

Substrata

Archaeological Geophysical Surveyors

An archaeological magnetometer survey

**Land at Trevarner Farm
Wadebridge, Cornwall**

Centred on NGR (E/N): 200130,072480 (point)

Report: 1604TRE-R-1

Ross Dean BSc MSc MA MCifA

05 May 2016

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Client:
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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

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: 21 and 22 April 2016
Area: 7.3ha
Lead surveyor: Mark Edwards BA
Author: Ross Dean BSc MSc MA MifA

1.2 Client

Stride Treglown Town Planning, Promenade House, The Promenade, Clifton Down, Bristol BS8 3NE

1.3 Location

Site: Land at Trevarner Farm
Civil Parish: Fields 1 and the western two-thirds of Field 4: Wadebridge
Fields 2 and 3: Eglloshayle (Figure 2)
County: Cornwall
Nearest Postcode: PL27 6HB
NGR: SX 001 725
Ordnance Survey NGR (E/N): 200130,072480 (point)

1.4 Archive

OASIS number: substrat1-250637
Archive: At the time of writing, the archive of this survey will be held by Substrata.

1.5 Introduction

This report presents the results of an archaeological magnetometer survey at the above site, hereafter referred to as the application area. It has been prepared for Stride Treglown Town Planning as supporting information for a forthcoming planning application. The application area location is shown in Figure 1.

Figure 2 shows the field designations used in this report for the purposes of description.

1.6 Summary

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

Forty-seven magnetic anomaly groups were mapped as representing possible archaeological deposits or structures. Of these, two are likely to represent a former field boundary and a former quarry recorded on historical maps. Two anomaly groups may represent a former ditched and metalled track or field lane. A further group may represent a less formal routeway which could be from any period or, indeed, modern. The remainder are typical of anomalies representing former field and enclosure boundaries of unknown origin and more than one phase of land enclosure.

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 application area. The results of the survey and any subsequent trial trenching will be reviewed and used to inform any ensuing mitigation.

2.2 Survey objectives

1. Complete a magnetometer 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 application 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/Digital Antiquity Guides (undated).

4 Site description

4.1 Landscape and land use

The application area comprises four fields located to the east of the town of Wadebridge (Figures 1 and 2). The northern boundary of the area is a steeply sloping and wooded stream valley with an industrial estate beyond. To the east the area is bound by Higher Trenant Road and the A389 and to the west and south by residential development on the east side of Egloshale. The southern field is separated from the rest by Green Hill, a minor road.

The topology of the site is dominated by a spur of land along which Green Hill road runs. The relatively flat land along the spur lies at approximately 50m AOD. The land descends to the south to just less than 30m AOD and to the north-north-east to approximately 35m AOD at the lip of the steeply sloping and wooded stream valley (Figure 1).

At the time of the survey the land was under low, young crops.

4.2 Geology

The application area has a solid geology of slate and sandstone of the Devonian undifferentiated Trevoise Slate Formation and Rosenum Formation. The superficial geology is not recorded in the source used (British Geological Survey, undated).

5 Archaeological background

5.1 Historic landscape characterisation

Farmland: Medieval.

The agricultural heartland, with farming settlements documented before the 17th century AD and whose field patterns are morphologically distinct from the generally straight-sided fields of later enclosure. Either medieval or prehistoric origins (Cornwall County Council, undated).

5.2 Historical and archaeological background

An archaeological assessment of an area 1000m around the application area was produced by Archaeia (Gent and Manning, 2012) as part of the same programme of work as this report and is the main source for the discussion below.

Archaeological sites, buildings, historic parks and gardens, conservation areas, registered battlefields and other aspects of the historic environment that are significant because of their historic, archaeological, architectural or artistic interest are considered *heritage assets*. *Designated heritage assets* are afforded protection as either scheduled monuments, listed buildings or through their inclusion within conservation areas. *Non-designated heritage assets* are potential archaeological remains and historic landscapes.

Only those heritage assets thought relevant to understanding this geophysical survey are discussed below.

5.2.1 Heritage assets within the application area (Gent and Manning, 2012: 5 - 6).

Field 1 (SW 99985 72607) contains a hollow way/trackway running along its eastern boundary and across the northern side of the field (Figure 2). This follows the hedgebank that divides the two northern fields and has been terraced into the steep stream valley slope. It is clearly of some antiquity. The route of the track, currently a public footpath, appears to form a continuation of the B3314 road between St Minver/St Endellion on the north coast and Egloshayle, taking the route further south into Egloshayle village. The route is shown as a trackway within the site on the Tithe Map and it seems likely that it is of at least medieval origin.

The OS map of 1908 depicts a small structure on the western side of Field 3 (SX 00098 72446). It is not shown on the Ordnance Survey map of 1888. No surface indication survives.

The Tithe Map depicts a quarry to the south of Green Hill in the north-eastern corner of Field 4 (SX 00159 72386). It is recorded in the Apportionment simply as 'Quarry'. It is shown as rough ground on later Ordnance Survey maps and has presumably been infilled as the area now forms part of a cultivated field.

A field to the south of Green Hill, now the western part of Field 4 (SX 00136 72281), is recorded as Barn Park in the Tithe Apportionment. No barn is shown within the field on the Tithe Map. The name may refer to a former barn, or perhaps one on adjacent land.

