Substrata
Archaeological Geophysical Surveyors

An archaeological magnetometer survey

Cox's Green, Wrington, North Somerset

Centred on NGR (E/N): 347238,162079

Report: 1705COX-R-1

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7 July 2017

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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:	between 23 and 27 May 2017
Area:	5.4ha
Lead surveyor:	Mark Edwards BA
Author:	Ross Dean BSc MSc MA MIfA

1.2 Clients

SLR Consulting Ltd, Langford Lodge, 109 Pembroke Road, Clifton, Bristol BS8 3EU

1.3 Location

Site:	Cox's Green
Civil Parish:	Wrington
Unitary Authority:	North Somerset
Nearest Postcode:	BS40 5NL
NGR:	ST 47238 62079 (point)
NGR (E/N):	347238,162079 (point)

1.4 Archive

OASIS number:	substrat1-289643
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

1.5 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 SLR Consulting Ltd on behalf of Redcliffe Homes. The survey area location is shown in Figure 1.

1.6 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.

Seventeen magnetic anomaly groups were mapped as representing potential archaeological deposits or features. Four of these groups are likely to represent field boundaries recorded on historical maps. Eleven of the groups have characteristics typical of anomaly groups representing fragments of former field boundaries and enclosures of unknown date and possibly more than one phase of past land management. Of these, five are spatially relatively close and, speculatively, may be related archaeologically. The remaining two groups are adjacent to this latter spatial group and may represent either spreads of potential archaeological material or wet areas.

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 proposed development site is located on the southeast corner of Wrington which lies in the valley of the Congresbury Yeo river, about 14km east of Weston-super-Mare and 4.8km south-east of Yatton. The survey area comprises two adjacent fields separated by a drainage ditch and hedged field boundary. The elevation towards the centre of the survey area is approximately 20m AOD.

4.2 Geology

The bedrock across the majority of the survey area comprises mudstone and halite-stone of the Triassic Mercia Mudstone Group. 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 and sandstones are also present. On the southern boundary of the site are rocks of the Triassic Arden Sandstone Formation. These rocks are heterolithic, consisting of grey, green and purple mudstones interbedded with paler grey-green to buff coloured siltstones and fine- to medium-grained, varicoloured green, brown, buff, mauve sandstones with beds of conglomerate occurring locally (British Geological Survey, undated).

The superficial deposits for the site are not recorded in the source used (ibid).

5 Archaeological background

5.1 Summary of archaeological background

An Historical Environment Desk-based Assessment was produced by SLR Consulting Ltd for the same programme of work in January 2017 (SLR, 2017). This report contains a detailed analysis of the archaeology and heritage of the site and the surrounding area.

The following is an extract of that report.

The proposed development lies within the historic parish of Wrington and is situated to the south east of the settlement of that name. The village has evidence for Roman activity and there is evidence of Saxon occupation, suggested by the name Wrington meaning 'River Wring farm/settlement'. Wrington was part of the hundred of Brent-cum-Wrington.

The wider landscape shows evidence for prehistoric, Roman, Saxon, medieval and post-medieval archaeology. The landscape to the south contains the sites of recorded medieval mills along the River Yeo. There is well recorded possibility of Roman villas at Havyatt Green and Lyehole near Wrington as well as numerous other findspots. The site then sits within a rich archaeological landscape, with potential for remains from multiple periods to survive.

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 changes 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

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.

Figures 3 and 4 are plots of processed data as specified in Table 3. Figure 5 is a plot of unprocessed data with accompanying 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 within the survey area was restricted as shown in the figures due to the presence of magnetic materials. Strong magnetic responses shown in Figures 3 to 5 are likely to relate to these materials except where otherwise indicated in Figure 2 and Table 1.

Data trends

A series of parallel lines in the data, trending along the long axes of the two fields and clear in Figure 2, are likely to denote relatively recent ploughing disturbance.

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 were mapped as potential archaeology when they were 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 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

Magnetic anomaly groups **4**, **5**, **7** and **17** coincide with, and likely represent, field boundaries recorded on various historical maps as recorded in Table 1.

6.3.3 Data with no previous archaeological provenance

Groups **1 to 3**, **6**, **8**, **9 to 12**, **15** and **16** have magnetic characteristics typical of anomaly groups representing fragments of former field boundaries and enclosures of unknown date and possibly more than one phase of past land management. Anomalies 9, 10, 11, 15 and 16 form a distinct grouping. It may be that this grouping represent a single phase of one or more former enclosures.

