



An archaeological gradiometer survey

Land at Chapel Gover
Newquay, Cornwall

Centred on NGR (E/N):183100,61000 (point)

Report: 1511CHA-R-1

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15 December 2015

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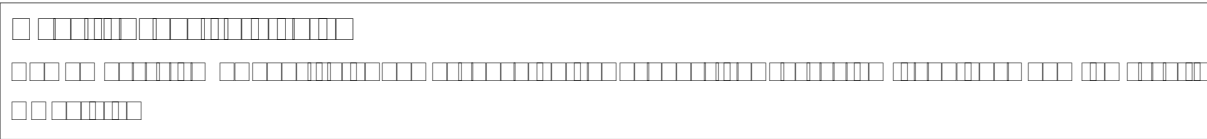
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Project archive

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 interpretationAutoCAD DXF



1 Survey description and summary

1.1 Survey

Type: twin-sensor fluxgate gradiometer
Date: 9 to 17 November 2015
Area: gradiometer survey: 25ha
Lead surveyor: Mark Edwards BA
Author: Ross Dean BSc MSc MA MifA

1.2 Client

Cotswold Archaeology, Building 11, Kemble Enterprise Park, Cirencester, Gloucestershire GL7 6BQ

1.3 Location

Site: Land at Chapel Gover
Town and Civil Parish: Newquay
County: Cornwall
Nearest Postcode: TR8 4NX
NGR: SW 831 610
Ordnance Survey NGR (E/N): 183100,61000 (point)

1.4 Archive

OASIS number: substrat1-234564
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 Cotswold Archaeology on behalf of clients. It is part of a programme of archaeological works undertaken in advance of a proposed residential development at the above site. The survey methodology conformed to a Written Scheme of Investigation (Brown, 2015) in accordance with the guidance of the Cornwall Archaeological Unit. The site location is shown in Figure 1.

1.6 Summary

[REDACTED]

2 Survey aims and objectives

2.1 Aims

1. The overall aim of the geophysical survey programme is to gather sufficient information to establish the extent, condition, character and date (as far as circumstances permit) of any previously unrecorded archaeological features and deposits within the site area.
2. A further aim of the survey is to obtain information that will contribute to an evaluation of the significance of impact of the scheme upon cultural heritage, and which will enable further evaluation and/or mitigation measures to be designed, as appropriate. If further mitigation measures include intrusive archaeological evaluation or monitoring, any anomalies or potential archaeological features identified through the geophysical will provide targets for evaluation trenching or monitoring during construction.

2.2 Survey objectives

1. Complete a magnetometer (gradiometer) 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 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 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 development area (the Site) is located on the eastern edge of Newquay, Cornwall, approximately 1.65km southeast of the town centre in an area earmarked for significant urban expansion, including strategic infrastructure, residential and commercial development. The Site comprises seven agricultural fields, is irregular in shape and extends to approximately 29 hectares. It is bordered by Chapel Stream in the north, the Newquay to Par branch railway line in the south, open agricultural land in the east and land currently being developed for housing by Taylor Wimpey in the west.

The site slopes gently from south to north. The southern boundary adjacent to the railway line sits at approximately 45m Above Ordnance Datum (AOD) while the northern boundary is at approximately 25m AOD, adjacent to Chapel Stream. The proposed development area is subdivided by a series of Cornish banks, that form linear fields across part of the Site (Brown, 2015).

4.2 Geology

The solid geology across the site is the Devonian Meadfoot Group which typically comprises dark shales and siltstones with sporadic grey-brown sandstones and beds of decalcified shell debris (British Geological Survey, undated).

The superficial geology on the northeast of the site, south of Chapel Stream, comprises Quaternary Head. Head is a polymict deposit of gravel, sand and clay depending on upslope source and distance from source. The poorly sorted and poorly stratified deposits are formed mostly by solifluction and/or hillwash and soil creep. Essentially Head comprises sand and gravel, locally with lenses of silt, clay or peat and organic material. Quaternary alluvium is present in the vicinity of Chapel Stream on the northern boundary of the Site. Alluvium is normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel, often with a stronger, desiccated surface zone. Elsewhere within the Site the superficial deposits are not recorded in the source used (ibid).

