

# Substrata

Archaeological Geophysical Surveyors

An archaeological magnetometer survey

## Land at Wrington, North Somerset

Centred on NGR (E/N): 347650,162640 (point)

Report: 1701WRI-R-1

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3 February 2017

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## Project archive

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](http://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: 17 and 19 January 2017  
Area: 2.12ha  
Lead surveyor: Mark Edwards BA  
Author: Ross Dean BSc MSc MA MifA

### 1.2 Clients

AC Archaeology Ltd, 4 Halthaies Workshops, Bradninch Nr Exeter, Devon EX5 4QL

### 1.3 Location

Site: Land at Wrington  
Village & Civil Parish: Wrington  
District: North Somerset  
County: Somerset  
Nearest Postcode: BS40 5PG  
NGR: ST 476 626 (point)  
NGR (E/N): 347650,162640 (point)

### 1.4 Planning information

Planning body: North Somerset Council  
Planning Application: 16/P/2560/RG3  
Proposal: Flood storage area

### 1.5 Archive

OASIS number: substrat1-275242  
Archive: At the time of writing, the archive of this survey will be held by Substrata. Depending on local authority policy, an archive of the unprocessed data may be deposited with the Archaeological Data Service

### 1.6 Introduction

This report presents the results of an archaeological magnetometer survey at the above site, hereafter referred to as the survey area. It has been prepared for AC Archaeology Ltd on behalf of clients. The survey area location is shown in Figure 1.

### 1.7 Summary

*The magnetic responses across the survey area were sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses.*

*No anomaly groups were interpreted as pertaining to archaeological deposits, structures or features. Anomaly groups relating to relatively recent rubble or landfill, field drains, possible recent ploughing disturbance and a possible iron or steel service were mapped.*

## 2 Survey aims and objectives

### 2.1 Aims

To establish the presence or absence, extent and character of any archaeological features and deposits within the survey area.

### 2.2 Survey objectives

1. Complete a magnetometer survey across agreed parts of the survey 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 survey area 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 Historic England (2010). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service (undated).

### 4 Site description

#### 4.1 Landscape and land use

The survey area lies immediately east of Wrington Village. It is bounded by agricultural land with a stream flowing east to west along its northern edge. It covers a total area of approximately 2.12 hectares at variable heights between 23m to 34m AOD (AC Archaeology, 2017: 1).

#### 4.2 Geology

The bedrock across the site is mudstone and halite stone of the Triassic Mercia Mudstone Group. Generically these are dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread; sandstones are also present. A nearby borehole (BGS ID 17288748) sunk to 15.3m in November and December 2006 at NGR (E/N) 347900,162900, within the Mercia Mudstone Group, recorded a sediment sequence of clay between 0m and 7m depth followed by dolomitic conglomerate (British Geological Survey, undated).

In the stream valley there are superficial deposits of Quaternary Alluvium which normally comprise soft to firm consolidated, compressible silty clay, but the deposits can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present. A nearby borehole sunk close to a stream to 16.5m in December 2006 at NGR (E/N) 348000,162700 recorded the near-surface sedimentary sequence as clay between 0m and 2m depth with gravel and clay in bands between 2m and 8m (ibid).

### 5 Archaeological background

#### 5.1 Historic landscape characterisation

‘Medieval or earlier enclosure of rich, wet grassland’ (North Somerset Council, undated)

#### 5.2 Summary of archaeological background

The following is taken from an Historical Environment Assessment for the same programme of work as this report (AC Archaeology Ltd, 2017: 1).

There are no designated heritage assets within the Scheme Area. The 1km study area surrounding the application area contains seven heritage assets, three of which are designated. Field-name and aerial photographic evidence, as well as favourable topography, indicates that there is potential, albeit currently unknown, for buried remains of medieval or earlier date to be present.

## 6 Results, discussion and conclusions

### 6.1 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 variations in the magnetism of 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 terms 'archaeological deposit', 'structure' and 'feature' refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity, excluding recent land maintenance and farming.

Magnetic anomalies cannot be regarded as physical archaeological deposits, structures or features and the dimensions of the anomalies shown do not represent the dimensions of any associated archaeology.

The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to archaeological deposits, structures and features.

The reader is referred to section 7.

### 6.2 Results

The survey area was split into sub-areas 1, 2 and 3 to aid description (Figure 2).

Figure 2 shows the interpretation of the survey data which 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.