Groups **13** and **14** may represent spreads of potential archaeological material or wet areas that may be associated with the adjacent grouping discussed above.

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.

Seventeen magnetic anomaly groups were mapped as representing potential archaeological deposits or features. Four of these groups (4, 5, 7 and 17) are likely to represent field boundaries recorded on historical maps. Eleven of the groups (1 to 3, 6, 8, 9 to 12, 15 and 16) have characteristics typical of anomaly groups representing fragments of former field boundaries and enclosures of unknown date and possibly more than one phase of past land management. Of these, five (9, 10, 11, 15 and 16) are spatially relatively close and, speculatively, may be related archaeologically. The remaining two groups (13 and 14) are adjacent to this latter spatial group and may represent either spreads of potential archaeological material or wet areas.

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.

8 Acknowledgements

Substrata would like to thank Andrew Burn of SLR Consulting Ltd for commissioning us to complete this survey.

9 Bibliography

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

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

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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/ [April 2017]

SLR Consulting (2017) *Cox's Green, Wrington, North Somerset, Historic Environment Desk-Based Assessment, Archaeology & Heritage*, SLR Consulting Ltd unpublished report 416.01918.00013, version 4

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.

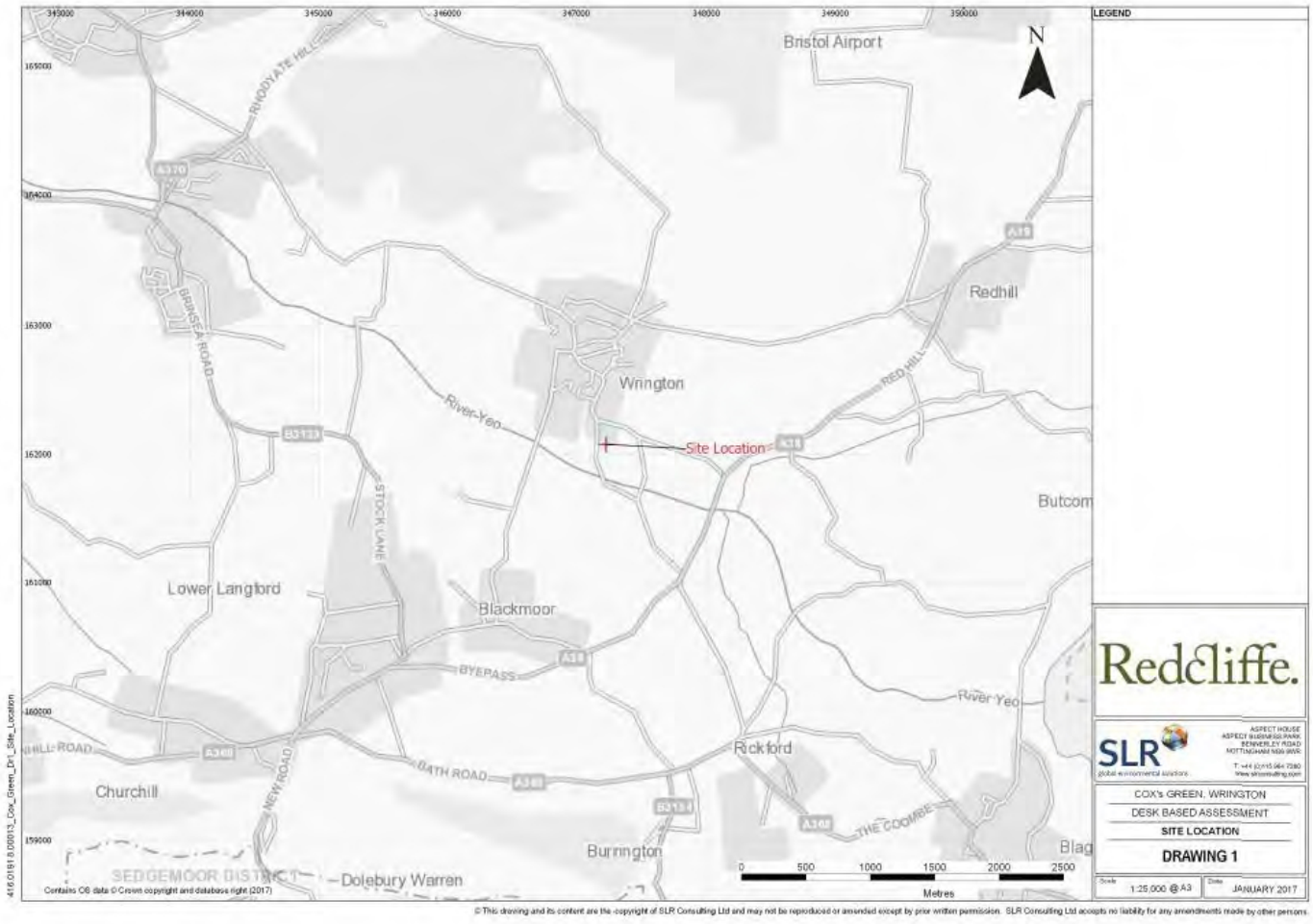
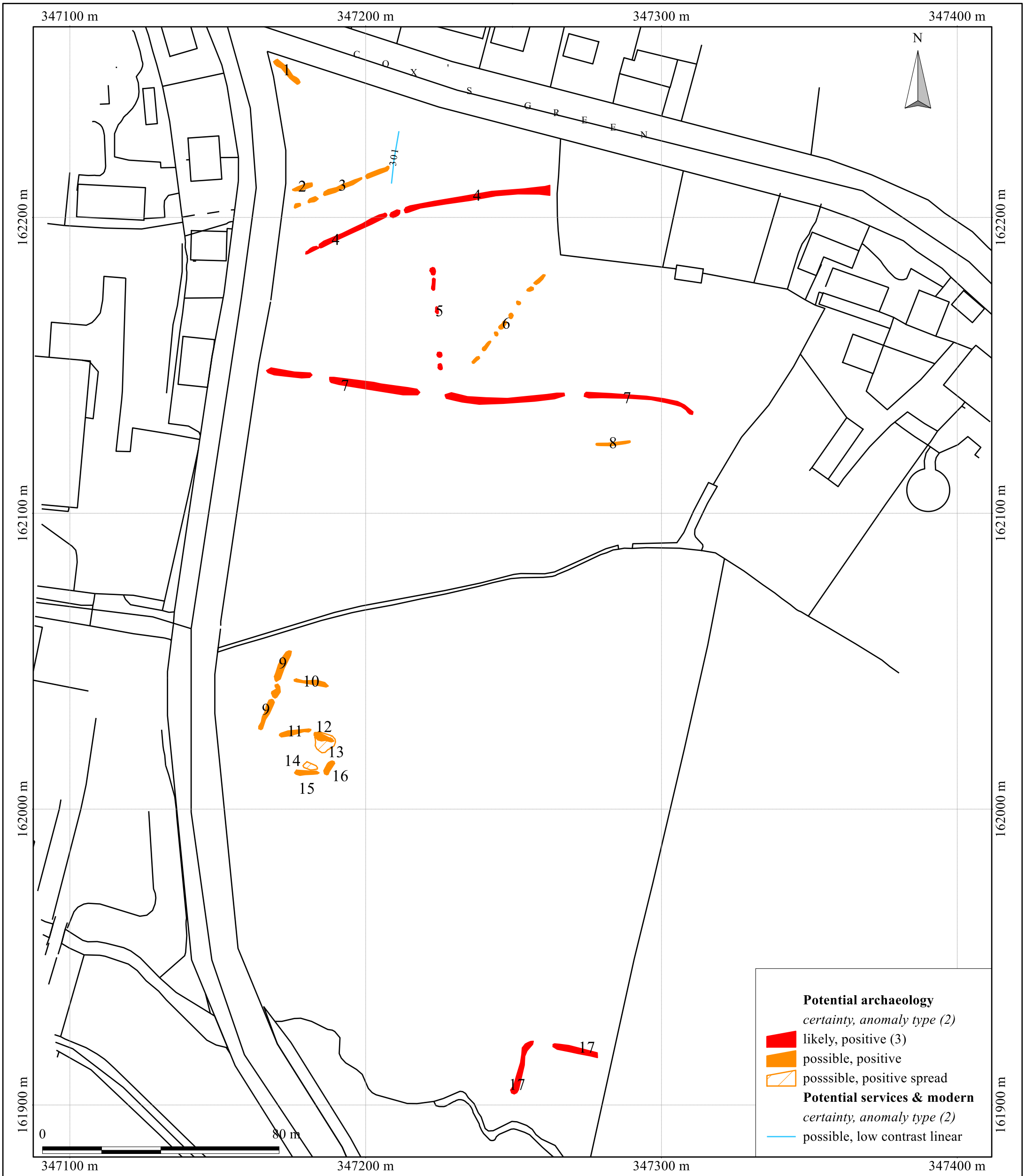


