

**Substrata**

Archaeological Geophysical Surveyors

An archaeological magnetometer survey

Land off Cossington Lane, Woolavington  
Sedgemoor, Somerset

Centred on NGR: 334912,140901

Report: 1806PWO-R-1

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7 September 2018

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## 1 Introduction

This report presents the results of an archaeological geophysical survey at the site listed in Section 4 and shown in Figure 1, hereafter referred to as the 'Survey Area'. The survey was commissioned by Pegasus Group (the Client) on behalf of Gladman Developments Limited. The commissioning of this report was in keeping with the National Planning Policy Framework, Chapter 16, Paragraph 189 (Ministry of Housing, Communities & Local Government, 2018). The survey and report were completed in compliance with a Written Scheme of Investigation (Substrata Ltd, 2018).

The survey follows on from the production of an Archaeology and Built Heritage Assessment of the site and its environment produced in May 2018 (Pegasus Group, 2018).

## 2 Client details

Pegasus Group, Sutton Coalfield, 5 The Priory, Old London Road, Canwell, Sutton Coalfield, West Midlands B75 5SH

## 3 Copyright

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## 4 Survey type and location

### 4.1 Survey

Method:	shallow depth magnetometer survey
Instrument:	twin-sensor fluxgate gradiometer
Date:	21 & 22 August 2018
Area:	6.35ha
Survey resolution:	1m by 0.25m

### 4.2 Location

Name:	Land off of Cossington Lane
Location:	Cossington Lane, Woolavington, Bridgwater
Civil Parish:	Woolavington
District:	Sedgemoor
County:	Somerset
Nearest Postcode:	TA7 8HJ
Survey centre NGR:	ST 34912 40901 (point)
Survey centre NGR (E/N):	334912,140901 (point)
Historic environment designation:	None
Approximate survey area:	6.45ha
OASIS ID:	substrat1-327772

## 5 Summary

A magnetometer survey was selected to provide a relatively fast and cost-effective evaluation of any buried archaeology across the Survey Area (see Section 14). The magnetic anomaly groups pertaining to potential buried archaeology were georeferenced to the Ordnance Survey National Grid, mapped, characterised and assigned with an appropriate degree of certainty in conformance with the survey aims and objectives set out in Section 7.

The differences in magnetic responses across the Survey Area were sufficient to be able to differentiate between anomalies representing possible buried archaeology and background magnetic responses.

Three magnetic anomaly groups were characterised as representing potential archaeological deposits. Of these, one anomaly group is likely to represent an area of wet deposits associated with a former pond mapped by the Ordnance Survey in 1886 but not recorded on earlier or later historic maps. One group may represent an archaeological pit and one group may represent a large archaeological pit or surface, possibly with a spread of heated deposits.

## 6 Standards

The standards that were used to complete this survey are defined by the Chartered Institute for Archaeologists (2014b) and the Europae Archaeologiae Consilium (undated). The codes of approved practice to be followed are those of the Chartered Institute for Archaeologists (2014) and Archaeology Data Service (undated).

## 7 Survey aims and objectives

### 7.1 Aims

1. Within the framework set out in Chartered Institute for Archaeologists (2014b) and Europae Archaeologiae Consilium (undated), complete an archaeological geophysical survey and report which will, as far as possible, establish the presence or absence, extent and character of any buried archaeology within the survey area.
2. Provide sufficient information on the nature of any archaeological remains to facilitate the assessment of their interest prior to the determination of the planning application.

### 7.2 Objectives

1. Complete a magnetometer survey across the Survey Area.
2. Identify any magnetic anomalies that may be related to buried archaeology.
3. Within the limits of the technique and dataset, archaeologically characterise any such anomalies or patterns of anomalies.
4. Accurately record the location of the identified anomalies.
5. Produce a report based on the survey that is sufficiently detailed to inform any subsequent development on the survey area about the location and possible archaeological character of the recorded anomalies.

## 8 Methodology

The magnetometer survey was undertaken in accordance a Written Scheme of Investigation (Substrata Ltd, 2018) using the standards specified in Section 6 to achieve the aims and objectives set out in Section 7. The survey method was selected to provide a relatively fast and cost-effective evaluation of any buried archaeology across the Survey Area (see Section 14).