Figure 3 is a shade plot of the processed data as specified in Table 3. Figures 4 to 6 are plots of the unprocessed data with its metadata.

### 6.3 Discussion

#### 6.3.1 General points

##### Discussion 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 the survey archive.

##### Data collection

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

##### Anomaly characterisation and mapping

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 only mapped as potential archaeology if they are clustered in groups or otherwise form recognisable patterns.

Anomalies thought to relate to natural features were only mapped where they comprised significant magnetic responses across the dataset that needed clarification.

Numerous dipole magnetic anomalies are scattered across the data set. 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.

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

None of the magnetic anomaly groups related to known historic records or artefacts.

#### 6.3.3 Data with no previous archaeological provenance

No anomaly groups were interpreted as pertaining to archaeological deposits, structures or features.

Anomaly groups relating to relatively recent ground disturbance are shown in Figure 2.

#### 6.4 Conclusions

The magnetic responses across the survey area were sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses.

No anomaly groups were interpreted as pertaining to archaeological deposits, structures or features. Anomaly groups relating to relatively recent rubble or landfill, field drains, possible recent ploughing disturbance and a possible iron or steel service were mapped.

## 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.

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## 8 Acknowledgements

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

## 9 Bibliography

AC Archaeology Ltd (2016) *Wrington, North Somerset, (NGR ST 4765 6264) Historic Environment Impact Assessment*, AC Archaeology Ltd unpublished report ACD1534/1/0 Draft

Archaeology Data Service (undated) *Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology* [Online], Available: [http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics\\_Toc](http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc) [October 2016]

British Geological Survey (undated) *Geology of Britain viewer, 1:50000 scale data*, [Online], Available: [http://www.bgs.ac.uk/discovering\\_Geology/geologyOfBritain/viewer.html](http://www.bgs.ac.uk/discovering_Geology/geologyOfBritain/viewer.html) [February 2017]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey*. Reading: Author [Online], Available: [http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics\\_1.pdf](http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf) [October 2016]

Chartered Institute for Archaeologists (2014b) *Code of conduct*. Reading: Author [Online], <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf> [August 2016]

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

Dean, R. (2017) *A survey method statement for a detailed magnetometer survey over land at Wrington, North Somerset*, Substrata Ltd unpublished document 1701WRI-M-1

Historic England (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> [August 2016]

North Somerset Council (undated) *Historic Environment Record*, [Online], Available: <http://map.n-somerset.gov.uk/HER.html> [February 2017]

