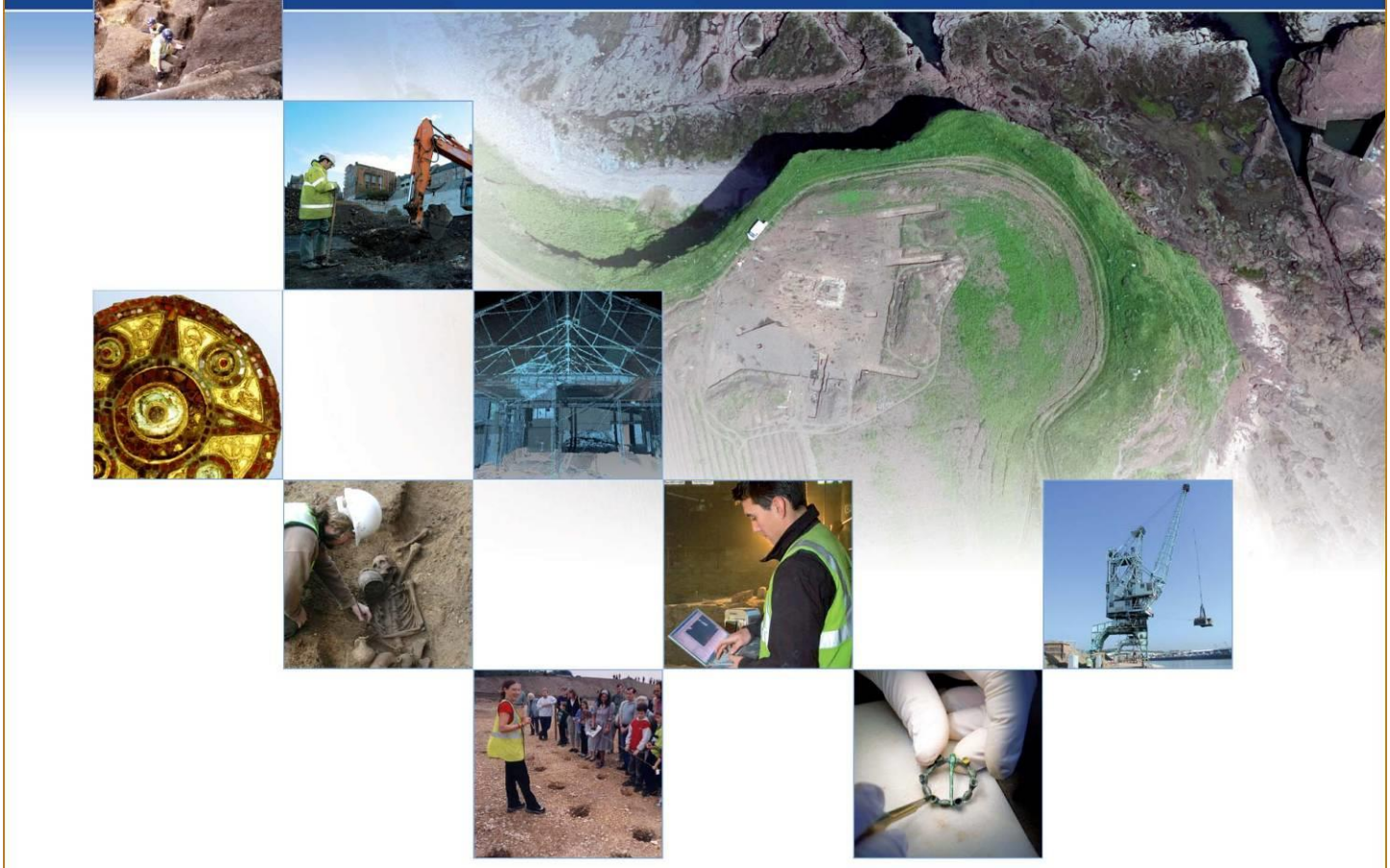
Acklington Road, Amble, Northumberland

Archaeological Geophysical Survey

National Grid Reference Number: NU 2604 0334

AOC Project No: 51733

Date: April 2017



AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

Acklington Road, Amble, Northumberland

Archaeological Geophysical Survey

On Behalf of:

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National Grid Reference (NGR): **NU 2604 0334**

AOC Project No: **51733**

Prepared by: **James Lawton**

Illustrations by: **Kimberley Teale**

Date of survey: **April 2017**

This document has been prepared in accordance with AOC standard operating procedures.

Author: James Lawton **Date: 18th April 2017**

Approved by: Graeme Cavers **Date: 02nd May 2017**

Report Stage: Final Draft **Date: 03rd May 2017**

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Non-Technical Summary

AOC Archaeology Group was commissioned by Hindhaugh Homes to undertake an archaeological geophysical (gradiometer) survey to investigate the potential for buried archaeological remains on a proposed development area in Amble, Northumberland (centred at NU 2604 0334*). A total of 9 hectares were surveyed and the results of the survey have identified a number of anomalies.*

The results of the survey identified no definitive archaeological anomalies within the survey area.

A number of tentative discrete linear, rectilinear and curvilinear trends possibly archaeological, have been located within the survey.

Several responses of unclear origin were also recorded although these are considered most likely to be the result of geotechnical trenches and boreholes and previous open cast mining remains.

A number of agricultural anomalies have been observed in the data including a former field boundary and a second possible field division, as well as ridge and furrow ploughing and more modern ploughing trends. Clear linear trends of field drainage have also been detected in a herringbone shape within the survey.

Several modern services were recorded close to the herringbone drainage and could be culverts or drainage pipes. Associated manhole covers were also detected and visible on the surface in these locations.

An area of magnetic disturbance, most likely the result of a former railway was also recorded, as was the edge of the former opencast boundary.

Throughout the survey area isolated dipolar or ferrous (iron spikes) anomalies were also recorded; these are most likely the result of manuring and modern detritus.

1 Introduction

1.1 AOC Archaeology Group was commissioned by Hindhaugh Homes to undertake an archaeological geophysical survey at a site in Amble, Northumberland as part of a wider scheme of archaeological assessments in advance of a proposed development of the site.

1.2 The survey was carried out to provide information on the extent and significance of potential buried archaeological remains within the proposed development site. The survey also aimed to determine the location of open cast mining known to have taken place, but with no accurate locational evidence of how far it spread.

2 Site Location and Description

2.1 The proposed development site is located on the southern and western boundary of the seaside settlement of Amble, Northumberland. It is located to the south and east of the B6345 Acklington Road, centred at NU 2604 0334 (see Figure 1).

