

Substrata

Archaeological Geophysical Surveyors

An archaeological gradiometer survey

**Land at East Codford Down
Codford, Wiltshire**

Centred on NGR: 399150,141670

Report: 150724

Ross Dean BSc MSc MA MCifA

27 July 2015

Substrata
Archaeological Geophysical Surveyors
Orchard Lodge, Cornborough Road
Westward Ho! Bideford
Devon EX39 1GX
Tel: 07788627822
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

Client:
AC Archaeology Ltd
Manor Farm Stables
Chicklade
Hindon
Nr. Salisbury
Wiltshire SP3 5SU
Web: acarchaeology.co.uk

Contents

1. Survey description and summary.....	1
2. Survey aims and objectives.....	1
3. Standards.....	2
4. Site description	2
5. Archaeological background	2
6. Results, discussion and conclusions.....	3
7. Disclaimer and copyright	5
8. Acknowledgements.....	5
9. Bibliography	5
Appendix 1 Analysis table and supporting plots	6
Appendix 2 Methodology	12
Appendix 3 Data processing	13

Figures

Figure 1: location map	8
Figure 2: survey interpretation.....	9
Figure 3: shade plot of processed data.....	10
Figure 4: contour plot of processed data.....	11

Tables

Table 1: data analysis	7
Table 2: methodology summary	12
Table 2: data processing	13

Accompanying CD-ROM

Report.....	Adobe PDF format
Copies of report figures.....	Adobe PDF format
Raw and processed grid & composite files	DW Consulting TerraSurveyor 3 formats
Minimal processing data plots and metadata	DW Consulting TerraSurveyor 3 formats
Final data processing data plots and metadata	DW Consulting TerraSurveyor 3 formats
GIS project, shape files and classification schema	
GIS project	Manifold 8 ‘.map’ file
GIS shape files	ESRI standard
GIS classification schema	Adobe PDF format
AutoCAD version of the survey interpretation	AutoCAD DXF

Website: substrata.co.uk

For an overview of Substrata, our archaeological geophysical surveying techniques and the results we obtain.

1 Survey description and summary

1.1 Survey

Type: twin-sensor fluxgate gradiometer
Date: 8 July 2015
Area: 3 ha
Lead surveyor: Ross Dean BSc MSc MA MifA

1.2 Client

AC Archaeology Ltd, Manor Farm Stables, Chicklade, Hindon, Nr. Salisbury,
Wiltshire SP3 5SU

1.3 Location

Site: Land at East Codford Down
Town & Civil Parish: Codford
District: West Wiltshire
County: Wiltshire
Nearest Postcode: BA12 0LZ
NGR: ST 991 416
Ordnance Survey NGR (E/N): 399150,141670 (point)

1.4 Archive

OASIS number: substrat1-218811
Archive: At the time of writing, the archive of this survey will be held by
Substrata and will be deposited with the ADS in due course.

1.5 Introduction

This report was commissioned by AC Archaeology Ltd on behalf of clients and was undertaken in advance of a proposed development at the above site.

1.6 Summary

The magnetic contrast across the area was sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses. Three magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Two are isolated linear groups of unknown archaeological provenance. The other group may indicate the presence of archaeological deposits such as pits or large post holes but could equally represent natural deposits.

2 Survey aims and objectives

2.1 Aims

The main aim of the geophysical survey was to establish the presence or absence, extent and character of any archaeological features and deposits within the site. The results of the survey and any subsequent trial trenching will be reviewed and used to inform any subsequent mitigation.

2.2 Survey objectives

1. Complete a gradiometer survey across agreed parts of the application area.
2. Identify any magnetic anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the techniques 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 site about the location and possible archaeological character of the recorded anomalies.

3 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and English Heritage (2010). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service/Digital Antiquity Guides (undated). The document text was written using the house style of the Chartered Institute for Archaeologists (Chartered Institute for Archaeologists, undated).