5.2.2 Heritage assets within 500m of the application area (Gent and Manning, 2012: 6 - 9).

A sub-circular enclosure, possible representing a barrow, 12m diameter, is partially visible as a faint soil mark on aerial photographs (Historic Environment Record (HER) 50353, SX 0061 7243, approximately 500m east of the area).

A possible sub-rectangular single-ditched enclosure with both straight and curving sides, 40m by 30m, is visible as a faint cropmark on aerial photographs (HER 50154, SX 0050 7257, approximately 300m east of the area).

The Tithe Apportionment records a mill pond at SX 0024 7209, approximately 100m south of the southern boundary of the area. A pond is shown on modern Ordnance Survey maps and is visible as a slight hollow on aerial photographs, although it is unclear where the water may have been used. Recent road building to the east has encroached into the pond (HER 26010).

A sub-rectangular enclosure and adjoining length of probable field boundary are visible as germination marks on aerial photographs. The features may represent part of a field system, or a late prehistoric enclosed settlement (HER 50192, SX 0013 7337, approximately 500m north of the northern boundary of the area).

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, structures and features.

The terms archaeological deposits, structures and features 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 3 shows the interpretation of the survey data. It includes the anomaly groups identified as 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 3 and Table 1 comprise the analysis of the survey data. Figures 4 and 5 display the analysis at a larger scale.

Figure 6 is a plot of the processed data as specified in Table 3. Figures 7 and 8 display the processed data at a larger scale. Figure 9 is a plot of the unprocessed data.

6.2 Discussion

6.2.1 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 application area edges was restricted as shown in Figures 3 to 8 due to the presence of magnetic materials adjacent to the application area and to dense vegetation as indicated. Strong magnetic responses mapped close to survey boundaries are likely to relate to these materials except where otherwise indicated in Figure 2.

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.

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.

Anomalies thought to relate to natural features were not mapped.

Numerous dipole magnetic anomalies are scattered across the data set. These are likely to represent recent buried ferrous objects and such anomalies are frequently found in close proximity to settlements.

Data trends

Parallel data trends running northwest to southeast in Fields 1, 2 and 4, and west-south-west to east-north-east in Field 3, are likely to represent recent ploughing.

6.2.2 Data relating to historic maps and other records

Magnetic anomaly group **28** represents the site of a former quarry, mapped on the 1841 Egloshayle tithe map and shown as rough ground on later historic maps.

Group **31** coincides with, and likely represents, a field boundary recorded on historic and recent maps as listed in Table 1.

6.2.3 Data with no previous archaeological provenance

Magnetic anomaly group **22** may represent stone footings or an area of field drains.

Groups **29** and **30** may represent the flanking ditches and metalling respectively or a former field lane or track.

It is not clear whether group **32** represents relatively recent ground disturbance or indicates the presence of a past informal routeway.

The remaining magnetic anomalies mapped as possible archaeological deposits or structures are typical of anomalies representing former field and enclosure boundaries of unknown origin and of more than one phase of land enclosure.

6.3 Conclusions

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

Forty-seven magnetic anomaly groups were mapped as representing possible archaeological deposits or structures. Of these, two are likely to represent a former field boundary and a former quarry recorded on historical maps. Two anomaly groups may represent a former ditched and metalled track or field lane. A further group may represent a less formal routeway which could be from any period or, indeed, modern. The remainder are typical of anomalies representing former field and enclosure boundaries of unknown origin and more than one phase of land enclosure.

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). This report contains material that is non-Substrata copyright or the intellectual property of third parties. Such material is labelled with the appropriate copyright and is non-transferrable by Substrata.

8 Acknowledgements

Substrata would like to thank Mike Harris of Stride Treglown Town Planning for commissioning us to complete this survey.

9 Bibliography

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Dean, R. (2016) *A survey method statement for a detailed magnetometer survey over land at Trevarner Farm, Wadebridge, Cornwall*, Substrata unpublished document 1604TRE-M-1

Gent, T. and Manning, P. (2012) *Archaeological assessment of land at Trevarner Farm, Wadebridge, Cornwall*, Archaedia unpublished document Report 12.02

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 2016]