2.2 The survey area covers an area of approximately 9 hectares (Ha) across four fields consisting of pasture. The survey area is situated on relatively level ground ranging between approximately 10m to 15m aOD (above Ordnance Datum).

2.3 The recorded bedrock geology within the survey area consists of two types the first Pennine Lower Coal Measures Formation consisting of sandstone and the second Pennine Lower Coal Measures Formation consisting of Mudstone, Siltstone and Sandstone (BGS 2017). The superficial geological deposits are made up of Devensian Till known as Diamicton.

2.4 These are overlain by slowly permeable seasonally wet acid loamy and clayey soils and restored soils mostly from quarry and opencast spoil (Soilscapes 2017).

3 Archaeological Background

3.1 The archaeological background below is drawn from the desk-based assessment of the site, undertaken in 2016 (Archaeological Services Durham University 2016).

Prehistoric period (up to AD 70)

3.2 The desk-based research indicated that although there is no evidence of any prehistoric activity on site there is the potential for unknown resources of this date to be located. This conclusion was formed from the evidence of prehistoric finds and sites located in the surrounding area that indicate the area was exploited during this period.

Roman period (AD 70 to 5th century)

3.3 The desk-based research indicated that there is limited evidence for archaeology of Roman date in the area. The areas of highest potential are considered to be those around late prehistoric settlements that may have continued in to the Roman period.

Medieval period (5th century to 1540)

3.4 There is little in the way of evidence of early medieval or medieval settlement activity within the site boundary. Although placename evidence and occupation is noted elsewhere outside the site boundary it is likely that during this period the site fell within the land of Tynemouth Priory.

3.5 Evidence from aerial photography would suggest field boundaries and cultivation remains are likely to be located within the survey area. These may well span in to the post medieval period.

Post-medieval period (1541 to 1899)

3.6 Post-medieval settlements are noted on a number of historic maps; however, very little in the way of detail has been ascertained from these regarding the site boundary. The mapping does seem to suggest a salt-making and coal mining developments in the Amble area during this period, although again, little evidence is present close to the site boundary.

3.7 The first edition map of the site from 1866 records six fields within the site boundary. The Amble Branch of the North Eastern Railway (HER 27319) extends through the central fields of the site. The railway was opened in 1849 and ran north-east to the Amble coal depot.

3.8 The 2nd edition Ordnance Survey map records no change to the field boundaries of the proposed development area. A footpath extends from the farm at Moor House westwards into the proposed site. A further footpath runs along the north part of the eastern field boundary, adjacent to which is a pond. Just to the south of the pond, external to the proposed site boundary, a building labelled as magazine is depicted. This may have been a store for explosives associated with the colliery, located at some distance from the site. A small pond is shown in the north centre field of the proposed development area, which appears to have walls either side. Amble has expanded to the south and a railway station (HER 27322) was opened to the north of the proposed site. A brickworks was also being operated at Radcliffe colliery by this date (HER 20831).

Modern period (1900 to present)

3.9 The proposed development area was not subject to boundary changes in the early 20th century.

3.10 The Ordnance Survey map of 1926 records no change within the proposed development area.

3.11 The 1950s Ordnance Survey map records no change within the proposed development area aside from the disappearance of the easternmost pond.

3.12 Ordnance Survey mapping from the 1980s records fields within an area of active workings associated with open cast mining. The geoenvironmental appraisal for the site (Patrick Parsons 2017) demonstrates with an aerial photograph and the site restoration plan that the eastern fields of the site were comprehensively disturbed by groundworks and settling ponds as part of the Togston open cast mining scheme. These works would have removed any archaeological resource.

4 Aims

4.1 The aim of the geophysical survey was to identify any potential archaeological anomalies that would enhance the current understanding of the archaeological resource within the proposed survey area.

4.2 Specifically, the aims of the gradiometer survey were;

- To locate, record and characterise any surviving sub-surface archaeological remains within the survey area
- To help determine the next stage of works as per the client's instruction
- To provide an assessment of the potential significance of any identified archaeological remains in a local, regional and (if relevant) national context
- To produce a comprehensive site archive and report.

5 Methodology

5.1 All geophysical survey work was carried out in accordance with recommended good practice specified in guideline documents published by English Heritage – now Historic England (David *et al.* 2008) and

the Chartered Institute for Archaeologists *Standard and Guidance for archaeological geophysical survey* (2014).

5.2 Parameters were selected that were suitable for the prospective aims of the survey and in accordance with recommended professional good practice (David *et al.* 2008, 8).

5.3 The gradiometer survey was carried out using Bartington Grad601-2 fluxgate gradiometers (see Appendices 2 and 3). Data was collected on an east-west alignment using zig-zag traverses, with a sample interval of 0.25m and a traverse interval of 1m. A total of 144 full or partial 30m by 30m grids were surveyed within the specified area, totalling an area of approximately 9ha.

5.4 Care was taken to avoid metal obstacles present within the survey area during data collection using gradiometers. Gradiometer survey is affected by 'above-ground noise' such as metal objects, and avoiding these improves the overall data quality and results obtained.

5.5 The gradiometer data were downloaded using Bartington Grad601 PC Software v313 and processed using Geoscan Geoplot v3.0 / v4.0. The details of these processes can be found in Appendices 4 and 5. Data processing, storage and documentation were carried out in accordance with the good practice specifications detailed in the guidelines issued by the Archaeology Data Service (Schmidt and Ernenwein, 2009).

5.6 Interpretations of the data were created as layers in AutoCAD LT 2009 / GIS and the technical terminology used to describe the identified features can be found in Appendix 6.

6 Results and Interpretation

6.1 The gradiometer survey results have been visualised as greyscale plots, with the minimally processed data plotted at -1nT to 2nT in Figure 3. The processed data is also plotted at -1nT to 2nT and can be seen in Figure 4. An interpretation of the data can be seen in Figure 5 and an individual characterisation of the identified anomalies follows this in Appendix 1.

Archaeology

6.2 No responses indicating definitive archaeological remains have been located in the survey area.

Discrete Archaeology

Discrete linear trends

6.3 Several discrete curvilinear trends have been identified in the data in the west of the site (**A1**). These trends comprise increased signals compared to the background values however poor patterning of these response values and weaker strength makes interpretation difficult and more tentative. An archaeological origin could be suggested, possibly related to ditches. Equally they could also be related to geological variations across the area.