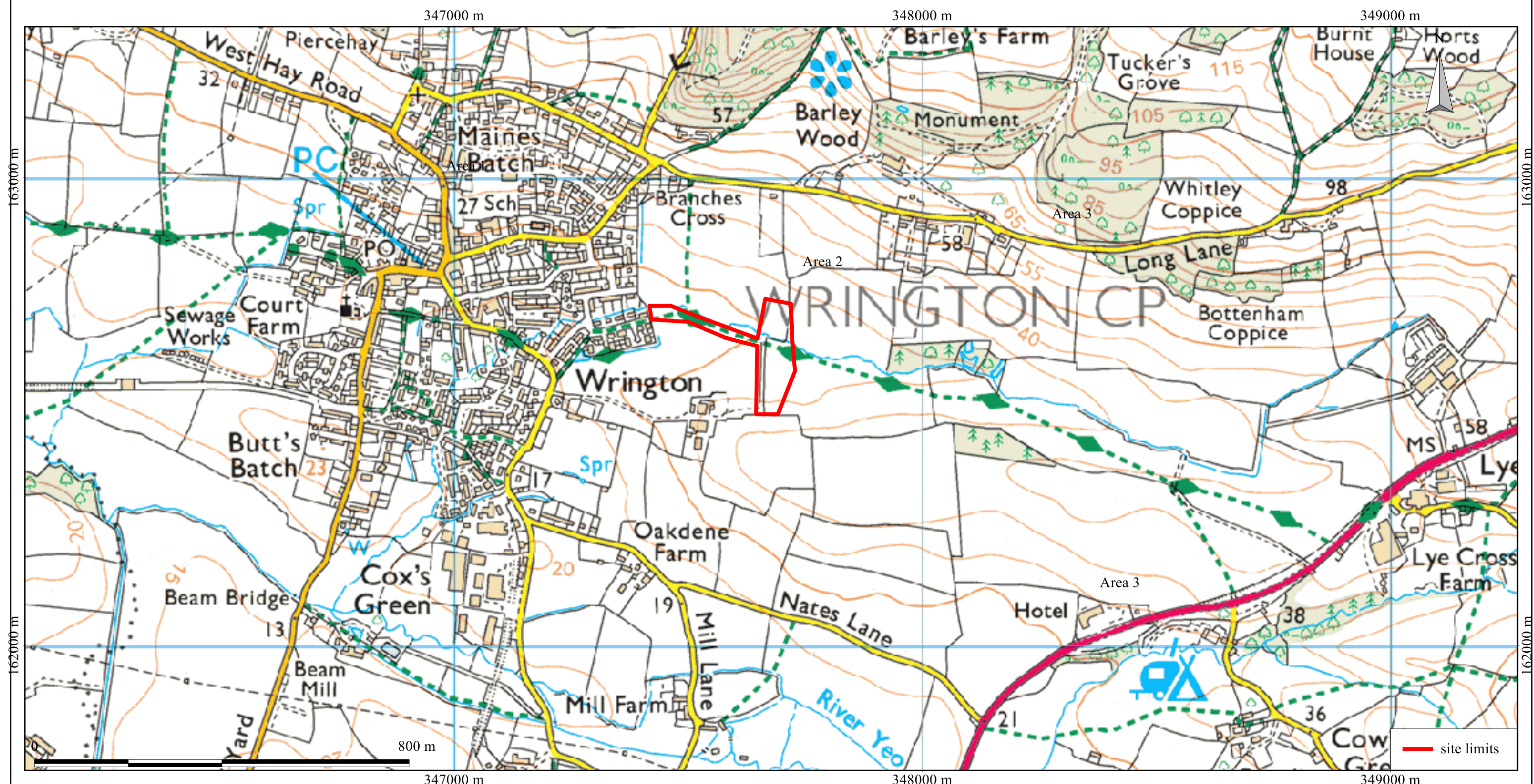
## Appendix 1     Figures

### 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 (see Section 6.1).

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: 347677.35 m, centre Y: 162527.95 m

Scale: 1:8000 @ A3. Spatial Units: Meter. Do not scale off this drawing