Data processing was undertaken using appropriate software (Table 2), with all anomalies being digitised and geo-referenced. The final report (this document) includes a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology. The survey and report conform to the Chartered Institute for Archaeologists standard for geophysical survey (Chartered Institute for Archaeologists, 2014b).

## 9 Survey Area

### 9.1 Location and description

The Survey Area comprises two arable fields situated at the south-eastern outskirts of Woolavington Village (Figure 1). The Survey Area is bound to the north and east by hedgerows with agricultural fields beyond, to the south by Cossington Lane with agricultural fields beyond and to the west by fences and brick walls of rear gardens of residential properties with Woolavington village beyond. The internal boundary is a hedgerow (Pegasus, 2018, p.19-20 and RSK, 2018, p.5).

The Survey Area lies on a west-east ridge and slopes moderately from a high point of approximately 52.1m aOD near the centre of the Survey Area down to approximately 44.7m aOD at the northern boundary. The Survey Area slopes gradually southwards from the centre to a height of approximately 50.2m aOD. A noticeable drop in elevation occurs beyond the northern boundary of the Survey Area. As this represents a historic field boundary, it is probable that this change in elevation is the result of cultivation and different land use between the two fields (Pegasus, 2018, p.20).

## 9.2 Geology and sub-surface deposits

The solid geology across the Survey Area comprises interbedded mudstone and limestone of the Langport Member of the undifferentiated Blue Lias and Charmouth Mudstone Formations (British Geological Survey, undated). The superficial geology is not recorded in the source used (ibid) but there is potential for Head deposits (RSK, 2018, p.7).

No relevant geotechnical reports or borehole logs of near-surface deposits within 500m of the Survey Area were available at the time of writing.

## 9.3 Soils

The topsoil is 'slightly acid loamy and clayey soils with impeded drainage' (LandIS, undated).

# 10 Archaeological background

## 10.1 Historic landscape characterisation

### Anciently Enclosed Land

This type of landscape character comprises fields which are generally 6-12ha in size with less than 25% boundary loss since 1905 (Archaeology Data Service, undated b).

## 10.2 Summary of archaeological background

An Archaeology and Built Heritage Assessment of the Survey Area and its environment was produced in May 2018 (Pegasus Group, 2018). The Assessment includes a review of the recorded heritage resource within the Survey Area and its vicinity in order to identify any extant heritage assets within the Survey Area and to assess the potential for below-ground archaeological remains.

The Assessment states that no prehistoric or Roman archaeology is recorded within the Survey Area. A possible prehistoric or Roman enclosure has been identified in cropmarks approximately 10m east of the site and a possible prehistoric or Roman round barrow site was recorded as a cropmark approximately 360m east of the Survey Area centre (ibid, Appendix 1 and Figure 4). Two additional undated enclosures in relatively close proximity may indicate further activity from this period. The only other recorded prehistoric archaeology in the vicinity is a bowl barrow which is recorded approximately 960m west-south-west of the site. Known Roman activity in the vicinity is sparse, with the nearest recorded activity consisting of the former line of a Roman road recorded approximately 415m south-west of the site.

The site most likely formed part of the agricultural hinterland to Woolavington from at least the medieval period. Medieval and post-medieval activity appears to have largely focused within the historic cores of Woolavington to the north and Cossington to the south-east. Historic maps and aerial photographs of the site indicate no significant changes within the site from at least the late 18th century (ibid, Summary).

# 11 Results

## 11.1 Scope and definitions

This survey was designed to record magnetic anomalies. A magnetic anomaly is a local variation in the Earth's magnetic field. Such variations can result from differences in the magnetic properties of the underlying solid geology, superficial geology and other near-surface deposits including those altered and created by past human activities. Near-surface artefacts can also create magnetic anomalies.

The dimensions of magnetic anomalies mapped as representing potential buried archaeology

do not represent the dimensions of any associated archaeology.

The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to buried archaeology.

## 11.2 Analysis

Figure 2 shows the interpretation of the survey data and includes the anomaly groups identified as possibly relating to archaeological deposits along with their identifying numbers. Table 1 is an extract of the detailed analysis of the survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figure 2 and Table 1 comprise the analysis of the survey data.

Figures 3 and 4 are plots of the processed data as specified in Table 3. Figure 5 is a plot of minimally processed data as specified in Table 4. Figure 6 shows the location of the survey grid and grid data files.

## 12 Discussion

### 12.1 General points

#### Scope

Not all anomalies or anomaly groups identified in Table 1 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project held in the survey archive.