6.4 A second set of curvilinear, linear/rectilinear trends are seen in the central part of the site and again this could have an archaeological origin (**A2**). However, the area has very clear modern ploughing and these might happen to fall within an area where geotechnical trenching and boreholing has taken place and as such the response may be the result of backfilling.

6.5 A much fainter but larger curvilinear trend is also recorded in this central area off the site (**A3**). The feature could have an archaeological origin, although a geological origin is also likely due to its position where the land begins to fall away to the lower topography in the east.

Unclear Origins

6.6 A number of responses of unclear origin are located throughout the site areas and these would all appear to be slightly ferrous signal (**A4**). It is thought that the majority of these are related to geotechnical trenches and boreholes that have been undertaken across the site and these responses relate to the upcast from these exploratory tests. An archaeological origin is felt to be highly unlikely.

6.7 Several responses in the east of the site would appear to be relatively large and made up of magnetically enhanced material (**A5**). This material is of unclear origin and does not appear to form any coherent pattern or shape. The responses fall within the location of the opencast mining area. It is thought that these unclear responses might be either material used to backfill the area or possibly the open cast face edge and the limit of the quarry workings.

Agricultural

Linear Trend (field boundary)

6.8 A linear trend of a possible field boundary has been located running north/south through the centre of the survey area (**A6**). This response consists of an isolated negative linear anomaly. The signal for this kind of anomaly appears to be inconsistent, but the patterning and positioning suggests such anomalies belong to those associated with former field division systems. First Edition historic Ordnance Survey mapping of 1866 of the area depicts the presents of this previous field divisions in the area.

Linear Trend (old field boundary?)

6.9 A linear trend of a possible field boundary has been located running north south through the centre of the survey area (**A7**). This response consists of an isolated negative linear anomaly. The signal for this kind of anomaly appears to be inconsistent, but the patterning and positioning suggests such anomalies belong to those associated with former field division systems. Historic mapping of the area has been unable to determine the presents of previous field divisions in the area however it falls within two areas of ridge and furrow running in differing directions which would suggest a boundary at some point.

Linear Trend (Ridge and Furrow / Rig and Furrow)

6.10 Two areas of former ridge and furrow ploughing trends have been recorded in the data in the western part of the site (**A8**). These are noted on historic accounts and aerial photography as discussed in the Desk-based assessment undertaken by Archaeological Services, Durham University (2016).

Linear Trend (Conventional ploughing)

6.11 An area of clear linear trends representing more modern conventional ploughing have been detected in the central area (**A9**). These anomalies either composed of an increased or decreased magnetic response compared to background values and run parallel to one another as well as being much more closely aligned.

Linear Trend (field drainage)

6.12 In the eastern areas of the site clear draining anomalies have been detected in the results (**A10**). These consist of a series of linear anomalies of an indeterminate date, regular and in this case forming a herringbone patterning, of regular spaced drains. These are likely to represent agricultural land drainage most likely put in as a result of the open cast mining that left the area with poor drainage.

Non-archaeology

Linear Trend (possible modern service)

6.13 Two linear responses in the eastern part of the survey area are likely to represent service pipes and run to locations in the field where manhole covers were visible on the surface (**A11 and A13**). The first of these changes direction slightly and runs to a number of manhole covers visible on the surface at the field boundary (**A12**). The second linear appears to run through the central part of the herringbone field drainage and runs predominantly north south direction and has two linears running parallel to it that appear to connect the herringbone drains together (**A13**). It is unknown if this is a separate pipe altogether or if this is the main drain or culvert to the herringbone drains. A manhole cover was also visible on the surface on the boundary between the fields in the same area as this main drain and is likely to be related (**A14**).

6.14 Two negative linear trends run north/south through the eastern part of the survey and would appear to fall within an area which is described as being the edge of the excavation area for the opencast mining (**A15**). This anomaly is considered likely to demarcate the area of mining to the east and the undistrubed area to the west.

Disturbed Area (modern disturbance?)

6.15 An area of modern disturbance running north south along the boundary of the eastern most field is likely to be the result of a former railway which once ran through the survey area (**A16**). Depicted on historic mapping of 1950, it went out of use some time later as reported in the Desk-based assessment undertaken by Archaeological services Durham University (2016). An area of disturbance that is likely to be caused by modern activity and is characterised by significant increases or decreases in magnetic values compared with background readings.

Isolated Dipolar Anomalies / Ferrous (iron spikes)

6.16 Across the data set there is a large quantity of isolated dipolar anomalies (iron spikes, e.g. **A17**). These are commonly caused by ferrous or high magnetically susceptible material on the surface or within the topsoil of the site, and it is likely that modern agricultural activity such as manuring has changed the magnetic properties of the top soil and created a high level of background ‘noise’ within the data set.

7 Conclusion

7.1 The gradiometer survey has not identified any anomalies or features of a definitive archaeological nature.

7.2 Across the survey area a number of discrete linear and curvilinear trends were identified but due to their poor strength and patterning only a tentative interpretation can be formed as to their origin, and therefore and archaeological origin can neither be dismissed or agreed.

7.3 Several unclear anomalies were detected that are most likely to relate to modern disturbance from geotechnical working on the site as well as previous quarrying works particularly in the east.

7.4 A number of agricultural anomalies, related to former field boundaries and possible field boundaries were detected, as well as a number of ploughing regimes. These ploughing regimes reflect both ridge and furrow as well as more conventional modern ploughing trends. Herringbone field drainage was also detected during the survey and is seen in the results in the east of the survey area.

7.5 Non archaeological anomalies were also detected in the results: these reflect areas of likely modern disturbance. In particular, three linear responses- two of which are most likely pipes or culverts- and a

negative linear most likely mark the extent of quarry workings. An area of disturbance in the general area of a former railway line was also highlighted, as well as general ferrous spikes located throughout.

8 Statement of Indemnity

8.1 Although the results and interpretation detailed in this report have been produced as accurately as possible, it should be noted that the conclusions offered are a subjective assessment of collected data sets.

8.2 The success of a geophysical survey in identifying archaeological remains can be heavily influenced by several factors, including geology, seasonality, field conditions and the properties of the features being detected. Therefore, the geophysical interpretation may only reveal certain archaeological features and not produce a complete plan of all of the archaeological remains within a survey area.

9 Bibliography

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Plate 1. Survey area looking north and west from the central southern boundary of site.

Plate 2. Survey area looking south and east from the central southern boundary of site.