4 Site description

4.1 Landscape and land use

The proposed development site occupies an area of approximately 3 hectares and is situated to the north of a power station and west a solar array to the north-east of Codford St Mary and south of Chitterne. The site consisted of agricultural land at the time of the survey and lies at approximately 160m above the Ordnance Datum. A location map is provided in Figure 1.

4.2 Geology and Pedology

The proposed development site is located close to a solid geology of chalk of the Cretaceous Seaford Chalk Formation. These rocks comprise firm white chalk with conspicuous semi-continuous nodular and tabular flint seams. Hardgrounds and thin marls are known from the lowest beds. Some flint nodules are large to very large (British Geological Survey, undated).

The superficial geology is not recorded in the source used (ibid).

The soils are free-draining, loamy, shallow and lime-rich (Cranfield University, undated)

5 Archaeological background

There are no historical assets within the proposed development area.

An assessment of the archaeological background of land adjacent to the proposed development area is reported in Brown (2012), a Heritage Statement which was completed as part of a programme of archaeological work in support of a planning application for a solar array to the east of the proposed development area and which is now constructed (Figure 1). The following is summarised from the Statement and uses site identifiers used by English Heritage (prefix SM) and the Wiltshire Historic Environment Record (prefix WHER).

The area lies within an Area of Archaeological Interest as defined on the Local Plan proposals map. This area encompasses an area across Codford and Deptford Downs which contain a concentration of Prehistoric (up to 43AD) monumental and funerary heritage assets. None of these sites fall within the currently proposed development area. The nearest securely identified monuments of this type are part of the barrow cemetery south of Codford Down (SM31665), but a probable barrow was identified to the east of the solar array (WHER MWI7247). The remains of Prehistoric and Romano-British (43AD up to 450 AD) field systems are recorded immediately adjacent to the site (WHER MWI7236). A Romano-British settlement in a D-shaped enclosure some 500m north of the solar array was excavated in 1812 by Colt Hoare (WHER MWI3720).

A detailed gradiometry survey was conducted in 2013 over approximately 14ha of agricultural land immediately east of the current proposed development as part of the afore mentioned solar array development (Marsh, 2013). Several linear responses indicative of former cut and banked features of probable archaeological origin were recorded. While these appeared to follow the general trend of the recorded former field system, they did not correlate precisely. Further magnetic anomalies were recorded which may also be of archaeological interest. Modern activity on the site was evident through multiple phases of agricultural activity, a modern pipe or service and magnetic spikes indicative of ferrous material.

6 Results, discussion and conclusions

This survey was designed to record magnetic anomalies. The anomalies themselves cannot be regarded as actual archaeological features and the dimensions of the anomalies shown do not represent the dimensions of any associated archaeological features. The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to archaeological deposits and structures.

The terms ‘archaeological features’ and ‘archaeological deposits’ refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity and not undertaken as recent land maintenance or farming.

The reader is referred to section 7.

6.1 Results

Figure 2 shows the interpretation of the survey data. It includes the anomaly groups identified as relating to archaeological deposits along with their numbers. Table 1 is an extract of the detailed analysis of the survey data which is provided in the attribute tables of the GIS project on the accompanying CD-ROM and in the project archive.

Figure 2 and Table 1 comprise the analysis of the survey data. Plots of the processed data are provided in Figures 3 and 4.

6.2 Discussion

6.2.1 General points

Not all anomalies or anomaly groups identified in Table 1 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project on the accompanying CD-ROM.

Anomalies thought to relate to natural features were not mapped.

Recent man-made objects such as manholes, water management equipment, drains, cables and other services were only mapped where they comprised significant magnetic responses across the dataset that needed clarification. If mapped, they are listed in Table 1 but are not discussed below.

There are numerous anomaly groups that could be interpreted as relating to large postholes or pits although most will have natural origins. Anomalies of this sort are only mapped as potential archaeology if they are clustered in groups or otherwise form recognisable patterns.

Data collection along the survey area edges was restricted as shown in Figures 3 and 4 due to the presence of magnetic materials in and adjacent to field and roadside boundaries. Strong magnetic responses mapped close to the field and roadside boundaries are likely to relate to these materials except where otherwise indicated in Figure 2.