#### Data collection

Data collection along the survey area edges was restricted as shown in the figures due to the presence of dense, rough vegetation and magnetic materials within and adjacent to the plot boundaries. Strong magnetic responses mapped close to the boundaries are likely to relate to the magnetic materials except where otherwise indicated in Figure 2 and Table 1.

#### Anomaly characterisation

There are a number of anomaly groups that could be interpreted as relating to large postholes or pits although most will have natural origins. Anomalies of this sort are mapped as potential archaeology when they are well defined in the data, associated with other significant anomaly groups or otherwise formed recognisable patterns as listed in Table 1.

Anomalies thought to relate to natural features and recent man-made objects such as manholes, water management equipment, drains, cables and other services are only mapped where they comprise significant magnetic responses across the dataset that need clarification.

Numerous dipole magnetic anomalies are present within the dataset. These are likely to represent recent ferrous objects. They are only mapped if they could influence the analysis of anomaly groups thought to have an archaeological origin.

#### Data trends

There is a set of indistinct curvilinear, parallel trends in the north-western area of the survey data (Figure 3). This trend probably reflects natural deposits or, less likely, historic ploughing.

A set of parallel, linear, west-south-west to east-north-east trends are visible in the southern part of the northern field (Figures 3 and 4). These are likely to reflect natural, geological features.

### 12.2 Data relating to historic maps and other records

Magnetic anomaly group 1 represents wet ground and coincides with the site of a pond recorded on historic maps published in 1886 but not on earlier or later maps, implying that it was a feature of relatively short-duration and that it was removed before 1904.

### 12.3 Data with no previous archaeological provenance

Anomaly group **2** is distinct in the dataset and may represent an archaeological pit.

Magnetic anomaly group **3** may represent an archaeological deposit such as a large pit or surface with a spread of heated deposits present.

## 13 Conclusions

The differences in magnetic responses across the Survey Area were sufficient to be able to differentiate between anomalies representing possible buried archaeology and background magnetic responses.

Three magnetic anomaly groups were characterised as representing potential archaeological deposits. Of these, one anomaly group (1) is likely to represent an area of wet deposits associated with a former pond mapped by the Ordnance Survey in 1886 but not recorded on earlier or later historic maps. One group (2) may represent an archaeological pit and one group (3) may represent a large archaeological pit or surface, possibly with a spread of heated deposits.

## 14 Disclaimer

The description and discussion of the results presented in this report are the authors', based on their interpretation of the survey data. Every effort has been made to provide accurate descriptions and interpretations of the geophysical data set. The nature of archaeological geophysical surveying is such that interpretations based on geophysical data, while informative, can only be provisional. Geophysical surveys are a cost-effective early step in the multi-phase process that is archaeology.

## 15 Archive

### 15.1 Online Access to the Index of archaeological investigations (OASIS)

OASIS ID: substrat1-327772

The OASIS entry has been completed and the boundary file and report uploaded with six months delay in publication.

### 15.2 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as specified in Appendix 3.

### 15.3 Archaeological Data Service (ADS)

Depending on local authority policy, an archive may be deposited with the ADS as specified in Appendix 3.

### 15.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF or printed copy of the report will be submitted to the appropriate HER within six months of completion.

## 16 Acknowledgements

Substrata would like to thank Donald Sutherland of Pegasus Group for commissioning us to complete this survey on behalf of Gladman Developments Limited.