Plate 3. Survey area looking west and north from the south eastern corner of the site.

Plate 4. Survey area looking south west highlighting the areas of geotechnical disturbance.

ACKLINGTON ROAD, AMBLE
ARCHAEOLOGICAL GEOPHYSICAL SURVEY
(AOC PROJECT NO, 51733)

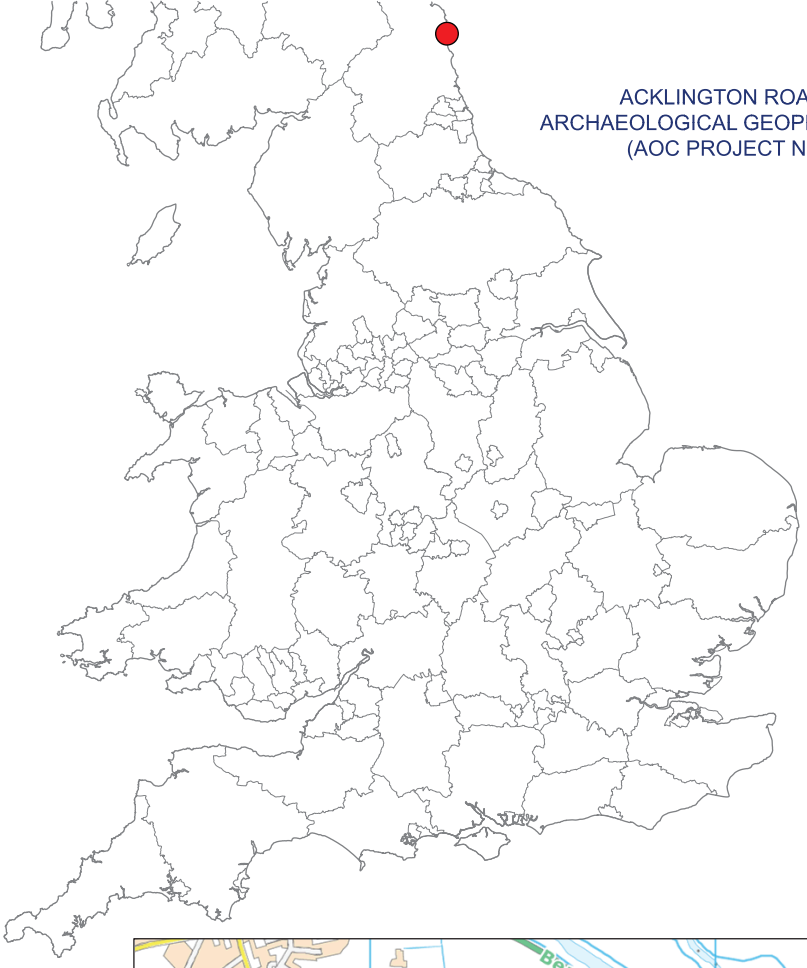

Figure
1

N

Site location

0 1km

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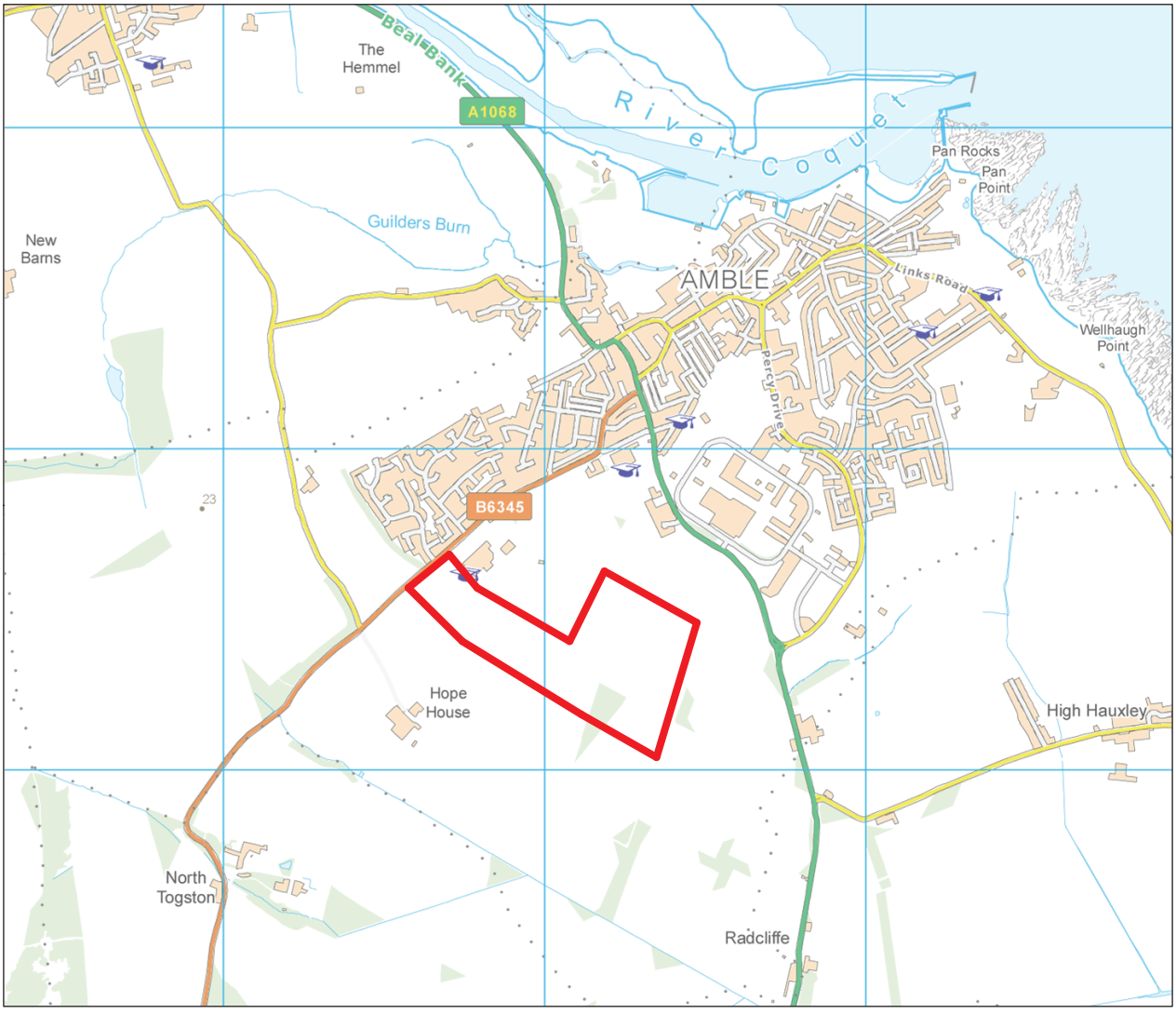