The parallel, linear anomaly patterns orientated with the long axes of the survey area are likely to reflect soils disturbance due to relatively recent ploughing.

6.2.2 Data relating to historical maps and other records

None of the data could be demonstrated as relating to features recorded on maps and other records.

6.2.3 Data with no previous archaeological provenance

Magnetic anomaly groups **1** and **3** cannot be characterised with any degree certainty. They are most likely to represent linear features such as former ditches and drains. These anomalies could reflect remnants of the of the Prehistoric and Romano-British field systems found on adjacent land (Section 5) but, given their isolation in the dataset, this can only be speculation.

Anomaly group **2** comprises a dispersed group of anomalies that have characteristics frequently associated with archaeological features such as large post holes or pits. They have no clear pattern, however, and so some or all could equally represent natural deposits.

6.3 Conclusions

The magnetic contrast across the area was sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses. Three magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Two are isolated linear groups of unknown archaeological provenance. The other group may indicate the presence of archaeological deposits such as pits or large post holes but could equally represent natural deposits.

7 Disclaimer and copyright

The description and discussion of the results presented in this report are the authors, based on his 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. The evaluation programme of which this survey is part may also be informed by other archaeological assessment work and analysis. It must be presumed that more archaeological features will be evaluated than those specified in this report.

Ross Dean, trading as Substrata, will assign copyright to the client upon written request but retains the right to be identified as the author of all project documentation and reports as defined in the Copyright, Designs and Patents Act 1988 (Chapter IV, s.79).

8 Acknowledgements

Substrata would like to thank Peter Cox of AC Archaeology Ltd for commissioning us to complete this survey.

9 Bibliography

Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology [Online], Available: http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc [May 2015]

British Geological Survey (undated) *Geology of Britain viewer*, [Online], Available: <http://www.bgs.ac.uk/discovering-Geology/geologyOfBritain/viewer.html> [July 2015]

Brown, M. (2012) *Solar Power South, Proposed Solar Farm - Land at East Farm, Codford St Mary, near Warminster, Heritage Statement, December 2012*, WYG Planning & Environment unpublished report, job number A079461

Chartered Institute for Archaeologists (undated) *IfA house style*, [Online], Available: http://www.archaeologists.net/sites/default/files/node-files/ifa_house_style.pdf [May 2015]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey*. Reading: Author [Online], Available: http://www.archaeologists.net/sites/default/files/node-files/CIfAS&GGeophysics_1.pdf [May 2015]

Chartered Institute for Archaeologists (2014b) *Code of conduct*. Reading: Author [Online], <http://www.archaeologists.net/sites/default/files/node-files/CodesofConduct.pdf> [May 2015]

Clark, A. (2000) *Seeing Beneath the Soil, Prospecting methods in archaeology*, London: Routledge

Cranfield University (undated) *Soilscapes*, [Online], Available: <http://www.landis.org.uk/soilscapes/> [June 2015]

Dean, R. (2015) *A gradiometer survey method statement, Land at East Codford Down, Codford, Wiltshire*, Substrata unpublished document

English Heritage (2010) *Geophysical Survey in Archaeological Field Evaluation*, [Online], Available: <https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/> [May 2015]

Marsh, B.P. (2013) *Geophysical Survey Report, Codford St Mary, Wiltshire*. Stratascan, Sumo Group unpublished report, job reference J3280