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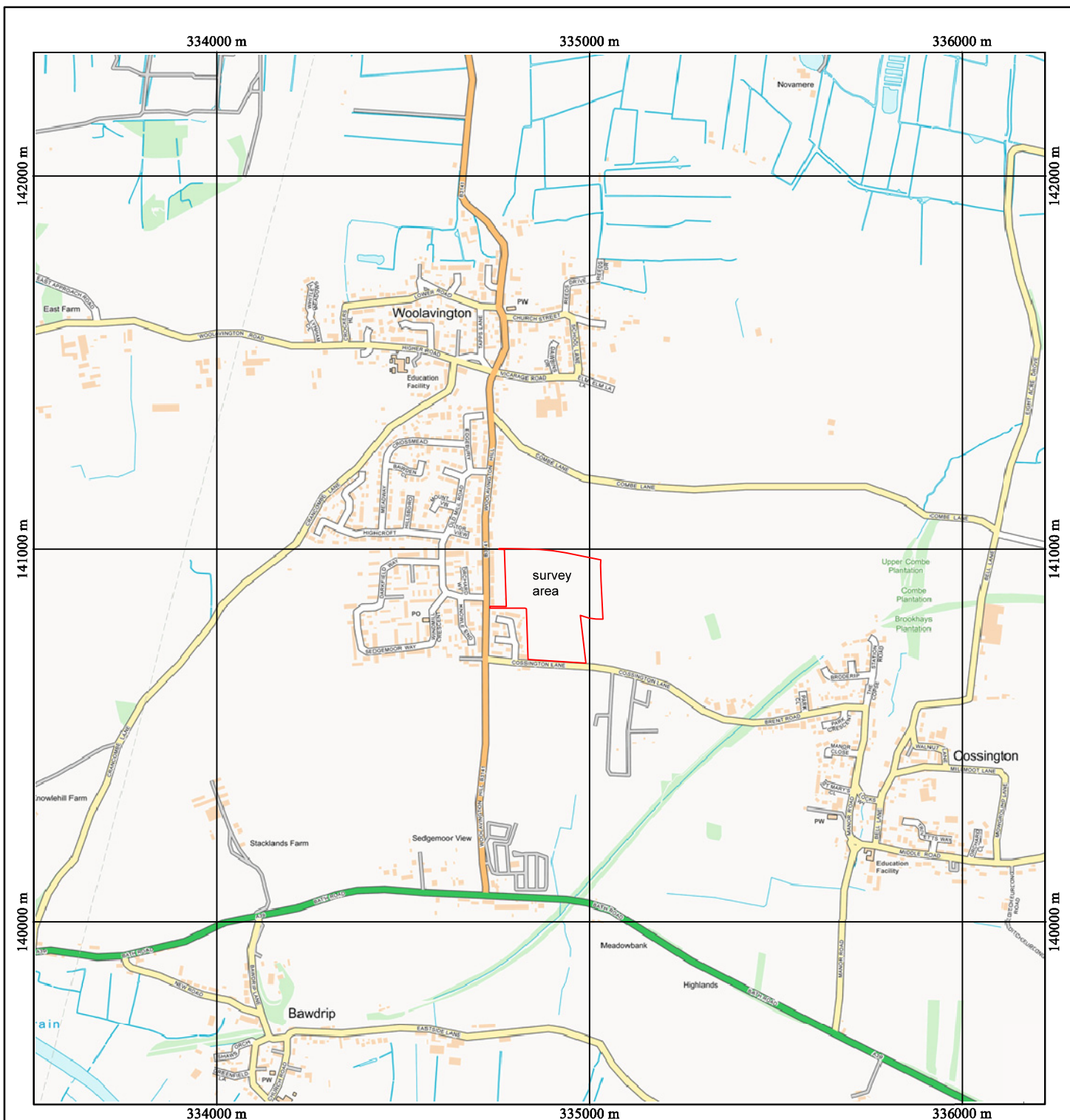


## Appendix 1     Figures

### General Guidance

The anomalies represented in the survey plots provided in this appendix are magnetic anomalies. The apparent size of such anomalies and anomaly patterns are unlikely to correspond exactly with the dimensions of any associated archaeological features .

A rough rule for interpreting magnetic anomalies is that the width of an anomaly at half its maximum reading is equal to the width of the buried feature, or its depth if this is greater (Clark, 2000: 83). Caution must be applied when using this rule as it depends on the anomalies being clearly identifiable and distinct from adjacent anomalies. In northern latitudes the position of the maximum of a magnetic anomaly will be displaced slightly to the south of any associated physical feature.