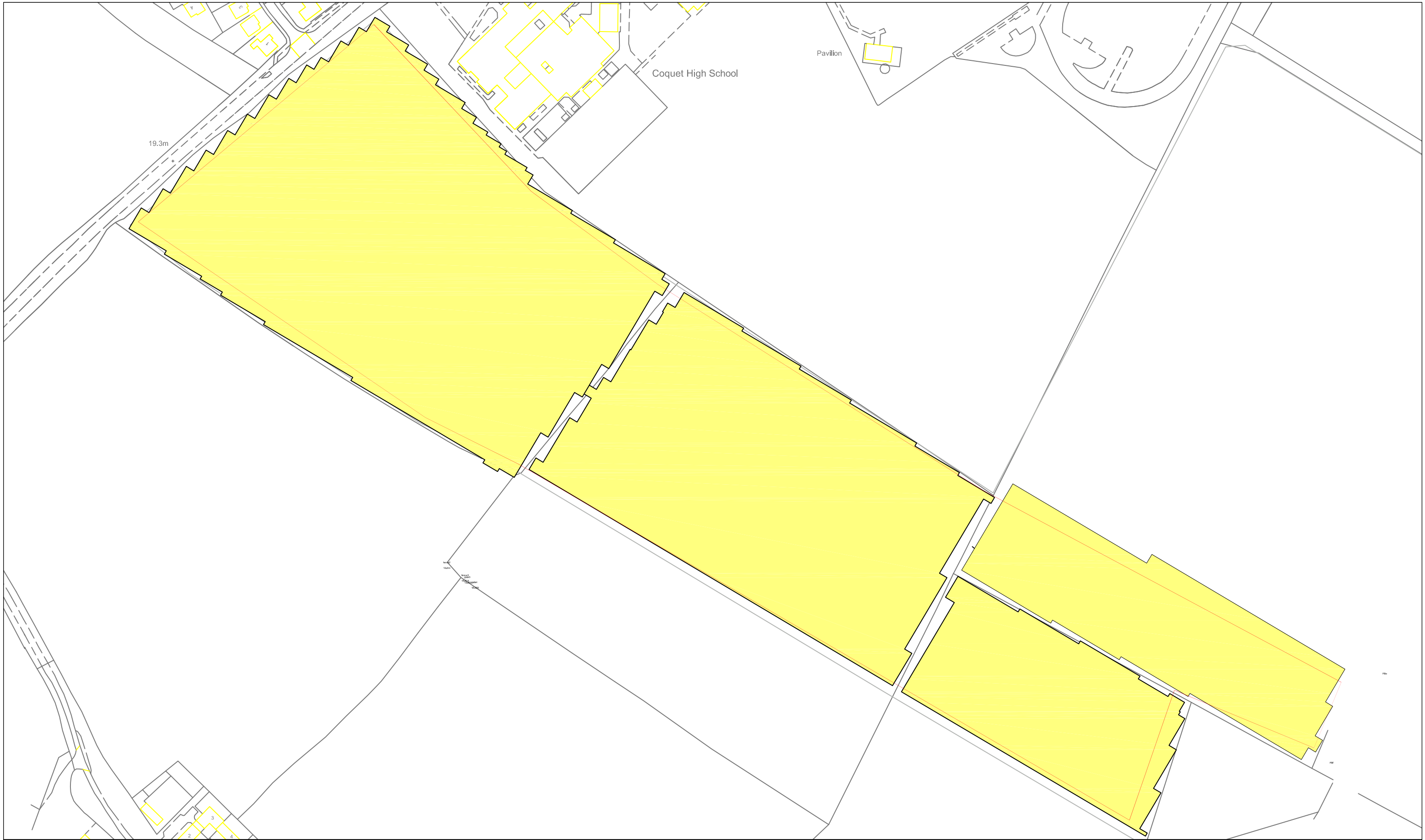

Location of survey areas

Figure 2

Areas Surveyed

Areas Not Surveyed

N

0 80m

1:2000 at A3

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Drawing Title: Figure 2 Location of Survey Areas		
V1/51733/GEO/F2/01.05.17		
Drawn by: JL	Checked by: GC	Approved by: GC
01/05/2017	01/05/2017	01/05/2017

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Minimally processed gradiometer survey results - greyscale plot

Figure 3

Scale 2nT -1nT

Red Line Boundary

N

0 80m

1:2000 at A3

Project Title: Acklington Road, Amble Project No: 51733		
Drawing Title: Figure 3 Minimally processed gradiometer survey results		
V1/51733/GEO/F3/01.05.17		
Drawn by: JL	Checked by: GC	Approved by: GC
01/05/2017	01/05/2017	01/05/2017

AOC Archaeology Group

Processed gradiometer survey results - greyscale plot

Figure 4

Scale
2nT
-1nT

Red Line Boundary

N
0 80m
1:2000 at A3

Project Title: Acklington Road, Amble Project No: 51733		
Drawing Title: Figure 4 Processed gradiometer survey results		
V1/51733/GEO/F4/01.05.17		
Drawn by: JL	Checked by: GC	Approved by: GC
01/05/2017	01/05/2017	01/05/2017