Figure 1: location map (SLR, 2017)



British Grid
centre X: 347249.64 m, centre Y: 162073.43 m

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

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. 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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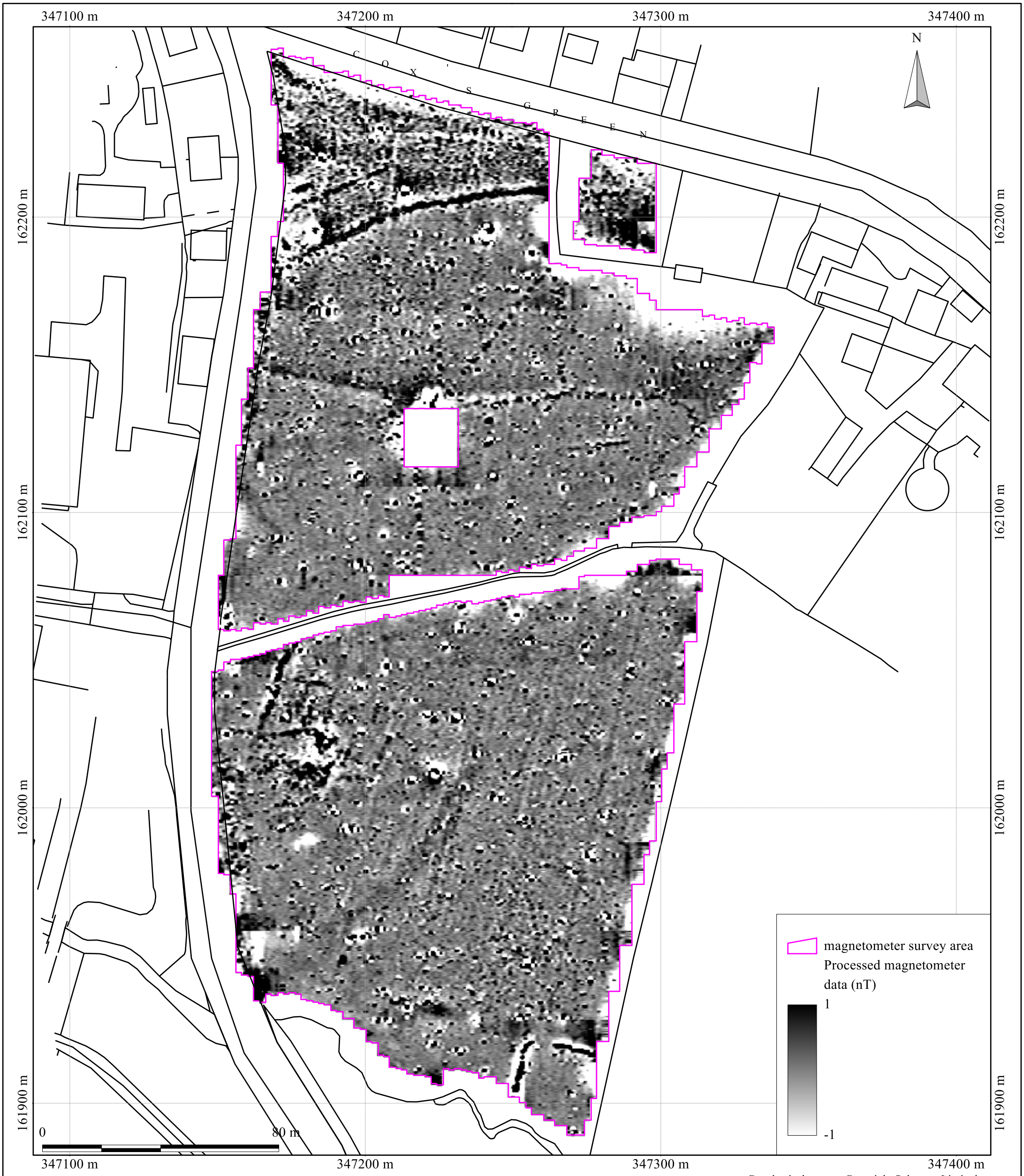

British Grid
centre X: 347249.64 m, centre Y: 162073.43 m

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

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Figure 3: shade plot of processed data