British Grid  
 centre X: 334865.52 m, centre Y: 140921.13 m

Geophysical survey: Copyright Substrata Limited.  
 Base map: Ordnance Survey (c) Crown Copyright 2018.  
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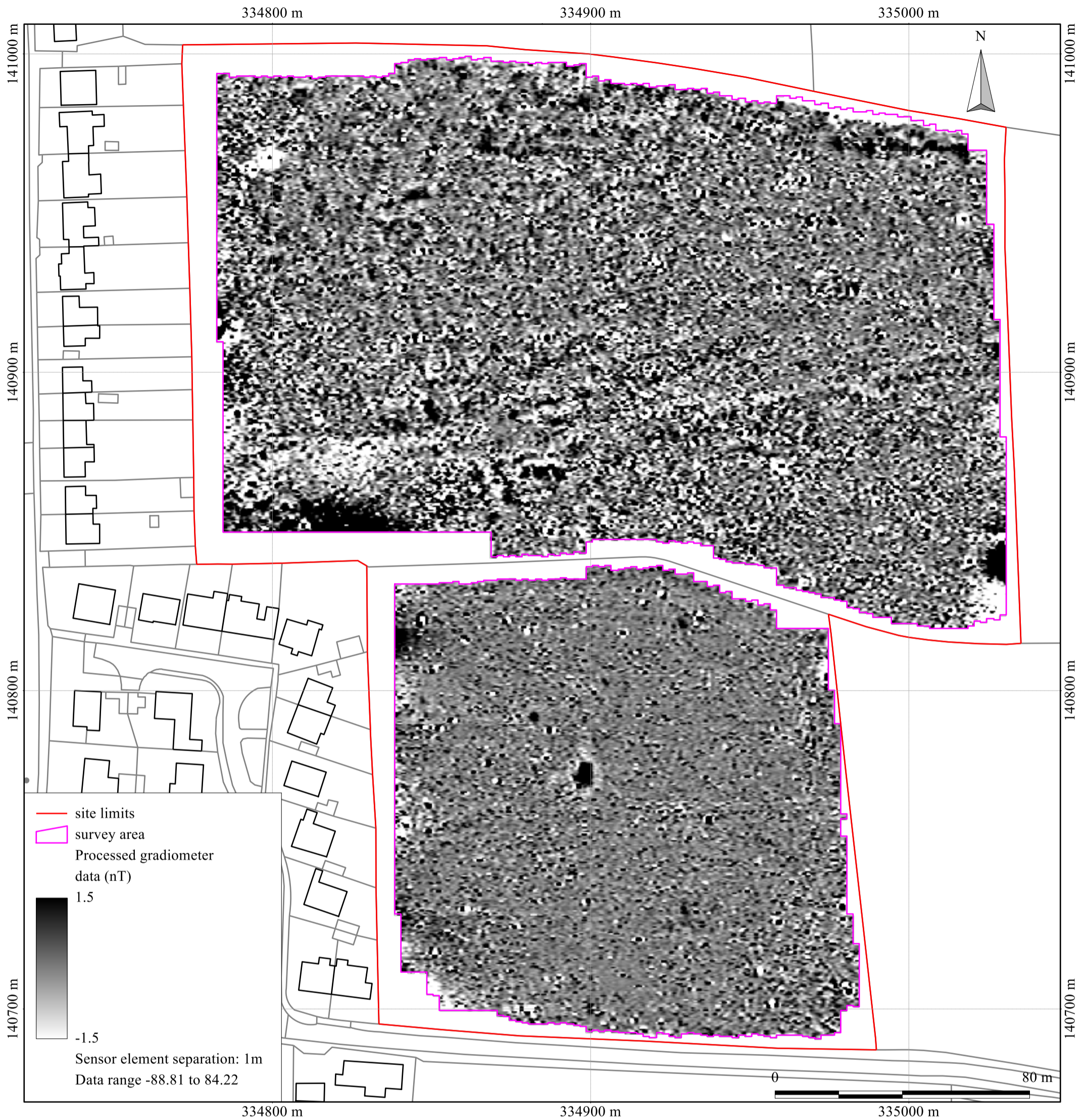
<p>Written Scheme of Investigation          An archaeological magnetometer survey          Land off Cossington Lane, Woolavington          Sedgemoor, Somerset          Centred on NGR: 334912,140901          Document 1806PWO-W-1</p>	<p>Figure 1: location map</p>	<p>Substrata Limited          Langstrath, Goodleigh          Barnstaple, Devon EX32 7LZ          Tel: 01271 342721          Email: <a href="mailto:enquiries@substrata.co.uk">enquiries@substrata.co.uk</a>          Web: <a href="http://substrata.co.uk">substrata.co.uk</a></p>
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Figure 2: survey interpretation