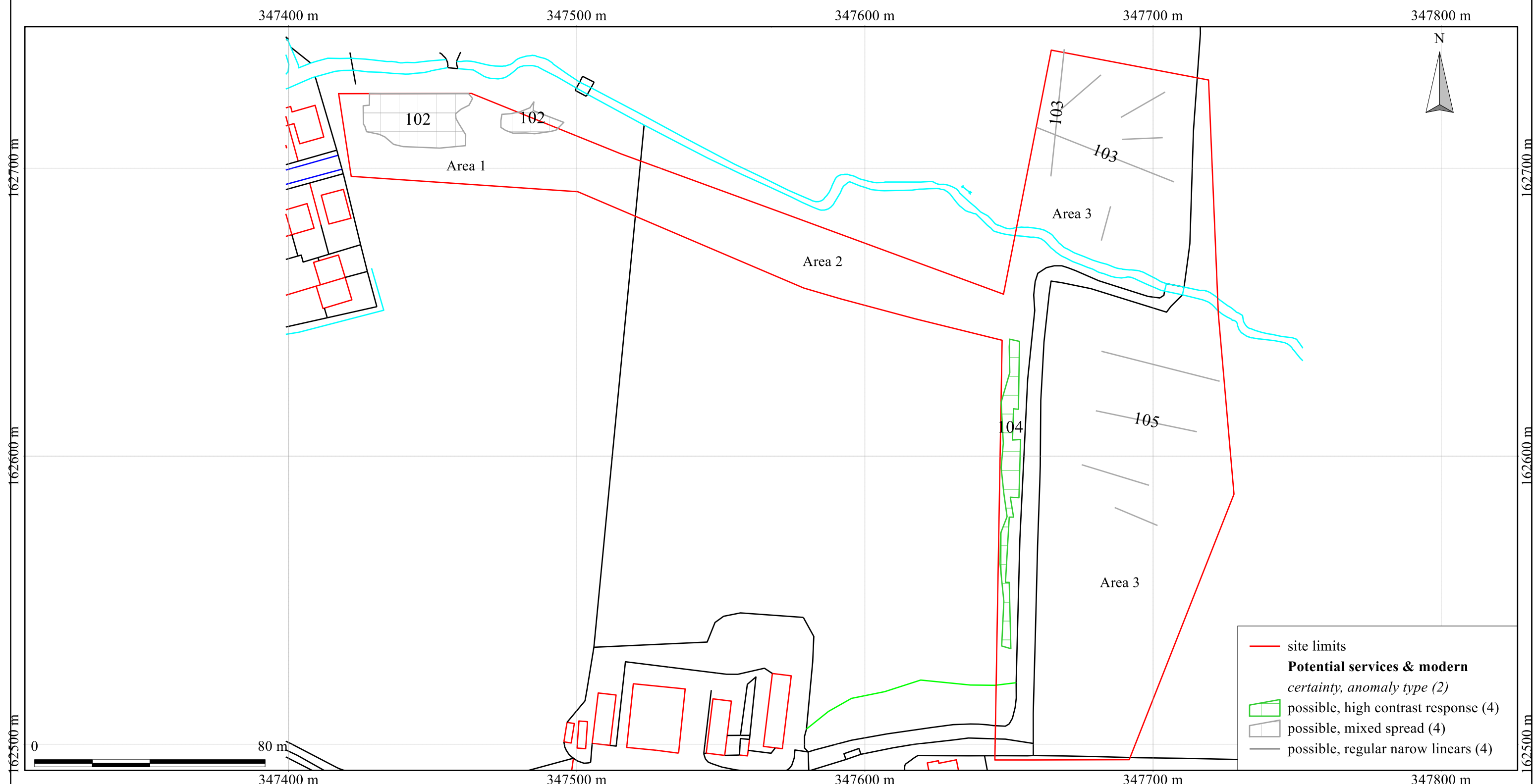
Geophysical survey: Copyright Substrata Limited.  
 Base map: Ordnance Survey (c) Crown Copyright 2017.  
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An archaeological magnetometer survey  
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Figure 1: location map