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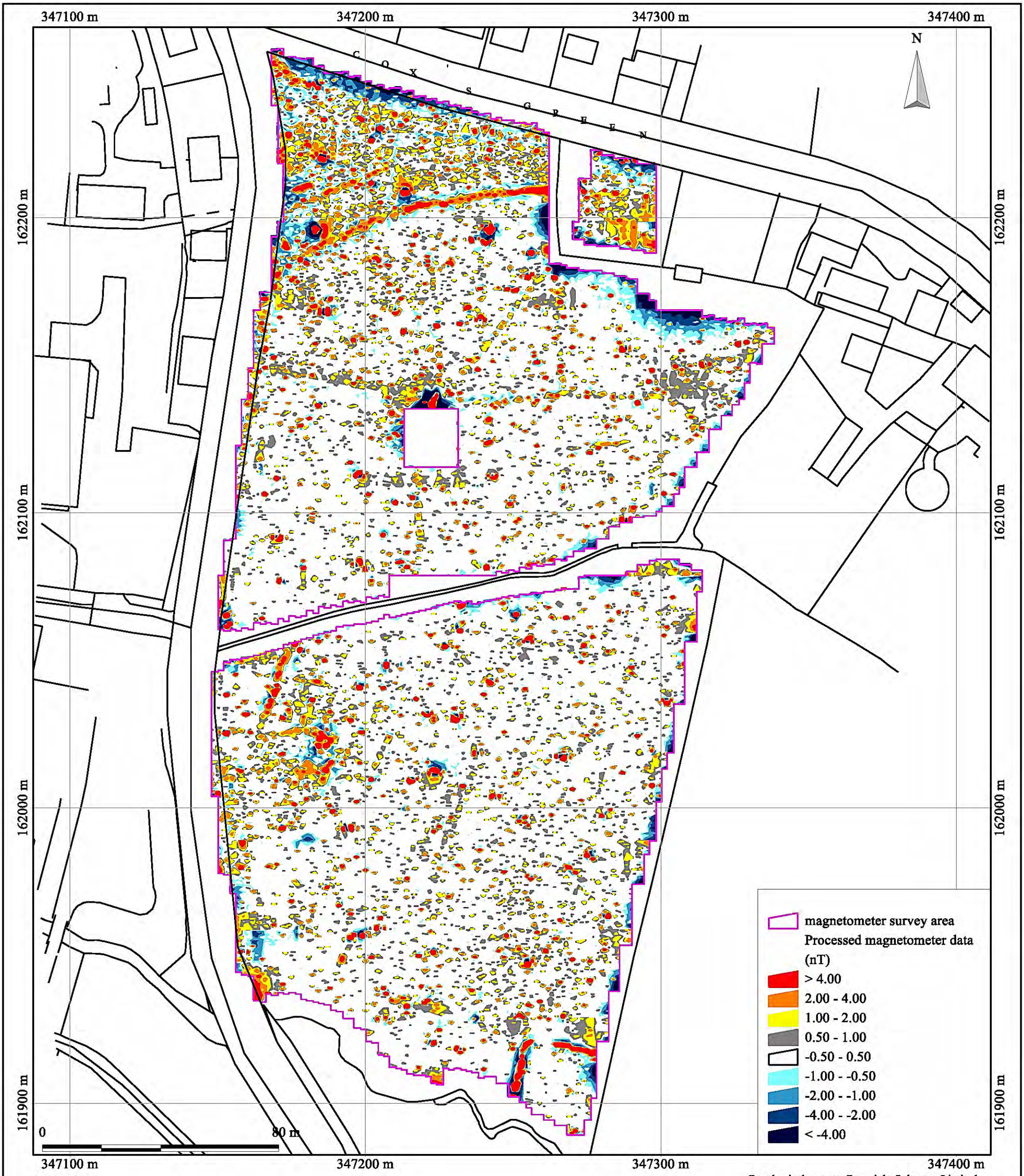

British Grid
centre X: 347249.64 m, centre Y: 162073.43 m

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

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Figure 3: shade plot of processed data

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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
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: 97.53
Mean: -0.32
Median: -0.30
PROGRAM
Name: TerraSurveyor
Version: 3.0.31.0