British Grid  
 centre X: 334884.79 m, centre Y: 140840.08 m

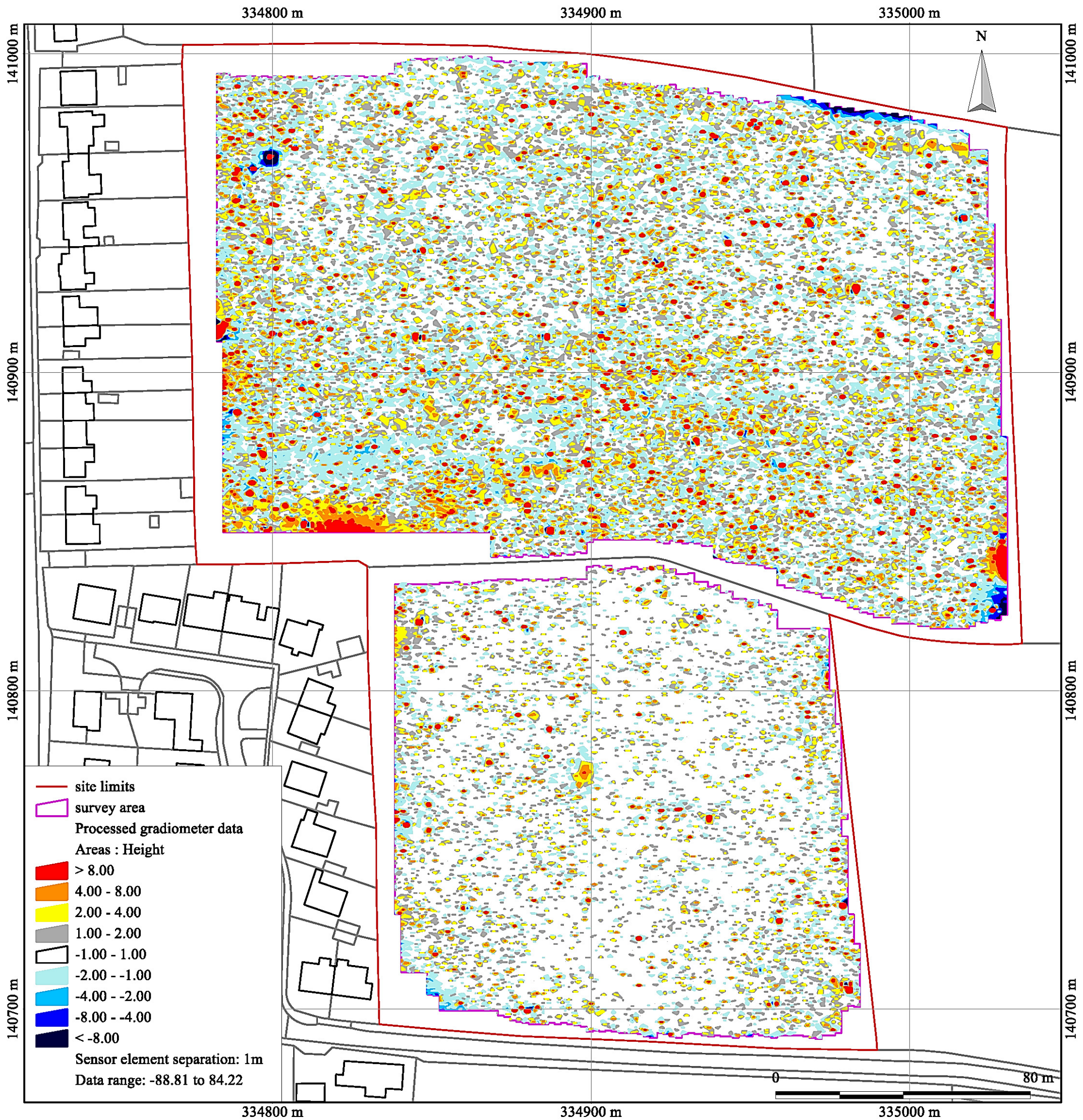
Geophysical survey: Copyright Substrata Limited.  
 Base map: Ordnance Survey (c) Crown Copyright 2018.  
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Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 3: shade plot of processed data