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British Grid  
 centre X: 347567.48 m, centre Y: 162619.98 m

Scale: 1:1300 @ A3. Spatial Units: Meter. Do not scale off this drawing

Geophysical survey: Copyright Substrata Limited.  
 Base map: Ordnance Survey (c) Crown Copyright 2017.  
 All rights reserved. Licence number 100022432

Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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Figure 2: survey interpretation

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— site limits

Processed magnetometer data (nT)

1.5

-1.5

British Grid  
 centre X: 347567.48 m, centre Y: 162619.98 m

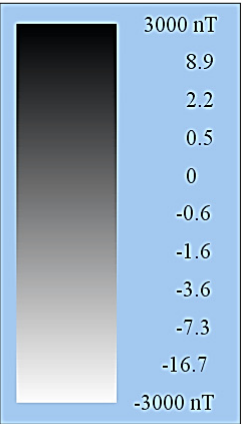
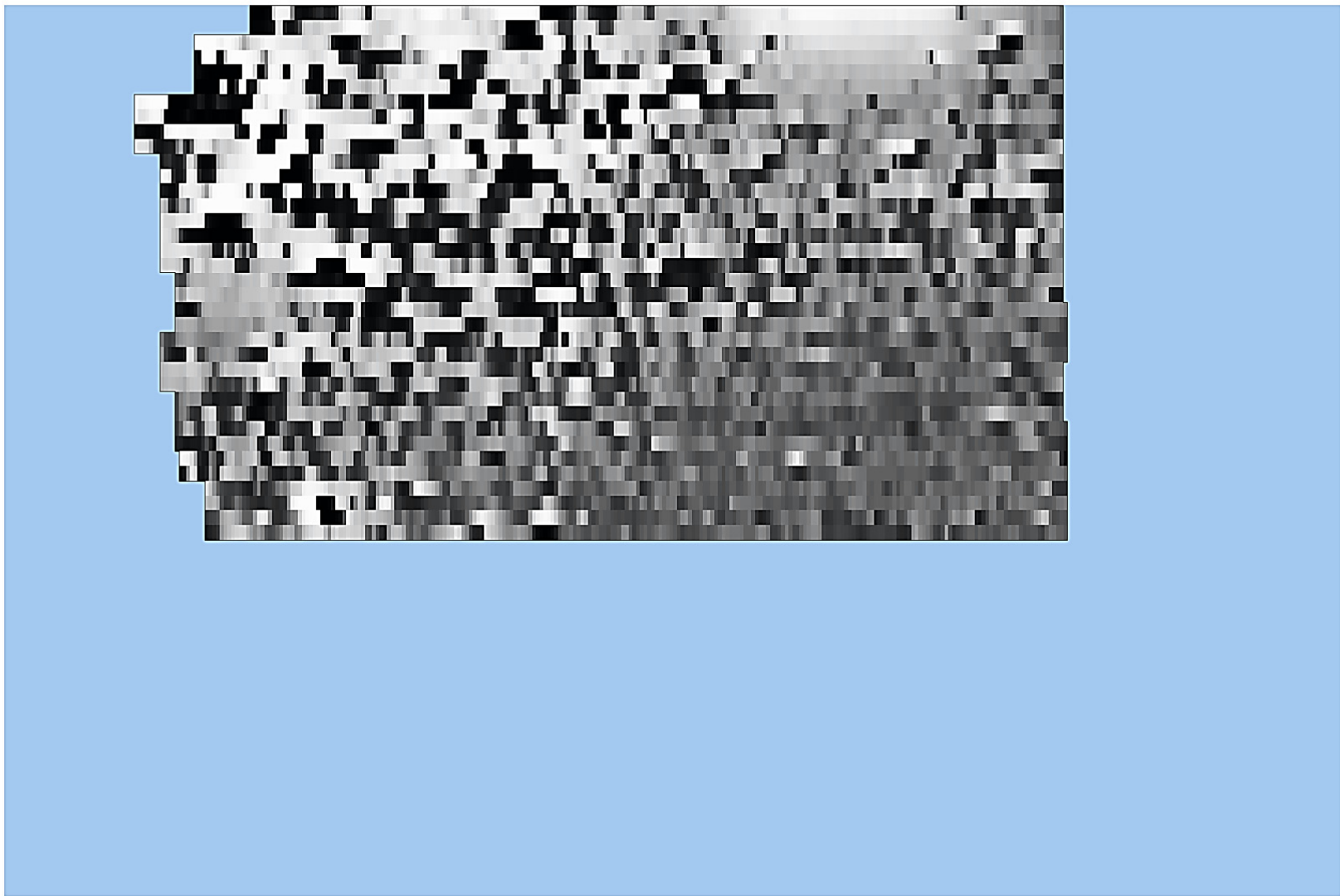
Scale: 1:1300 @ A3. Spatial Units: Meter. Do not scale off this drawing

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright West Country Land Surveyors Ltd

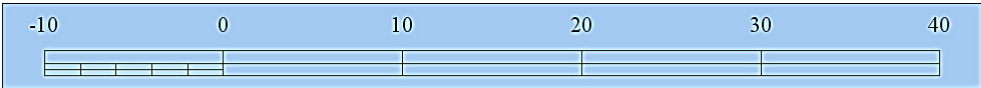
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Figure 3: shade plot of processed data

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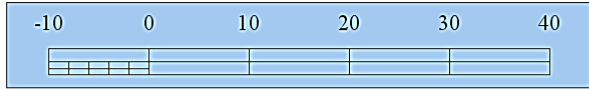
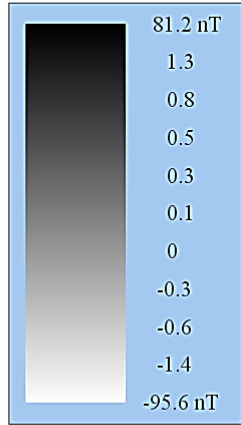
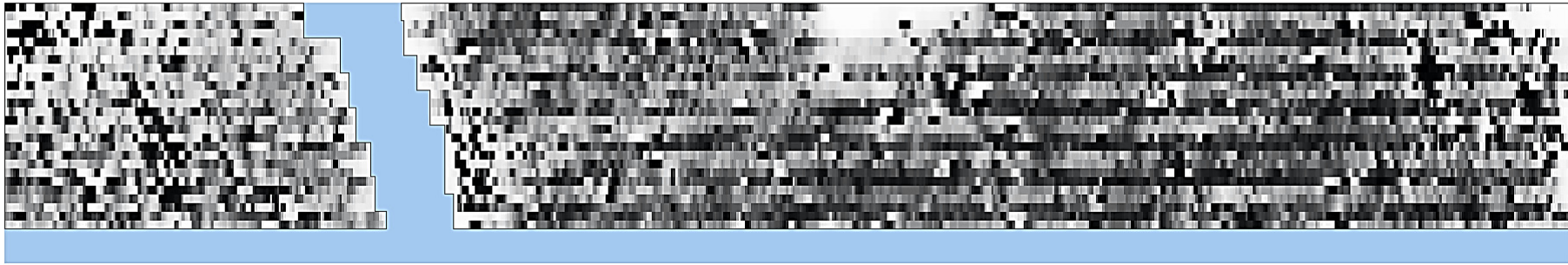