Appendix 1 Analysis table and supporting plots

General Guidance

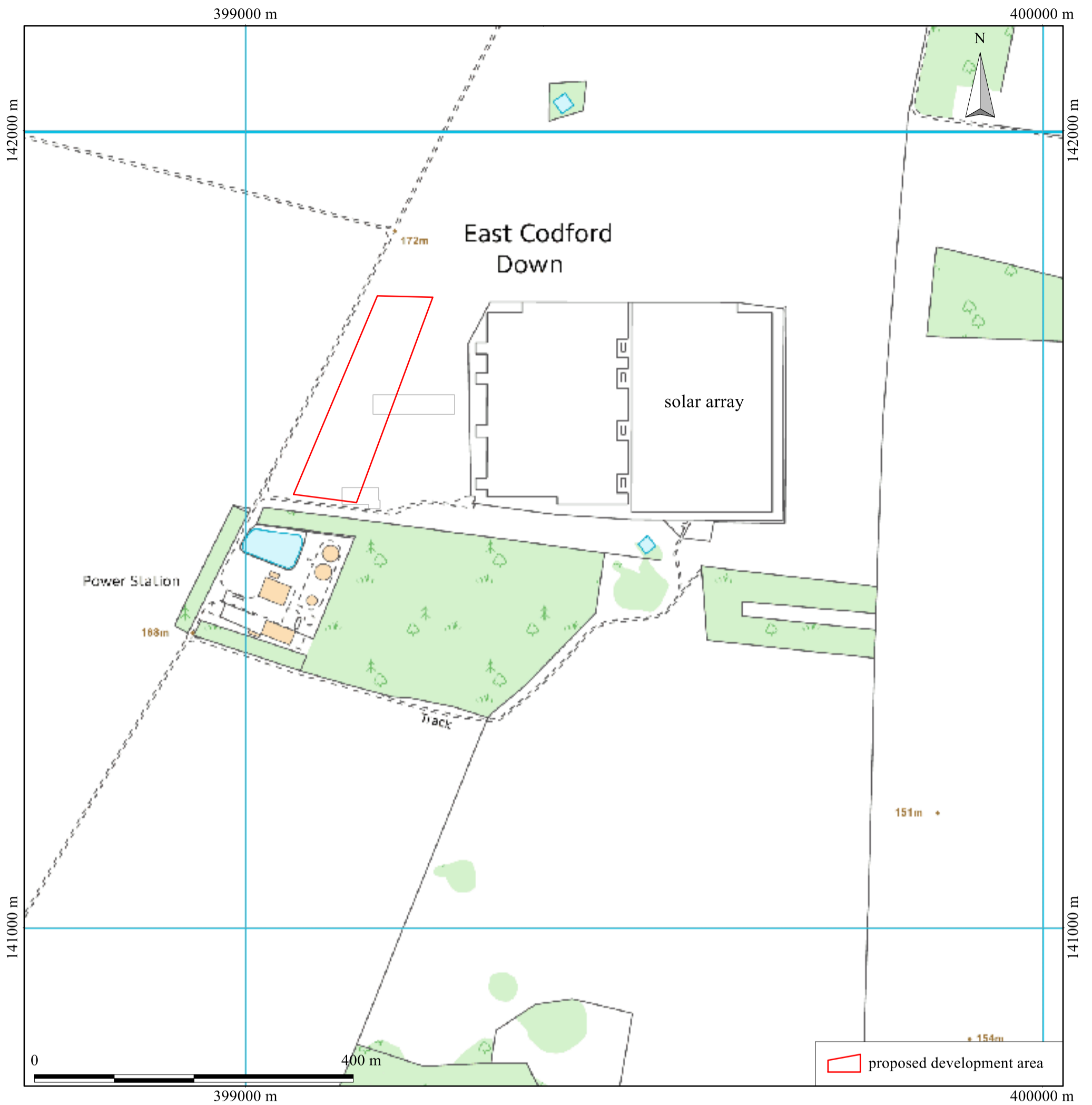
The anomalies represented in the survey plots provided in this appendix are magnetic anomalies. The apparent size of such anomalies and anomaly patterns are unlikely to correspond exactly with the dimensions of any associated archaeological features.

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.

Site:

anomaly group	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	possible, positive	disrupted linear			
2	possible, positive	oval	natural deposits, pits and/or large postholes	anomaly group shows no clear pattern and could represent natural deposits although archaeological deposits cannot be ruled out	
3	possible, positive	linear			
101	possible, repeated parallels		recent ploughing disturbance		
102	likely, mixed spread	irregular	rubble and disturbed ground		survey team noted bricks at the surface

Table 1: data analysis



British Grid
centre X: 399374.15 m, centre Y: 141466.42 m

Copyright Substrata 2015.
Base map: Ordnance Survey (c) Crown Copyright 2015.
All rights reserved.