British Grid  
 centre X: 334884.79 m, centre Y: 140840.08 m

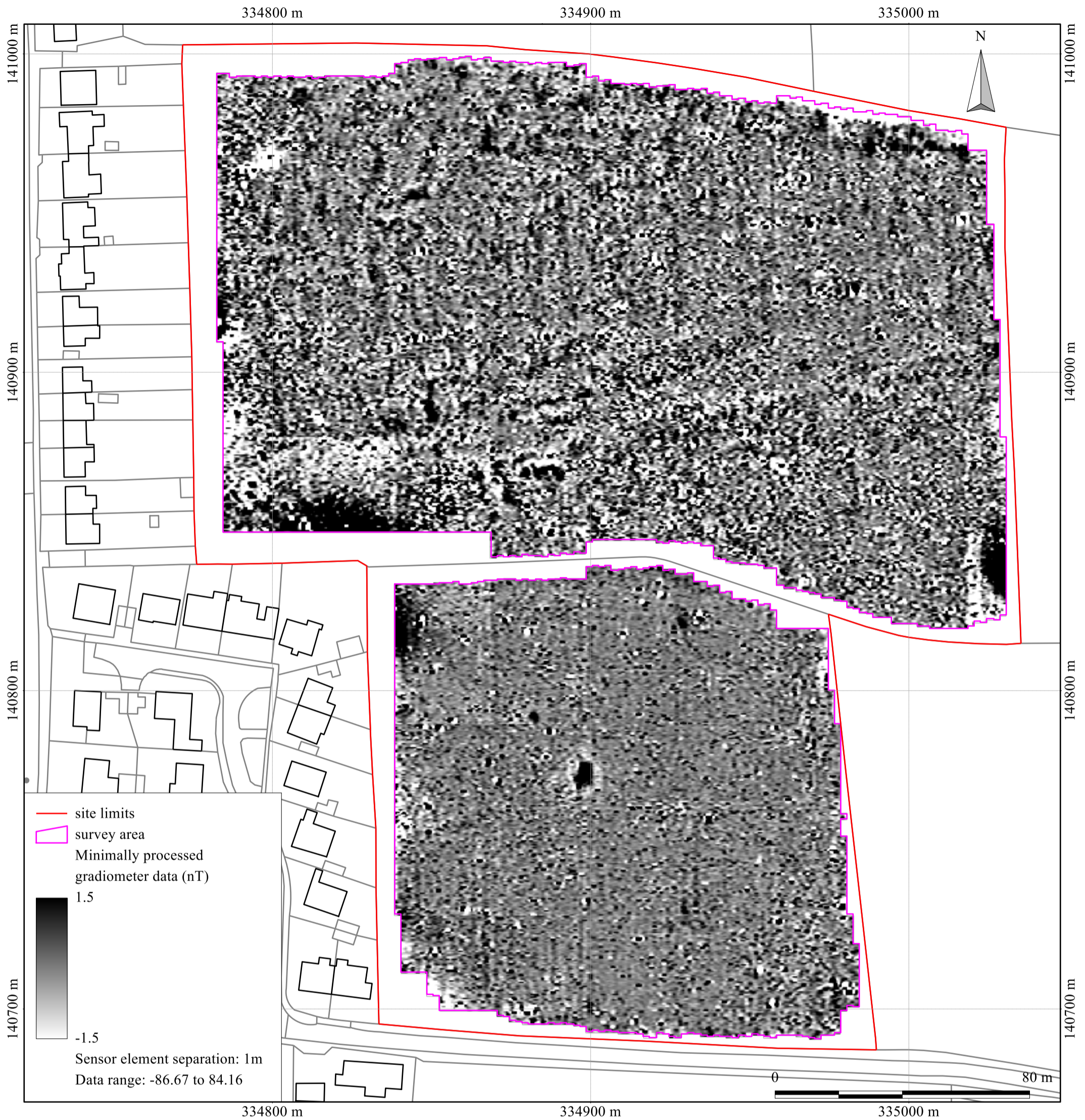
Geophysical survey: Copyright Substrata Limited.  
 Base map: Ordnance Survey (c) Crown Copyright 2018.  
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Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 4: contour plot of processed data



British Grid  
 centre X: 334884.79 m, centre Y: 140840.08 m

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Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 5: shade plot of minimally processed data



British Grid  
 centre X: 334884.79 m, centre Y: 140840.08 m

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Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 6: survey grid plan and location

## Appendix 2 Tables



Site: Land off Cossington Lane, Woolavington, Sedgemoor, Somerset  
 Centred on NGR 334912,140901

anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1		likely, weak broad response	irregular	wet area coinciding with a former pond	anomaly group is indicative of a wet area and approximately coincides with the location of a pond recorded on historic maps in 1886 and removed by 1904	Ordnance Survey maps 1886 1:2500 and 1888-90 1:10560, 1904 1:2500 and 1:10560
2		possible, positive	sub-circular	pit	anomaly group is clear in the data and may represent an archaeological deposit such as a pit	
3		possible, positive	sub-circular	large pit or surface, possibly with heated material present	anomaly group is clear in the data and may represent an archaeological deposit such as a large pit or surface, possibly with a spread of with heated material	