Appendix 1 Supporting plots

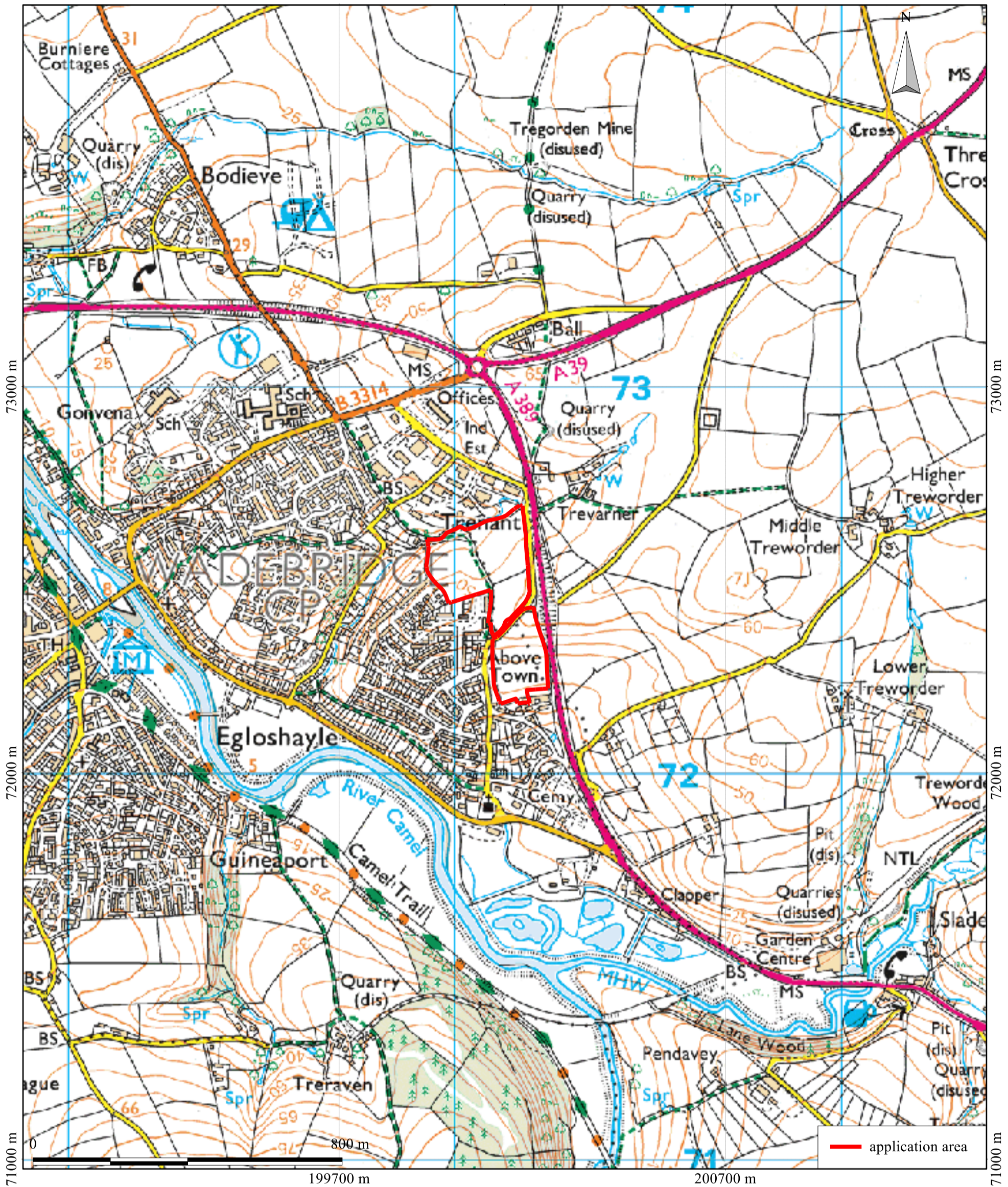
General Guidance

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.

199700 m

200700 m



British Grid
 centre X: 200128.75 m, centre Y: 72481.25 m

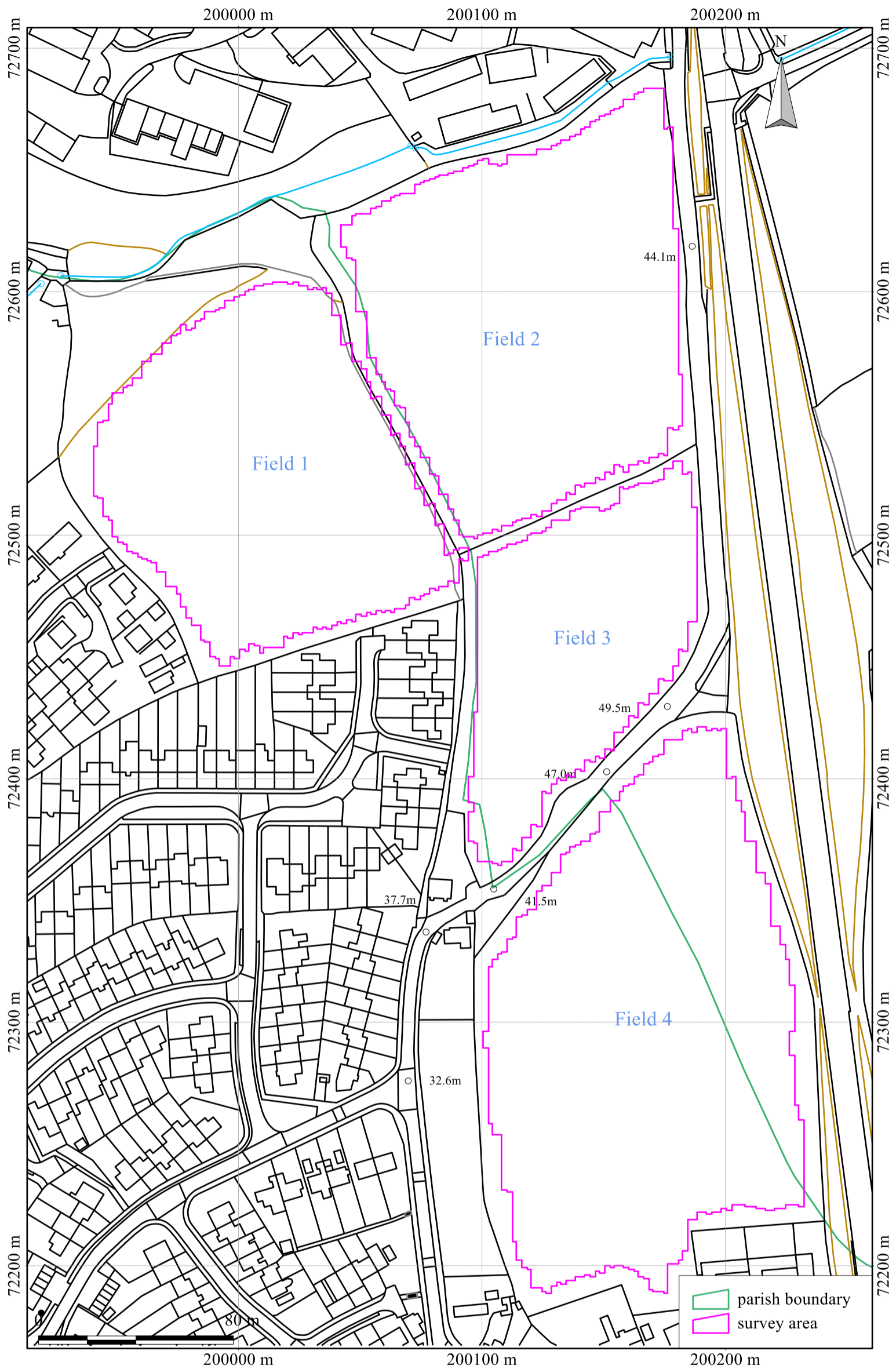
Geophysical survey: Copyright Substrata 2016.
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Scale: 1:10000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at Trevarner Farm, Wadebridge, Cornwall
 Centred on NGR (E/N): 200130,072480 (point)
 Report: 1604TRE-R-1