Processes: 1
1 Base Layer

Figure 5: shade plot of unprocessed data

Appendix 2 Tables

Site: An archaeological magnetometer survey
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anomaly group	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	possible, positive	linear			
2	possible, positive	linear			
3	possible, positive	disrupted linear			
4	likely, positive	disrupted curvilinear	field boundary	anomaly group approximately coincides with a field boundary mapped in 1739 and 1839 but not recorded on later maps	1739 John Rocque's Wrington Manor map, 1839 Wrington tithe map
5	likely, positive	disrupted linear	field boundary	anomaly group approximately coincides with a field boundary mapped in 1839 and 1855 but not recorded on later maps	1839 Wrington tithe map, OS 1885 1:2500 map
6	possible, positive	disrupted linear			
7	likely, positive	disrupted curvilinear	field boundary	anomaly group approximately coincides with a field boundary mapped in 1739, 1839 and 1855 but not recorded on later maps	1739 John Rocque's Wrington Manor map, 1839 Wrington tithe map, OS 1885 1:2500 map
8	possible, positive	linear			
9	possible, positive				
10	possible, positive	linear			
11	possible, positive	linear			
12	possible, positive	linear			
13	possible, positive spread	irregular	spread of potential archaeological material or wet area	anomaly group may represent archaeological deposits or a wet area which may be associated with adjacent potential linear archaeological features	
14	possible, positive spread	irregular	spread of potential archaeological material or wet area	anomaly group may represent archaeological deposits or a wet area which may be associated with adjacent potential linear archaeological features	
15	possible, positive	linear			
16	possible, positive	linear			
17	likely, positive	disrupted return	field boundary	anomaly group approximately coincides with a field boundary mapped in 1739 and 1839 but not recorded on later maps	1739 John Rocque's Wrington Manor map, 1839 Wrington tithe map
301	possible, low contrast linear		service trench		

Table 1: data analysis

Documents
Survey methodology statement: Dean (2017)

Methodology

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).
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.

Grid
Method of Fixing: DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.
Composition: 30m by 30m grids
Recording: Geo-referenced and recorded using digital map tiles.
DGPS used: Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program.

Equipment	**Data Capture**
Instrument: Bartington Instruments grad601-2 *Firmware:* version 6.1	*Sample Interval:* 0.25m *Traverse Interval:* 1 metre *Traverse Method:* zigzag *Traverse Orientation:* GN

Data Processing, Analysis and Presentation Software
QCAD 3
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

Table 2: methodology summary

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
PROGRAM	
Name:	TerraSurveyor
Version:	3.0.31.0

Stats	
Max:	118.97
Min:	-119.24
Std Dev:	3.21
Mean:	-0.04
Median:	0.00

Processes: 17

1 Base Layer
2 Clip at 1.00 SD
3 Search & Replace From: -3000 To: 3000 With: Dummy (Area: Top 65, Left 988, Bottom 82, Right 1065)
4 Search & Replace From: -3000 To: 3000 With: Dummy (Area: Top 60, Left 809, Bottom 89, Right 839)
5 DeStripe Median Traverse: Grids: All
6 De Stagger: Grids: c11.xgd c12.xgd c1.xgd c10.xgd c13.xgd c2.xgd c9.xgd c14.xgd c3.xgd c8.xgd c15.xgd c20.xgd c21.xgd c4.xgd c7.xgd c16.xgd c19.xgd c5+a1.xgd c6+b3.xgd b4+c17.xgd c18.xgd Mode: Both By: -2 intervals
7 De Stagger: Grids: c4.xgd Mode: Both By: -1 intervals
8 De Stagger: Grids: a2.xgd b2.xgd b5.xgd b16.xgd b17.xgd b24.xgd a3.xgd b1.xgd b6.xgd b15.xgd b18.xgd b23.xgd a4.xgd a11.xgd b7.xgd b14.xgd b19.xgd b22.xgd b25.xgd a5.xgd a10.xgd b8.xgd b13.xgd b20.xgd b21.xgd a6.xgd a9.xgd b9.xgd b12.xgd a7.xgd a8.xgd b10.xgd b11.xgd Mode: Both By: -1 intervals
9 De Stagger: Grids: b9.xgd b12.xgd Mode: Both By: 1 intervals
10 De Stagger: Grids: b15.xgd b14.xgd Mode: Both By: 1 intervals
11 De Stagger: Grids: b19.xgd Mode: Both By: 1 intervals
12 De Stagger: Grids: b23.xgd Mode: Both By: 1 intervals
13 Edge Match (Area: Top 0, Left 1440, Bottom 119, Right 1559) to Left edge
14 Edge Match (Area: Top 0, Left 1200, Bottom 29, Right 1319) to Left edge
15 DeStripe Median Traverse: Grids: c6+b3.xgd b4+c17.xgd Threshold: 1.5 SDs
16 Edge Match (Area: Top 120, Left 1200, Bottom 149, Right 1319) to Top edge
17 Interpolate: Match X & Y Doubled.

Table 3: processed data metadata