Scale: 1:5000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
Land at East Codford Down, Codford, Wiltshire
Centred on NGR: 399150,141670
Report: 150724

Figure 1: location map

Substrata
Orchard Lodge, Cornborough Road
Westward Ho!, Bideford, Devon EX39 1AA
Tel: 07788627822
Email: geophysics@substrata.co.uk
Web: substrata.co.uk



British Grid
centre X: 399181.68 m, centre Y: 141663.00 m

Copyright Substrata 2015.
Base map: Ordnance Survey (c) Crown Copyright 2015.
All rights reserved.

Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

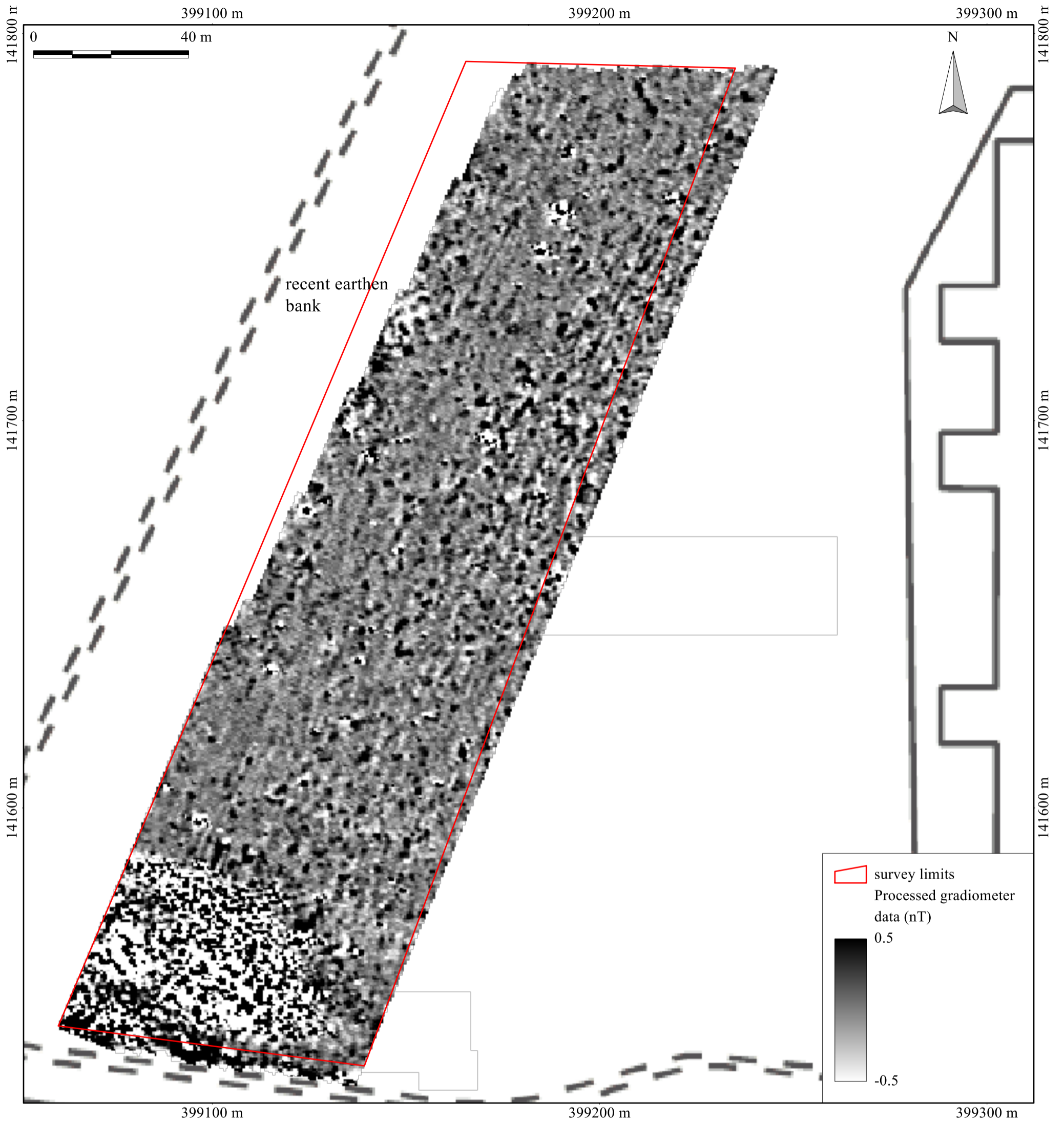
Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
3. Representative; not all instances are mapped.
4. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