Figure 1: location map

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British Grid
 centre X: 200086.77 m, centre Y: 72437.21 m

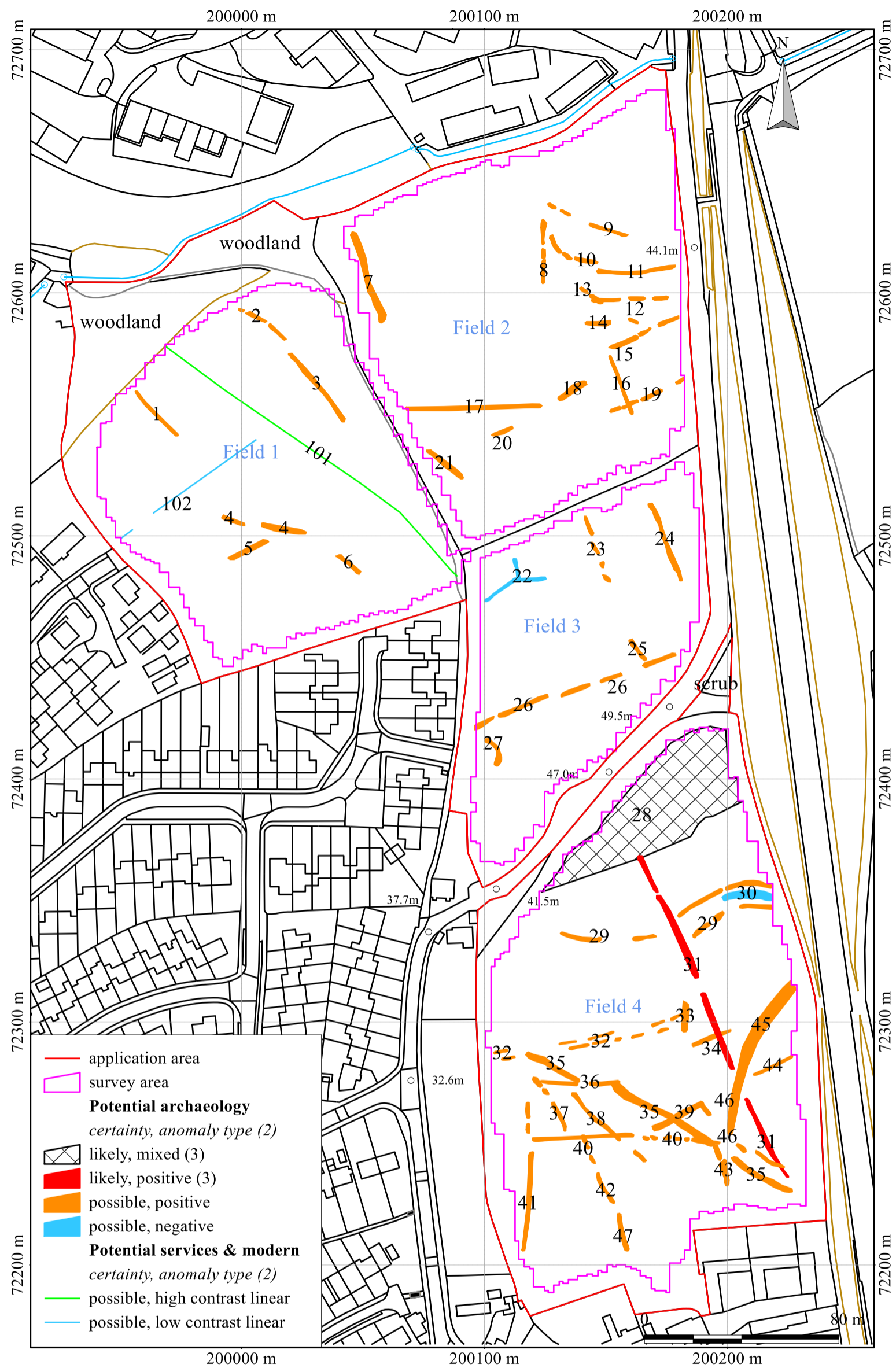
Geophysical survey: Copyright Substrata 2016.
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Scale: 1:1800 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at Trevarner Farm, Wadebridge, Cornwall
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Figure 2: field designations and parish boundaries