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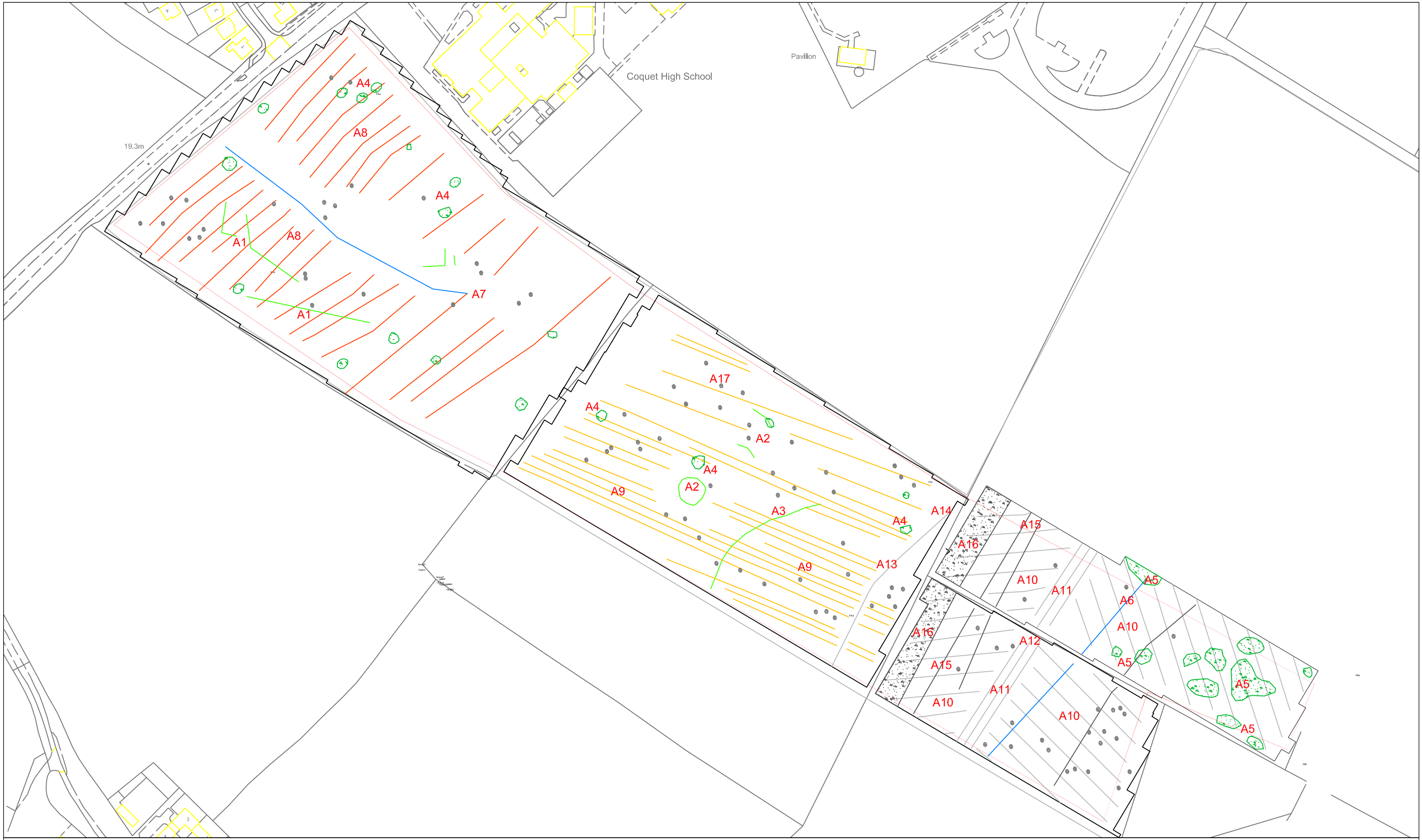

Interpretation of gradiometer survey results

Figure 5

- Discrete Trend (Archaeology?)
- Discrete Area of Disturbance (Archaeology?)
- Trend (Unclear Origin)
- Area of Disturbance (Unclear Origin)
- Old Field Boundary
- Linear Trend (Ridge and Furrow)
- Linear Trend (Ploughing)
- Linear Trend (Field Drains)
- Linear Trend (Modern Service)
- Area of Disturbance (Modern)
- Ferrous / Iron Spikes

N

0 80m

1:2000 at A3

Project Title: Acklington Road, Amble Project No: 51733		
Drawing Title: Figure 5 Interpretation of gradiometer survey results		
V1/51733/GEO/F5/01,05,17		
Drawn by: JL	Checked by: GC	Approved by: GC
01/05/2017	01/05/2017	01/05/2017

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Appendix 1: Characterisation of Identified Anomalies

Gradiometer survey

Site Specific Anomaly Code: **A**

Anomaly	Type of Archaeology
A1	Discrete curvilinear trends
A2	Discrete linear or rectilinear trends
A3	Discrete curvilinear trend
A4	Unclear responses
A5	Unclear responses
A6	Linear trend of a possible field boundary
A7	Linear trend of a possible field boundary?
A8	Linear Trend (Ridge and Furrow / Rig and Furrow)
A9	Linear Trend (Conventional ploughing)
A10	Linear Trend (field drainage)
A11	Linear Trend (possible modern service)
A12	Man hole cover? (possible modern service)
A13	Linear Trend (possible modern service)
A14	Man hole cover? (possible modern service)
A15	Linear Trend (possible modern service)
A16	Disturbed Area (modern disturbance?)
A17	Isolated Dipolar Anomalies / Ferrous (iron spikes)

Appendix 2: Survey Metadata

Field	Description
Surveying Company	AOC Archaeology
Data collection staff	James Lawton, Kimberley Teale, Alistair Galt
Client	Hindhaugh Homes
Site name	Amble
County	Northumberland
NGR	NU 2604 0334
Land use/ field condition	Pasture
Duration	5/4/17 - 7/4/17
Weather	Overcast/Sunny
Survey type	Gradiometer Survey
Instrumentation	Trimble GXOR system Bartington Grad 601-2
Area covered	Approx 9 ha (144 full and 15 partial)
Download software	Grad601 PC Software v313
Processing software	Geoplot v3.0 and v4.0
Visualisation software	AutoCAD LT 2009
Geology	The recorded bedrock geology within the survey area consists of two types the first Pennine Lower Coal Measures Formation consisting of sandstone and the second Pennine Lower Coal Measures Formation consisting of Mudstone, Siltstone and Sandstone (BGS 2017). The superficial geological deposits are made up of Devensian Till known as Diamicton. (BGS 2017)
Soils	These are overlain by slowly permeable seasonally wet acid loamy and clayey soils and restored soils mostly from quarry and opencast spoil (Soilscapes 2017)
Scheduled Ancient Monument	No
Known archaeology on site	None
Historical documentation/ mapping on site	None
Report title	Acklington Road, Amble, Northumberland
Project number	51733
Report Author	James Lawton
Report approved by	Graeme Cavers

Appendix 3: Archaeological Prospection Techniques, Instrumentation and Software Utilised

Gradiometer survey

Gradiometer surveys measure small changes in the earth's magnetic field. Archaeological materials and activity can be detected by identifying changes to the magnetic values caused by the presence of weakly magnetised iron oxides in the soil (Aspinall *et al.*, 2008, 23; Sharma, 1997, 105). Human inhabitation often causes alterations to the magnetic properties of the ground (Aspinall et al, 2008, 21). There are two physical transformations that produce a significant contrast between the magnetic properties of archaeological features and the surrounding soil: the enhancement of magnetic susceptibility and thermoremnant magnetization (Aspinall *et al.*, 2008, 21; Heron and Gaffney 1987, 72).