An archaeological gradiometer survey
Land at East Codford Down, Codford, Wiltshire
Centred on NGR: 399150,141670
Report: 150724

Figure 2: survey interpretation

Substrata
Orchard Lodge, Cornborough Road
Westward Ho!, Bideford, Devon EX39 1AA
Tel: 07788627822
Email: geophysics@substrata.co.uk
Web: substrata.co.uk



British Grid
 centre X: 399181.68 m, centre Y: 141663.00 m

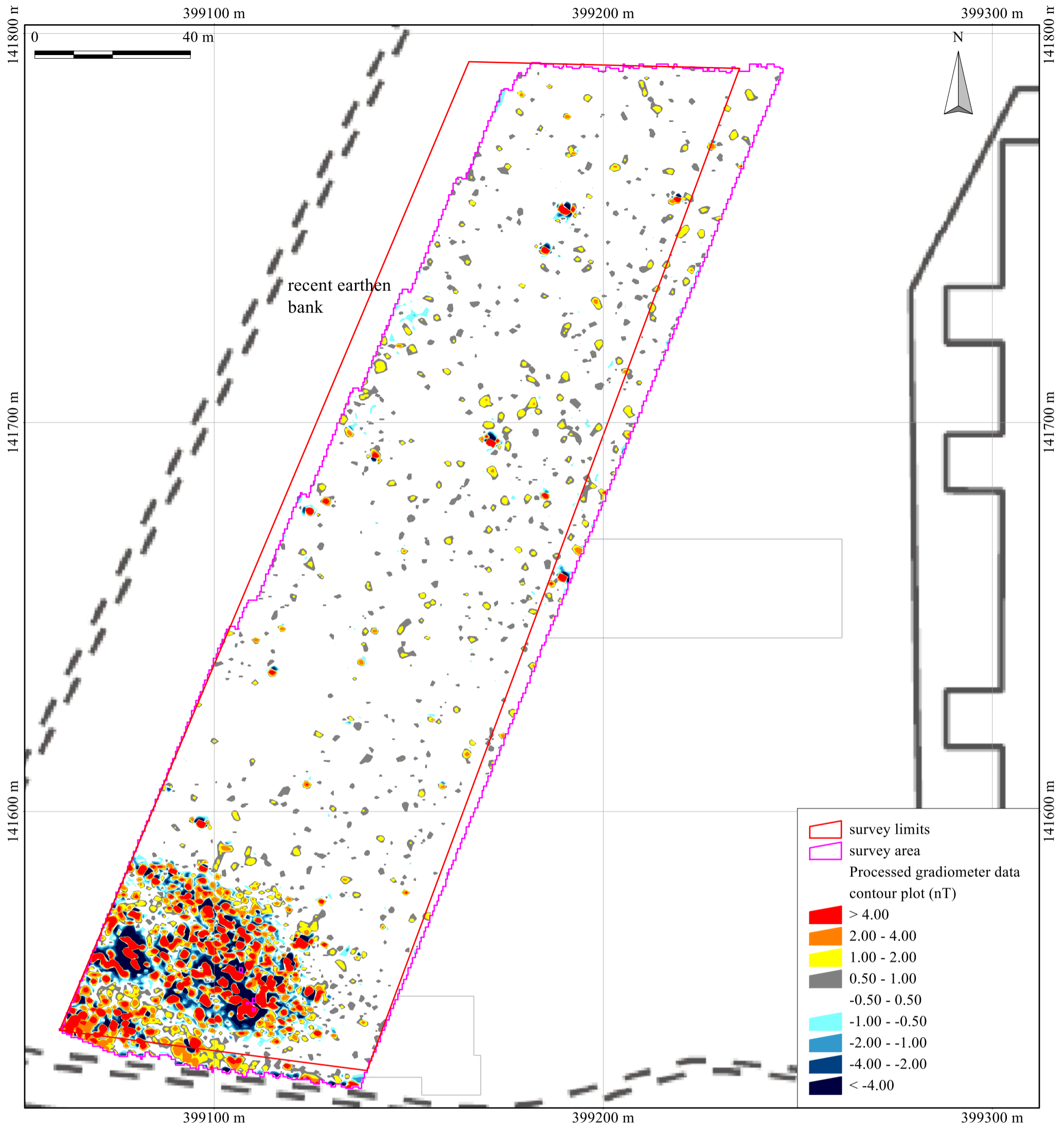
Copyright Substrata 2015.
 Base map: Ordnance Survey (c) Crown Copyright 2015.
 All rights reserved.

Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at East Codford Down, Codford, Wiltshire
 Centred on NGR: 399150,141670
 Report: 150724

Figure 3: shade plot of processed data

Substrata
 Orchard Lodge, Cornborough Road
 Westward Ho!, Bideford, Devon EX39 1AA
 Tel: 07788627822
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 399181.68 m, centre Y: 141663.00 m

Copyright Substrata 2015.
 Base map: Ordnance Survey (c) Crown Copyright 2015.
 All rights reserved.

Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at East Codford Down, Codford, Wiltshire
 Centred on NGR: 399150,141670
 Report: 150724

Figure 4: contour plot of processed data

Substrata
 Orchard Lodge, Cornborough Road
 Westward Ho!, Bideford, Devon EX39 1AA
 Tel: 07788627822
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk

Appendix 2 Methodology Summary

Table 2: methodology summary	
<p>Documents Survey methodology statement: Dean (2015)</p>	
<p>Methodology</p> <ol style="list-style-type: none"> 1. The work was undertaken in accordance with the survey methodology statement. The geophysical (gradiometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service/Digital Antiquity Guides (undated). 2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system. 3. Data processing was undertaken using appropriate software, with all anomalies being digitised and geo-referenced. The final report included 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. 	
<p>Grid <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>Equipment <i>Instrument:</i> Bartington Instruments grad601-2 <i>Firmware:</i> version 6.1</p>	<p>Data Capture <i>Sample Interval:</i> 0.25-metres <i>Traverse Interval:</i> 1 metre <i>Traverse Method:</i> zigzag <i>Traverse Orientation:</i> GN23</p>
<p>Data Processing, Analysis and Presentation Software IntelliCAD Technology Consortium IntelliCAD 7.2 DW Consulting TerraSurveyor3 Manifold System 8 GIS Microsoft Corp. Office Excel 2013 Microsoft Corp. Office Publisher 2013 Adobe Systems Inc Adobe Acrobat 9 Pro Extended</p>	

Appendix 3 Data processing

Table 3: gradiometer survey - processed data metadata	
SITE	
Instrument Type:	Bartington Grad 601
Units:	nT
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702
PROGRAM	
Name:	TerraSurveyor
Version:	3.0.25.0
Stats	
Max:	104.65
Min:	-99.94
Std Dev:	4.97
Mean:	0.03
Median:	0.00
Processes: 5	
1	Base Layer
2	Clip at 1.00 SD
3	De Stagger: Grids: All Mode: Both By: -1 intervals
4	DeStripe Median Traverse: Grids: All
5	Interpolate: Match X & Y Doubled.