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British Grid
centre X: 200086.77 m, centre Y: 72437.21 m

Geophysical survey: Copyright Substrata 2016.
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Notes:

Scale: 1:1800 @ A3. Spatial Units: Meter. Do not scale off this drawing

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.

An archaeological gradiometer survey
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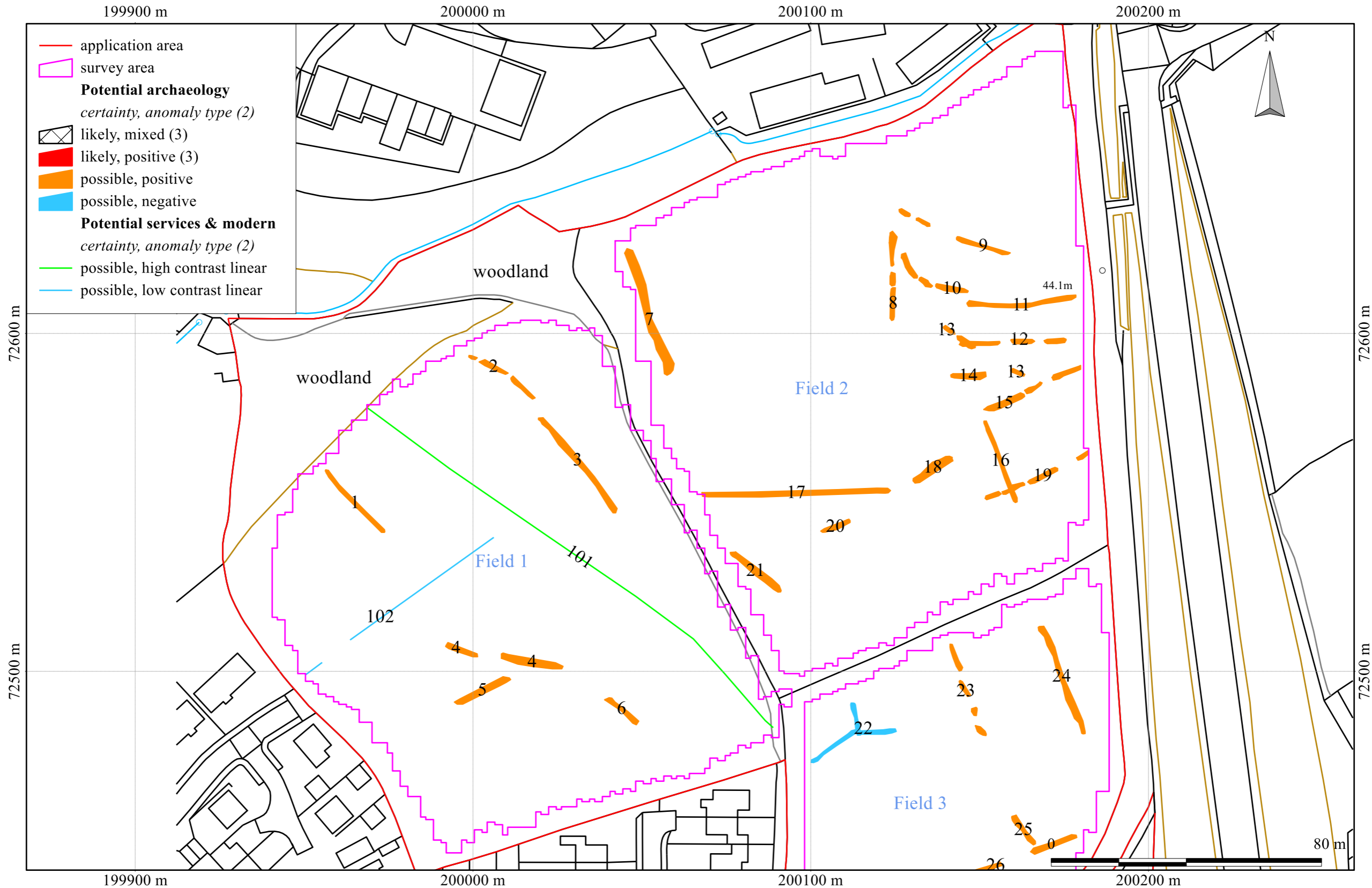
Figure 3: survey interpretation, all fields