Ditches and pits can be easily detected through gradiometer survey as the top soil is generally suggested to have a greater magnetisation than the subsoil caused by human habitation. Also areas of burning or materials which have been subjected to heat commonly have high magnetic signatures, examples include: hearths, kilns, fired clay and mudbricks (Clark 1996, 65; Lowe and Fogel 2010, 24). It should be noted that negative anomalies can also be useful for characterising archaeological features. If the buried remains are composed of a material with a lower magnetisation compared with the surrounding soil, the surrounding soil will consequently have a greater magnetisation resulting in the feature displaying a negative signature. For example stone materials of a structural nature that are composed of sedimentary rocks are considered non-magnetic and so will appear a negative features within the data set.

Ferrous objects- i.e. iron and its alloys- are strongly magnetic and are typically detected as high-value peaks in gradiometer survey data, though it is not usually possible to determine whether these relate to archaeological or modern objects.

Although gradiometer surveys have been successfully carried out in all areas of the United Kingdom, the effectiveness of the technique is lessened in areas with complex geology, particularly where igneous and metamorphic bedrock is present. All magnetic geophysical surveys must therefore take the effects of background geological and geomorphological conditions into account.

Gradiometer survey instrumentation

AOC Archaeology's gradiometer surveys are carried out using Bartington Grad601-2 magnetic gradiometers. The Grad601-2 is a high-stability fluxgate magnetic gradient sensor, which uses a 1m sensor separation. The detection resolution is from 0.03 nT/m to 0.1nT/m, depending on the sensor parameters selected, making the Grad601-2 an ideal instrument for prospective survey of large areas as well as detailed surveys of known archaeology. The instrument stores the data collected on an on-board data-logger, which is then downloaded as a series of survey grids for processing.

Gradiometer survey software

Following the survey, gradiometer data is downloaded from the instrument using Grad601 PC Software v313. Survey grids are then assembled into composites and enhanced using a range of processing techniques using Geoscan Geoplot v3.0 / v4.0 (see Appendix 4 for a summary of the processes used in Geoplot and Appendix 5 for a list of processes used to create final data plots).

Appendix 4: Summary of Processes used in Geoplot

Process	Effect
Clip	Limits data values to within a specified range
De-spike	Removes exceptionally high readings in the data that can obscure the visibility of archaeological features. In resistivity survey, these can be caused by poor contact of the mobile probes with the ground. In gradiometer survey, these can be caused by highly magnetic items such as buried ferrous objects.
De-stagger	Corrects a misalignment of data when the survey is conducted in a zig-zag traverse pattern.
Edge Match	Counteracts edge effects in grid composites by subtracting the difference between mean values in the two lines either side of the grid edge.
High pass filter	Removes low-frequency, large scale detail in order to remove background trends in the data, such as variations in geology.
Interpolate	Increases the resolution of a survey by interpolating new values between surveyed data points, creating a smoother overall effect.
Low Pass filter	Uses a Gaussian filter to remove high-frequency, small scale detail, typically for smoothing the data.
Periodic Filter	Used to either remove or reduce the appearance of constant and reoccurring features that distort other anomalies, such as plough lines.
Wallis filter	Applies a locally adaptive contrast enhancement filter.
Zero Mean Grid	Resets the mean value of each grid to zero, in order to counteract grid edge discontinuities in composite assemblies.
Zero Mean Traverse	Resets the mean value of each traverse to zero, in order to address the effect of striping in the data and counteract edge effects.