Instrument type: Bartington grad601-2  
 Units: nT  
 Direction of 1st Traverse: 90 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 32702  
 Dimensions  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m  
 Stats  
 Max: 3000.00  
 Min: -3000.00  
 Std Dev: 371.63  
 Mean: 5.92  
 Median: -0.60  
 Surveyed Area: 0.21535 ha  
 PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.31.0



Processes: 1  
 1 Base Layer

Figure 4: shade plot of unprocessed data, area 1

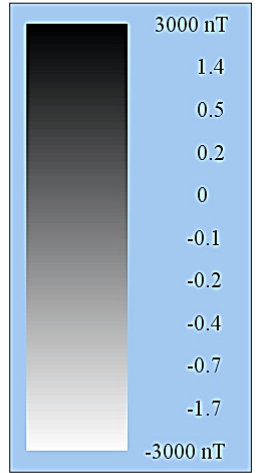
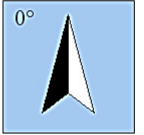
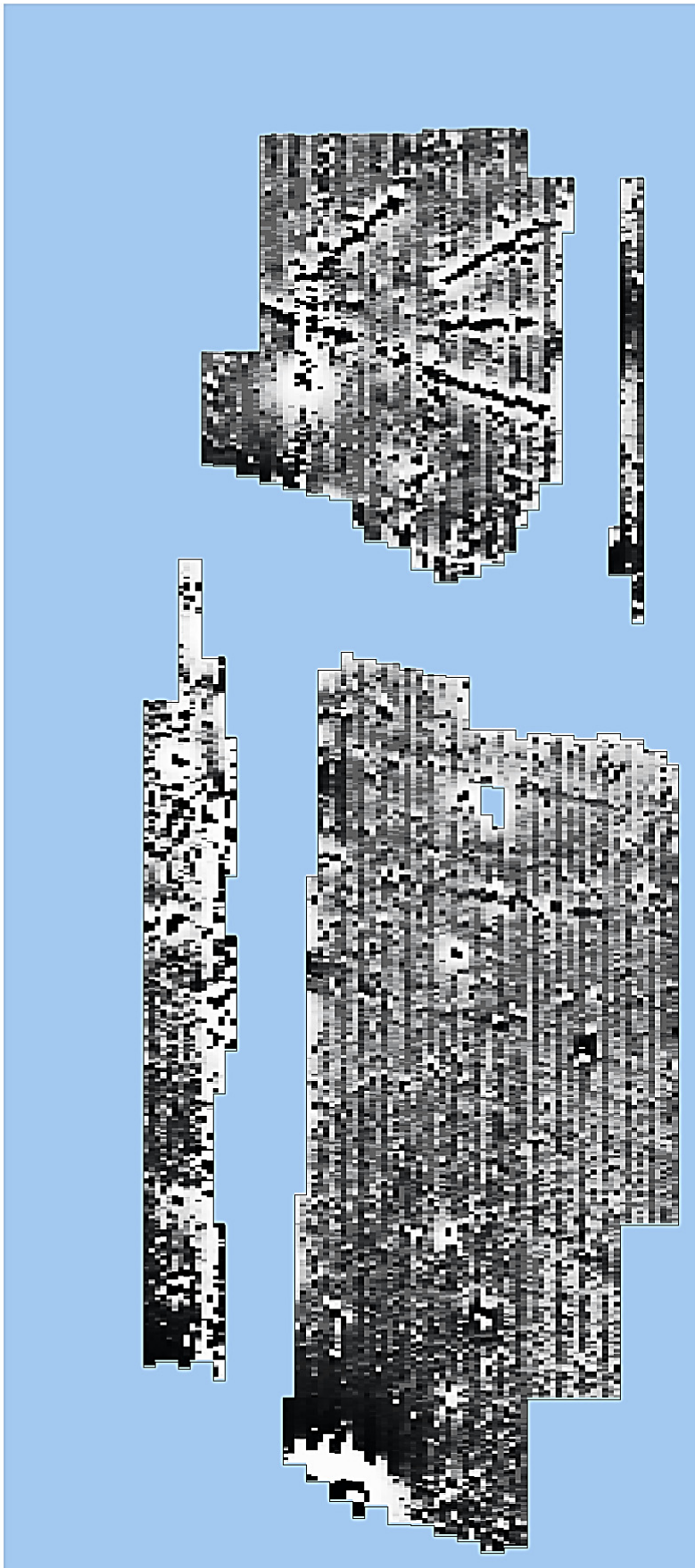