Table 1: data analysis

<p><b>Grid</b>  <i>Method of Fixing:</i> DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.  <i>Composition:</i> 30m by 30m grids  <i>Recording:</i> Geo-referenced and recorded using digital map tiles.  <i>DGPS used:</i> Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program.</p>	
<p><b>Equipment</b>  <i>Instrument:</i> Bartington Instruments grad601-2  <i>Firmware:</i> version 6.1</p>	<p><b>Data Capture</b>  <i>Sample Interval:</i> 0.25m  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zigzag  <i>Traverse Orientation:</i> GN</p>
<p><b>Data Processing, Analysis and Presentation Software</b>                  IntelliCAD 8.4                  DW Consulting TerraSurveyor3                  Manifold System 8 GIS                  Microsoft Corp. Office 365: Excel, Publisher, Word                  Adobe Systems Inc Adobe Acrobat 9 Pro Extended</p>	

Table 2: methodology information

<b>Instrument</b>	
Type:	Bartington Grad-601 gradiometer
Units:	nT
Direction of 1st Traverse:	see below
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing, each with 1m separation
Dummy Value:	32702
<b>Program</b>	
Name:	TerraSurveyor
Version:	3.0.33.6
<u>Statistics</u>	<u>Processing</u>
Max:	84.22
Min:	-88.81
Std Dev:	3.55
Mean:	0.12
Median:	0.00
	1 Base Layer
	2 Clip at 4.00 SD
	3 DeStripe Median Traverse: Grids: All
	4 Edge Match (Area: Top 240, Left 600, Bottom 269, Right 719) to Top edge
	5 De Stagger: Grids: All By: 0 intervals, 25.00cm
	Interpolate match x & y double is imposed on export to the GIS

Table 3: processed data metadata

<b>Instrument</b>	
Type:	Bartington Grad-601 gradiometer
Units:	nT
Direction of 1st Traverse:	see below
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing, each with 1m separation
Dummy Value:	32702
<b>Program</b>	
Name:	TerraSurveyor
Version:	3.0.33.6
<u>Statistics</u>	<u>Processing</u>
Max:	84.16
Min:	-86.67
Std Dev:	3.61
Mean:	0.14
Median:	0.00
	1 Base Layer
	2 Clip at 4.00 SD
	3 DeStripe Median Sensors: Grids: All
	Interpolate match x & y double is imposed on export to the GIS

Table 4: minimally processed data metadata

## Appendix 3 Project archive contents

### A3.1 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as follows:

Report:	Adobe PDF (.pdf), Microsoft Publisher (.pub)
Raw grid data files:	DW Consulting TerraSurveyor 3 (.xgd) and XYZ (.dat)
Minimally processed data composite files:	DW Consulting TerraSurveyor 3 (.xgd) and ESRI ASCII (.asc)
Final data processing composite files:	DW Consulting TerraSurveyor 3 (.xgd) and ESRI ASCII (.asc)
GIS project:	GIS project Manifold 8 (.map)
Survey interpretation:	ESRI shape files
AutoCAD version of the survey interpretation: (if generated)	AutoCAD (.dwg)
All project working files:	IntelliCAD 8.4 Microsoft Corp. Office 365: Excel, Publisher, Word Adobe Systems Inc Adobe Acrobat 9 Pro Extended

### A3.2 Online Access to the Index of archaeological investigationS (OASIS)

Metadata:	online form
Georeferenced survey boundary file:	ESRI shape file
Report:	Adobe PDF (.pdf)

### A3.3 Archaeological Data Service

Depending on local authority policy, an archive may be deposited with the ADS as follows:

Raw data composite file:	XYZ file
Processed data plot:	ESRI shape files
Survey grid plot:	ESRI shape files
Details of data processing:	image in TIFF format
Interpretation plot:	ESRI shape files
Metadata:	Microsoft Excel format

### A3.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF copy of the report will be submitted to the appropriate HER within 6 months of the completion of this report via the OASIS process or by other means, depending on the relevant HER process.