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field number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence	
1	1		possible, positive	linear				
	2	3	possible, positive	disrupted curvilinear				
	3	2	possible, positive	linear				
	4		possible, positive	disrupted linear				
	5		possible, positive	linear				
	6		possible, positive	linear				
2	101		possible, high contrast linear		ferrous pipe, cable or drain service trench			
	102		possible, low contrast linear					
	7		possible, positive	linear				
	8		possible, positive	disrupted linear				
	9		possible, positive	disrupted linear				
	10		possible, positive	disrupted curvilinear				
	11		possible, positive	curvilinear				
	12		possible, positive	disrupted linear				
	13		possible, positive	disrupted linear				
	14		possible, positive	linear				
	15		possible, positive	disrupted linear				
	16		possible, positive	linear				
	17		possible, positive	linear				
	18		possible, positive	linear				
	19		possible, positive	disrupted linear				
	20		possible, positive	linear				
	21		possible, positive	linear				
	3	22		possible, negative	multi-linear	building footings or drains	anomaly group may represent relatively recent archaeological deposits or an area of field drains	
		23		possible, positive	disrupted linear			
		24		possible, positive	linear			
		25		possible, positive	linear			
26			possible, positive	disrupted linear				
27			possible, positive	curvilinear				
4	28		likely, mixed		quarry	anomaly groups coincide with a former quarry mapped in 1841 as a quarry and as rough ground between 1881 and 1963	1841 Egloshayle tithe map, Ordnance Survey maps 1881 1:2500 to 1963 1:10560	
	29	30	possible, positive	disrupted curvilinear	track flanking ditches			
	30	29	possible, negative	disrupted curvilinear	track metalling			
	31		likely, positive	disrupted linear	field boundary	anomaly groups coincide with a field boundary mapped between 1841 and at least 1978	1841 Egloshayle tithe map, Ordnance Survey maps 1881 1:2500 to 1978-84 1:10000	
	32		possible, positive	disrupted parallel linear	ground disturbance	anomaly groups may represent ground disturbance either from a historic/prehistoric former routeway or after service laying or from recent stock and/or vehicle movement		
	33		possible, positive	linear				
	34		possible, positive	linear				
	35		possible, positive	disrupted linear				
	36		possible, positive	disrupted linear				
	37		possible, positive	disrupted curvilinear				
	38		possible, positive	disrupted linear				
	39		possible, positive	linear				
	40		possible, positive	disrupted curvilinear				
	41		possible, positive	disrupted curvilinear				
	42		possible, positive	disrupted linear				
	43		possible, positive	disrupted linear				
	44		possible, positive	linear				
	45		possible, positive	disrupted curvilinear				
	46		possible, positive	disrupted curvilinear				
	47		possible, positive	linear				

Table 1: data analysis



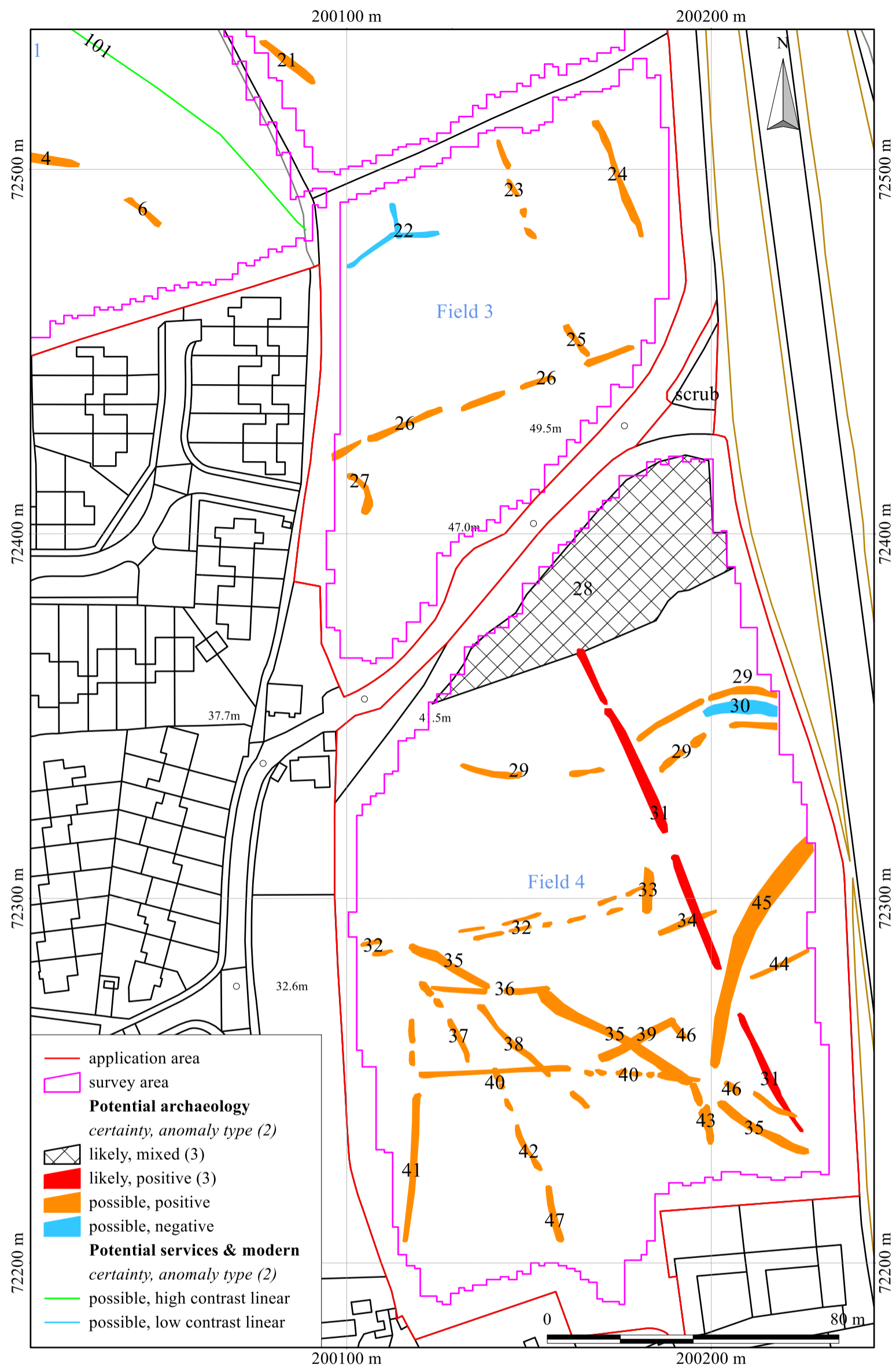
British Grid
 centre X: 200064.34 m, centre Y: 72566.42 m