Instrument type: Bartington grad601-2  
Units: nT  
Direction of 1st Traverse: 90 deg  
Collection Method: ZigZag  
Sensors: 2 @ 0.00 m spacing.  
Dummy Value: 32702  
Grid Size: 30 m x 30 m  
X Interval: 0.25 m  
Y Interval: 1 m  
Stats  
Max: 81.20  
Min: -95.60  
Std Dev: 3.78  
Mean: -0.01  
Median: 0.10

Processes: 1  
1 Base Layer

Figure 5: shade plot of unprocessed data, area 2





Instrument Type: Bartington Grad 601  
 Units: nT  
 Direction of 1st Traverse: 0 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 32702  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m  
 Stats  
 Max: 3000.00  
 Min: -3000.00  
 Std Dev: 243.32  
 Mean: -2.82  
 Median: -0.10  
 Surveyed Area: 1.3953 ha  
 PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.31.0

Processes: 1  
 1 Base Layer

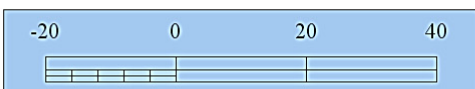


Figure 6: shade plot of unprocessed data, area 3

## Appendix 2 Tables

An archaeological magnetometer survey  
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anomaly group	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation
102	possible, mixed spread	irregular	rubble and/or landfill
103	possible, regular narrow linears		field drain
104	possible, high contrast response		iron/steel service or wire fence
105	possible, regular narrow linears		field drain or recent ploughing traces

Table 1: data analysis



<p><b>Documents</b> Survey methodology statement: Dean (2017)</p>	
<p><b>Methodology</b></p> <ol style="list-style-type: none"> <li>1. The work was undertaken in accordance with the survey methodology statement. The geophysical (magnetometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service (undated).</li> <li>2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system.</li> <li>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.</li> </ol>	
<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> areas 1 and 2, E  area 3, GN</p>
<p><b>Data Processing, Analysis and Presentation Software</b>  IntelliCAD Technology Consortium IntelliCAD 8.0  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>	

Table 2: methodology summary

<b>SITE</b> Instrument Type: Bartington Grad-601 gradiometer Units: nT Direction of 1st Traverse: see below Collection Method: ZigZag Sensors: 2 @ 1.00 m spacing. Dummy Value: 32702	
<b>PROGRAM</b> Name: TerraSurveyor Version: 3.0.31.0	
<b>Area 1</b> Stats Max: 15.24 Min: -15.25 Std Dev: 7.87 Mean: -0.20 Median: 0	Processes: 8 1 Base Layer 2 Clip at 1.00 SD 3 Clip at 1.00 SD 4 DeStripe Median Sensors: Grids: All 5 Edge Match (Area: Top 30, Left 240, Bottom 59, Right 359) to Top edge 6 Edge Match (Area: Top 30, Left 120, Bottom 59, Right 239) to Right edge 7 Interpolate: X & Y Doubled. 8 Clip at 1.00 SD
<b>Area 2</b> Max: 30.93 Min: -26.03 Std Dev: 2.31 Mean: -0.07 Median: 0.01	Processes: 5 1 Base Layer 2 Clip at 4.00 SD 3 DeStripe Median Sensors: Grids: All 4 De Stagger: Grids: All Mode: Both By: -1 intervals 5 Interpolate: Match X & Y Doubled
<b>Area 3</b> Max: 68.92 Min: -72.87 Std Dev: 4.52 Mean: -0.12 Median: 0.00	Processes: 6 1 Base Layer 2 Clip at 1.00 SD 3 DeStripe Median Traverse: Grids: All 4 De Stagger: Grids: All Mode: Both By: -1 intervals 5 Clip at 1.00 SD 6 Interpolate: Match X & Y Doubled.

Table 3: processed data metadata, areas 1 to 3