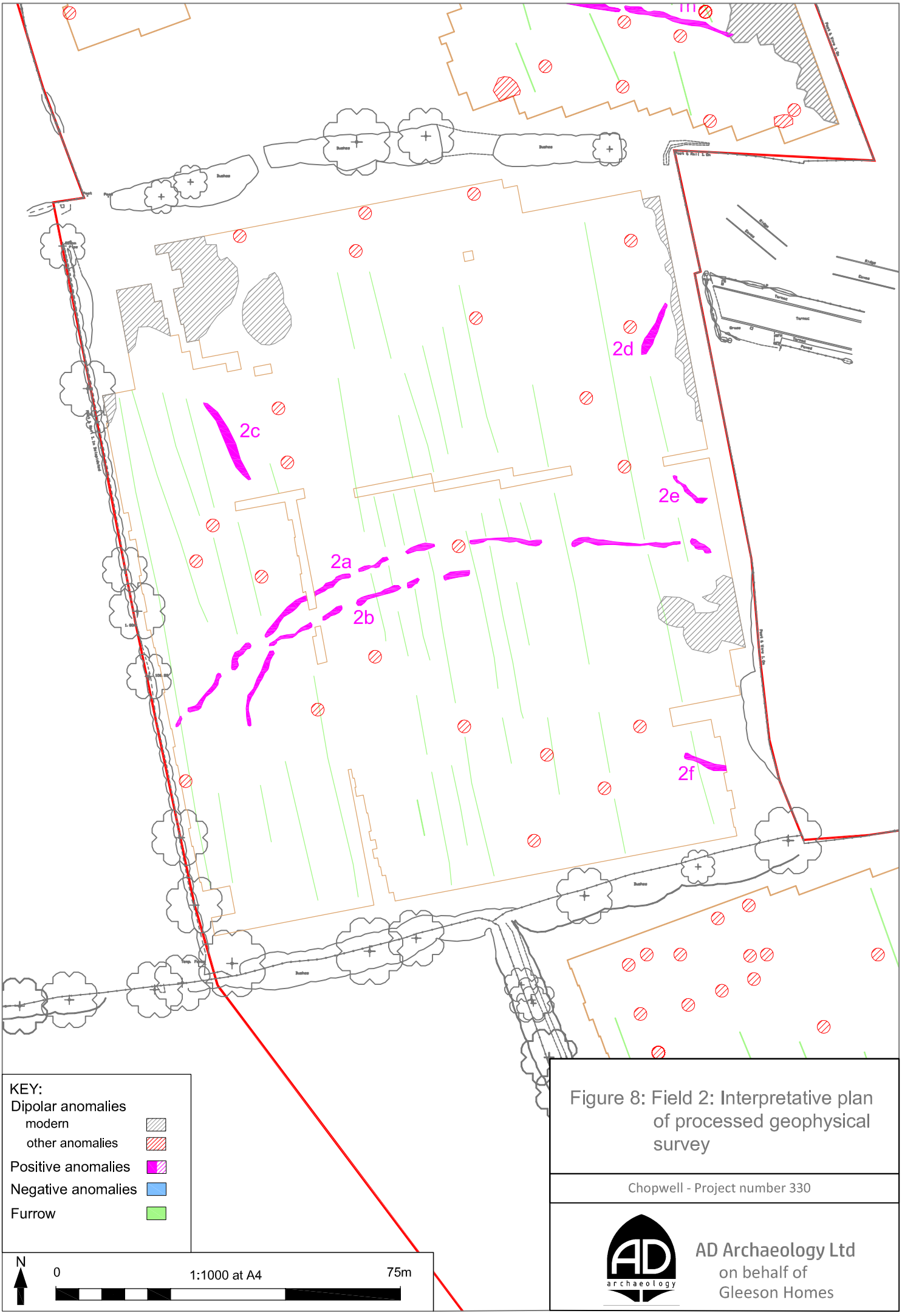

Figure 8: Field 2: Interpretative plan of processed geophysical survey

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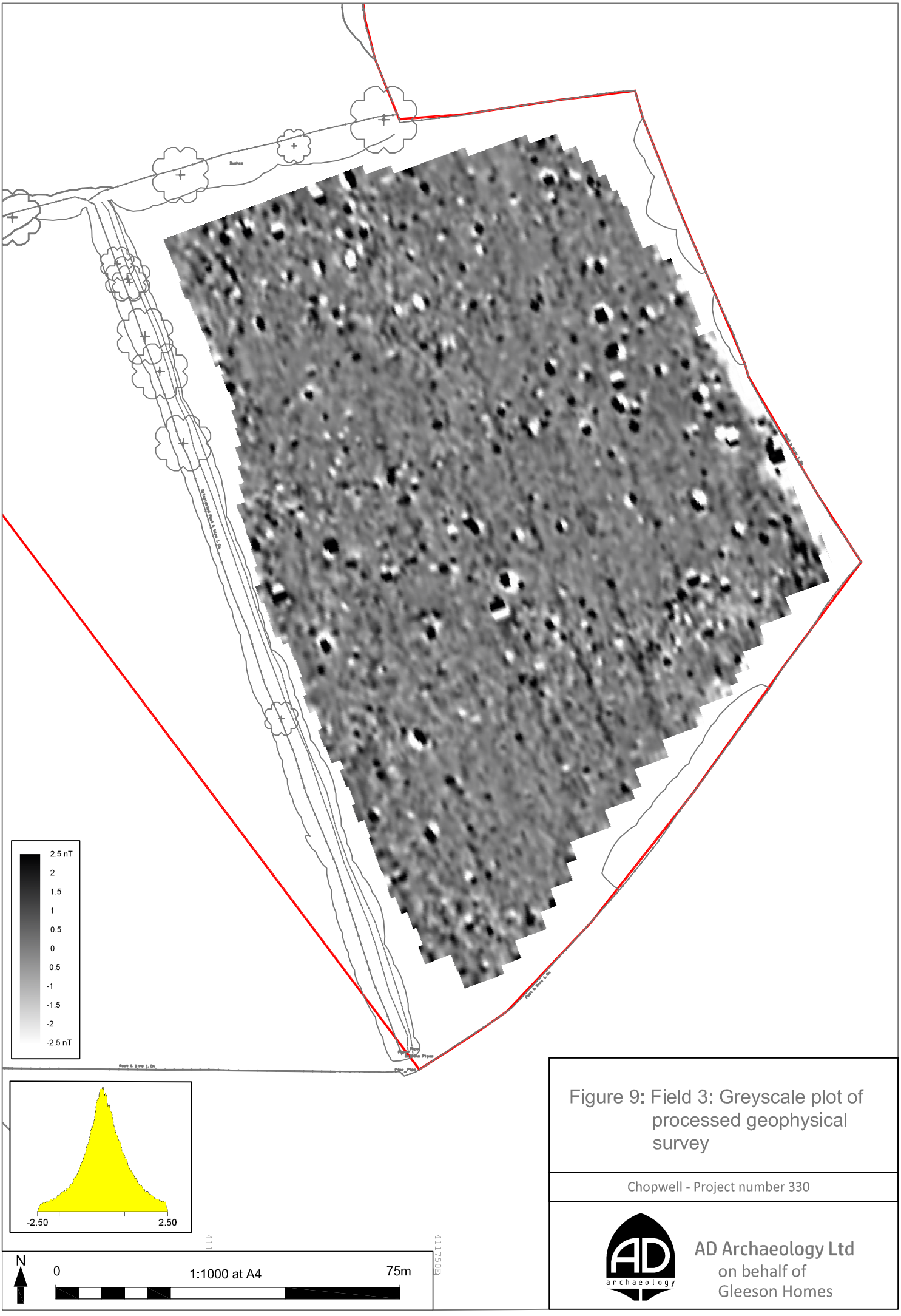

Figure 9: Field 3: Greyscale plot of processed geophysical survey

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Figure 10: Field 3: Interpretative plan of processed geophysical survey

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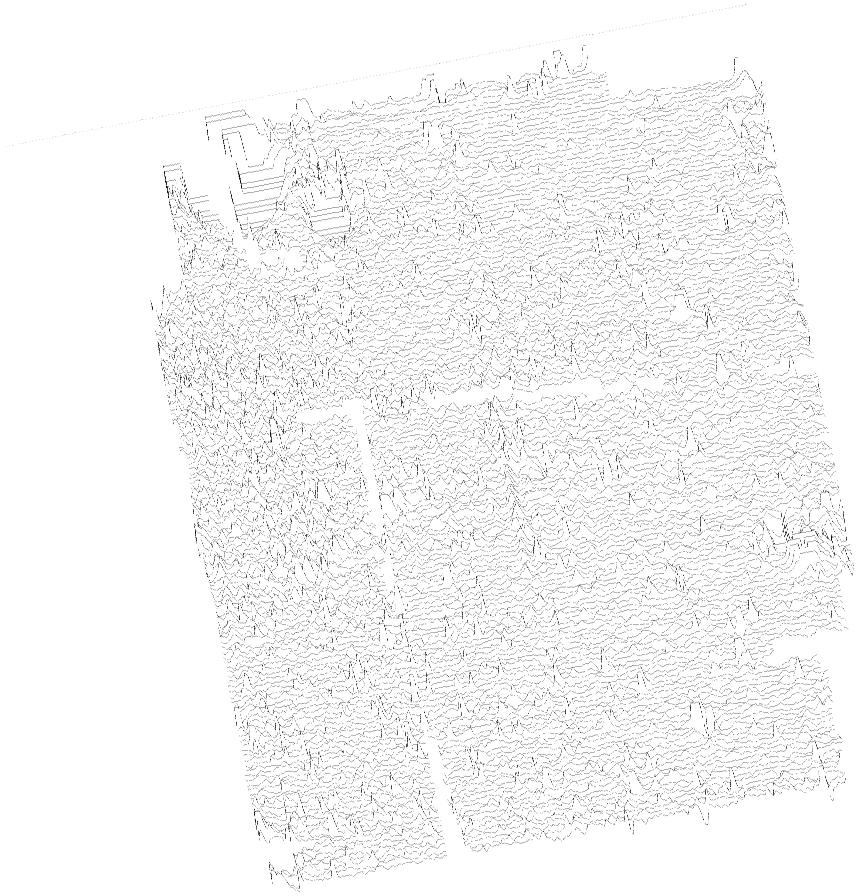
Field 1
Survey clipped to -20/20nT
30nT/cm



Field 2
Survey clipped to -6/6nT
15nT/cm

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Figure 11: Fields 1 & 2: Trace plots of geophysical survey

N
0 1:1500 at A4 100m

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Field 3
Survey clipped to -6/6nT
15nT/cm

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Figure 12: Field 3: Trace plot of geophysical survey

N
0 1:1500 at A4 100m

Chopwell - Project number 330

Figure 13: Overall interpretative plan of geophysical survey showing terrain contours

Chopwell - Project number 330

KEY:
Dipolar anomalies
modern
other anomalies
Positive anomalies
Negative anomalies
Furrow

Field 1
Field 2
Field 3

1a
1b
1c
1d
1e
1f
1g
1h

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N

0 1:1250 at A3 75m

AD Archaeology Ltd
South Shields Business Works,
Henry Robson Way,
South Shields,
NE33 1RF
Tel: 0191 603 0377
info@adarchaeology.co.uk211