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

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 Base map: © Crown copyright 2016. Supplied by mapserve.co.uk
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- 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

Figure 4: survey interpretation, fields 1 and 2



British Grid
centre X: 200128.96 m, centre Y: 72357.61 m

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Notes:

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

1. All interpretations are provisional and represent potential archaeological deposits.
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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 5: survey interpretation, fields 3 and 4

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British Grid
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Figure 6: shade plot of processed data, all fields

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

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Figure 7: shade plot of processed data, fields 1 and 2



British Grid
 centre X: 200128.96 m, centre Y: 72357.61 m

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Figure 8: shade plot of processed data, fields 3 and 4

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Appendix 2 Methodology Summary

Table 2: methodology summary	
<p>Documents Survey methodology statement: Dean (2016)</p>	
<p>Methodology</p> <ol style="list-style-type: none"> 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/ 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> 0.25m <i>Traverse Interval:</i> 1 metre <i>Traverse Method:</i> zigzag <i>Traverse Orientation:</i> GN</p>
<p>Data Processing, Analysis and Presentation Software 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 3: magnetometer survey - processed data metadata	
SITE	
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:	3.0.29.1
Stats	
Max:	98.70
Min:	-72.70
Std Dev:	7.05
Mean:	-0.14
Median:	-0.14
Processes: 21	
1 Base Layer	
2 Clip at 1.00 SD	
3 Clip at 1.00 SD	
4 De Stagger: Grids: All Mode: Both By: -2 intervals	
5 De Stagger: Grids: a25+a36.xgd a35.xgd a34.xgd a33.xgd a32.xgd Mode: Both By: -1 intervals	
6 De Stagger: Grids: c21.xgd c26.xgd c20.xgd c27.xgd Mode: Both By: 2 intervals	
7 De Stagger: Grids: d5.xgd Mode: Both By: -1 intervals	
8 De Stagger: Grids: b12.xgd b11.xgd b10.xgd Mode: Both By: 1 intervals	
9 De Stagger: Grids: c21.xgd Mode: Both By: -1 intervals	
10 De Stagger: Grids: c26.xgd Mode: Both By: -5 intervals	
11 DeStripe Median Traverse: Grids: c10.xgd c23.xgd c24.xgd c11.xgd c22.xgd c25.xgd d9.xgd d10.xgd c12.xgd c21.xgd c26.xgd d8.xgd d11.xgd c13.xgd c20.xgd c27.xgd d7.xgd d12.xgd c14.xgd c19.xgd c28.xgd d6.xgd d13.xgd c15.xgd c18.xgd c29.xgd d5.xgd d14.xgd b21.xgd b28.xgd c17.xgd c30.xgd d4.xgd b22.xgd b27.xgd c1+c16.xgd c31.xgd d3.xgd b23.xgd b26.xgd c2.xgd c9+d1.xgd d2.xgd a7.xgd a8.xgd a19.xgd a20.xgd a27.xgd b25.xgd c3.xgd c8.xgd a6.xgd a9.xgd a18.xgd a21.xgd b1+a26.xgd b2+b24.xgd c4.xgd c7.xgd a1.xgd a5.xgd a10.xgd a17.xgd a22.xgd a25+a36.xgd b3.xgd b14+c5.xgd b15+c6.xgd a2.xgd a4.xgd a11.xgd a16.xgd a28+a23.xgd a35.xgd b4.xgd b13.xgd b16.xgd a3.xgd a12.xgd a15.xgd a29+a24.xgd a34.xgd b5.xgd b12.xgd b17.xgd	
12 DeStripe Median Sensors: a30.xgd a33.xgd b6.xgd b11.xgd b18.xgd a31.xgd a32.xgd b7.xgd b10.xgd b19.xgd b8.xgd b9.xgd b20.xgd	
13 Edge Match (Area: Top 210, Left 1920, Bottom 239, Right 2039) to Left edge	
14 Edge Match (Area: Top 240, Left 1920, Bottom 269, Right 2039) to Left edge	
15 Edge Match (Area: Top 180, Left 1800, Bottom 209, Right 1919) to Left edge	
16 Edge Match (Area: Top 150, Left 1800, Bottom 179, Right 1919) to Left edge	
17 Edge Match (Area: Top 120, Left 1800, Bottom 149, Right 1919) to Left edge	
18 Edge Match (Area: Top 240, Left 720, Bottom 269, Right 839) to Left edge	
19 Edge Match (Area: Top 210, Left 720, Bottom 239, Right 839) to Left edge	
20 Edge Match (Area: Top 270, Left 840, Bottom 299, Right 959) to Left edge	
21 Interpolate: Match X & Y Doubled.	