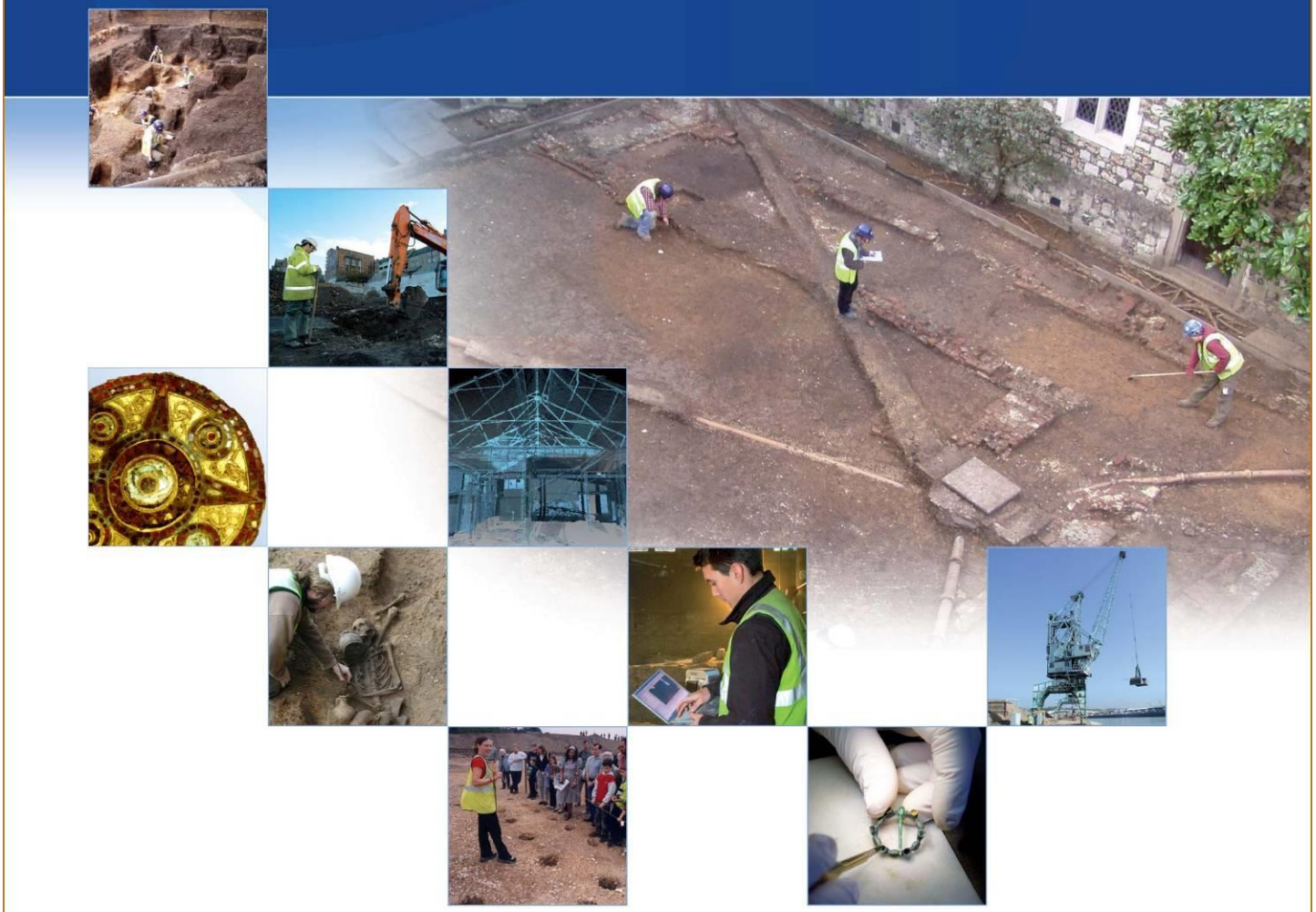
Appendix 5: Survey Processing Steps

Gradiometer survey	
Process	**Extent**
Zero Mean Traverse	All LMS =on, threshold -5 to 5
Despike	X=1 Y=1 Thr = 3 Repl = Mean
Clip	Min =-5 Max = 5
Destagger	All grids dir Shift = 2 Line Pattern 34-78 Dual-DS
Low Pass filter	X=1 Y=1 Wt=G
Interpolate	Y, Expand – Expand –SinX/X x2
Raw Palette Scale	Grey55 – Grey08 Min= -1nT Max= 2nT
Palette Scale	Grey55 – Grey08 Min= -1nT Max= 2nT

Appendix 6: Technical Terminology

Type of Anomaly	Description
Archaeology	
Archaeology - Trend	These are made up of linear / curvilinear / rectilinear anomalies and are either characterised by an increase or decrease in values compared to the magnetic background. This evidence is normally supported by the presence of archaeological remains and is confirmed by other forms of evidence such as HER records and aerial photography.
Archaeology - Area of Disturbance	This is characterised by a general increase and decrease of magnetic responses over a localised area and does not appear as having a linear form. These anomalies do not have the high dipolar response which are manifested in an 'iron spike' anomaly. This anomaly may be supported by the known location of a former building, or other forms of evidence such as HER records and aerial photography.
Archaeology - Pit	An anomaly composed of an increase in magnetic values with a patterning on the XY trace plot that is suggestive of buried remains, such as the infill of a pit. This evidence is normally supported by the presence of archaeological remains and is confirmed by other forms of evidence such as HER records and aerial photography.
Discrete Archaeology	
Archaeology? – Trend	Anomalies of a linear / curvilinear / rectilinear form either composed of an increased or decreased signal compared to magnetic background values. It is possible these anomalies belong to archaeological remains, but poor patterning or weaker response values makes interpretation difficult. Where historical records are present, the anomalies would appear to be weak or inconclusive.
Archaeology? - Area of Disturbance	Anomalies with an increase or decrease in magnetic values compared with the magnetic background over a localised area. Poor patterning or weak signal changes creates difficulty in defining the origin of the anomaly and so interpretation is only tentative. The anomaly lacks definitive records to confirm its origin as being archaeological. Disturbed areas could indicate the presence of buried rubble relating to fallen structures, or instead denote modern material from either quarrying or agricultural activity. On certain geologies these anomalies could be caused by in-filled natural features.
Archaeology? – Pit	An anomaly composed of an increase in magnetic values with a patterning on the XY trace plot that is suggestive of buried remains, such as the infill of a pit, but is isolated in its location and association with other features.
Unclear Origin	
Linear Trend	Anomalies of a linear / curvilinear form which are composed of a weak or different change in magnetic values. Coupled with poor patterning, the anomaly is difficult to interpret and it is unclear whether it has an archaeological origin.
Area of Disturbance	An area of magnetic disturbance which consists of a variety of increased and decreased magnetic values compared with background readings, but lacks sufficient patterning or context for a conclusive interpretation. It is likely that these readings are caused by modern disturbances, but interpretation is tentative.

Agricultural	
Linear Trend (Old Field Boundary)	These isolated long linear anomalies, most often represented as a negative magnetic trend, are likely to relate to former field boundaries. The magnetic signal may appear inconsistent but when the positioning is cross referenced with historic mapping, it is confirmed as a former field boundary.
Linear Trend (Old Field Boundary?)	These isolated long linear anomalies, most often represented as a negative magnetic trend, are likely to relate to former field boundaries. The positioning is not supported by historic mapping, but is often confirmed with adjacent ploughing patterns.
Linear Trend (Ridge and Furrow / Rig and Furrow)	A series of regular linear anomalies either composed of an increased or decreased magnetic response compared to background values. The width between the anomalies is consistent with that of a Ridge and Furrow ploughing regime, which is normally wider than conventional ploughing methods.
Linear Trend (Conventional ploughing)	A series of regular linear anomalies either composed of an increased or decreased magnetic response compared to background values. The regular patterning is likely to denote the presence of ploughing, however isolated trends can occasionally be observed that follow the orientation of ploughing trends seen elsewhere in the area. Anomalies seen adjacent to field edges are representative of headlands caused by ploughing.
Linear Trend (field drainage)	A series of linear anomalies of an indeterminate date, usually with a regular or herringbone patterning and regular spacing. These are likely to represent agricultural activity such as land drainage.
Non- Archaeology	
Geology / Natural	An area of disturbance that is composed of irregular significant increases or decreases in magnetic values compared with background readings and is likely to indicate natural variations in soil composition or geology.
Linear Trend (possible modern service)	Anomalies of a linear form often composed of contrasting high positive and negative values. Such anomalies usually signify a feature with a high level of magnetisation and are likely to belong to modern activity such as pipe lines or modern services.
Disturbed Area (modern disturbance?)	An area of disturbance that is likely to be caused by modern activity and is characterised by significant increases or decreases in magnetic values compared with background readings.
Isolated Dipolar Anomalies / Ferrous (iron spikes)	A response normally caused by ferrous materials on the ground surface or within the top soil, which causes a 'spike' representing a rapid variation in the magnetic response. These are generally not assessed to be archaeological when surveying on rural sites, and generally represent modern material often re-deposited during manuring.



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