Appendix 4 unprocessed data plot

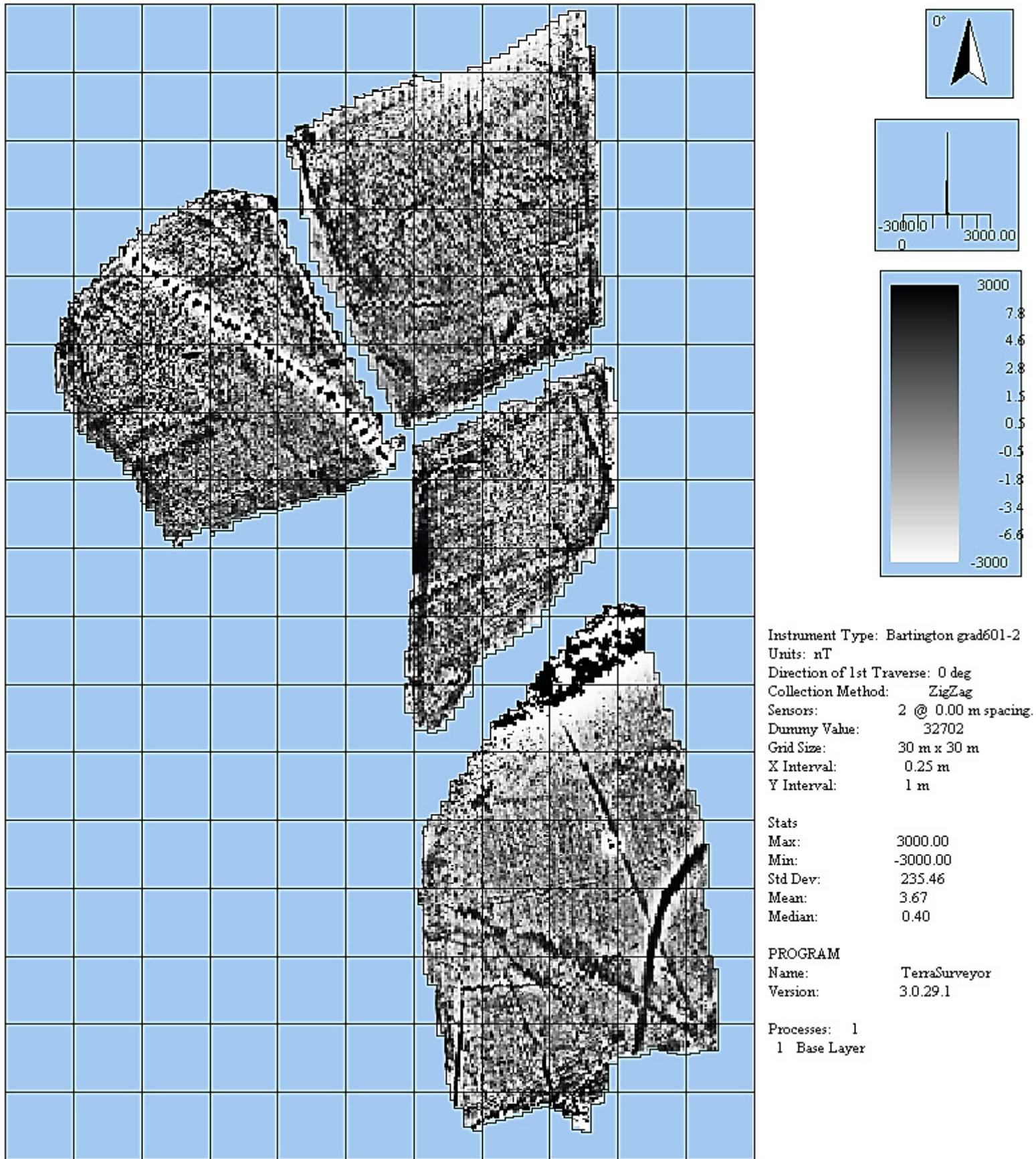


Figure 9: shade plot of unprocessed data