5 Archaeological background

In April 2014, the Cornwall Archaeology Unit made the following comments in response to an Environmental Impact Assessment Scoping Consultation related to the current application, 'This site lies within an area particularly rich in historic assets and increasingly well researched as a result of the various urban expansion schemes to the east and south of Newquay.' (Brown, 2015)

4558.10 at NGR SW 828 606).

From the Post Medieval period onwards there is evidence of mining activity in the area. At Treloggan (HER 41227 at NGR SW 822 611), to the southwest of the survey area, a mine was in operation from 1844 to 1846 and worked again in 1853. More evidence of Post-medieval mining can be seen in close proximity to the survey area at Wheal Arundell Consols (HER 41221 at NGR SW 8330 6125).

5.2.3 Previous archaeological investigations

General

Archaeological investigations have been undertaken within and to the south of the site, along and around the Newquay Strategic Route to the north of the Chapel Stream (within the 'Newquay Growth Area'), and to the west (Trencreek / Trevenson developments by Taylor Wimpey). All of these investigations have demonstrated high archaeological potential with Middle Bronze Age settlement known from the Taylor Wimpey development, Iron Age Settlement known from the Newquay Strategic Route to the south, and further features known from geophysical surveys undertaken in advance of the Newquay Growth Area to the north of the Chapel Stream.

Within the Site

The archaeological investigations undertaken in advance of the Newquay Strategic Route comprised a geophysical survey followed by excavations undertaken along a 40m wide strip which crossed the Site running toward its eastern edge. Both to the north and south of the Site these investigations revealed a range of Prehistoric to Modern archaeological features but within the Site, relatively few archaeological features were recorded. The post-geophysics evaluation trenching revealed undated ditches, two of which appear to be flanking ditches to a trackway, the western continuation of which is still in existence (Cotswold Archaeology, 2011).

A desk-based assessment has previously been completed for the Site (CGMS, 2013). The desk-based assessment identified limited evidence for archaeological remains within the proposed development site.

magnetic readings generated by steel and other magnetic components of the track and surrounding structures (survey areas 8, 9 and 10).

The area of enhanced magnetic response recorded in area 6 is likely to reflect a spread of material from the demolished field wall represented by magnetic anomaly group 24 in Figures 2 and 5.

6.2.2 Data relating to historical maps and other records

Magnetic anomaly groups **19** (area 6, Figure 4), **24** (area 6, Figure 4), **27** (area 7, Figure 6), **39** (area 9, Figure 6), **42** (area 9, Figure 6), **43** (area 9, Figure 6), **44** (area 9, Figure 6), **50** (area 10, Figure 7) and **54** (area 10, Figure 7) coincide with historical field boundaries mapped by the Ordnance Survey as recorded in Table 1.

6.2.3 Data with no previous archaeological provenance

All of the remaining anomaly groups characterised as representing potential archaeological deposits or features are typical of anomalies representing former field boundaries, enclosures and tracks of more than one phase of land enclosure.

6.3 Conclusions

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

Sixty-seven magnetic anomaly groups were mapped as possibly representing archaeological deposits or features. Nine groups represent former field boundaries mapped by the Ordnance Survey since 1881 and now removed. A number of groups represent former ridge-and-furrow cultivation. All of the remaining anomaly groups characterised as representing potential archaeological deposits or features are typical of anomalies representing former field boundaries, enclosures and tracks of 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 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 present than those specified in this report.

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8 Acknowledgements

Substrata would like to thank Derek Evans, Project Manager, Cotswold Archaeology for commissioning us to complete this survey.

9 Bibliography

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Brown, M. (2015) [Online], Available: <http://www.wygplanningandenvironment.co.uk>

Chartered Institute for Archaeologists (2014a) [Online], Available: http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf [December 2015]

Chartered Institute for Archaeologists (2014b) [Online], Available: <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf> [October 2015]

Clark, A. (2000) [Online], Available: <http://www.routledge.com>

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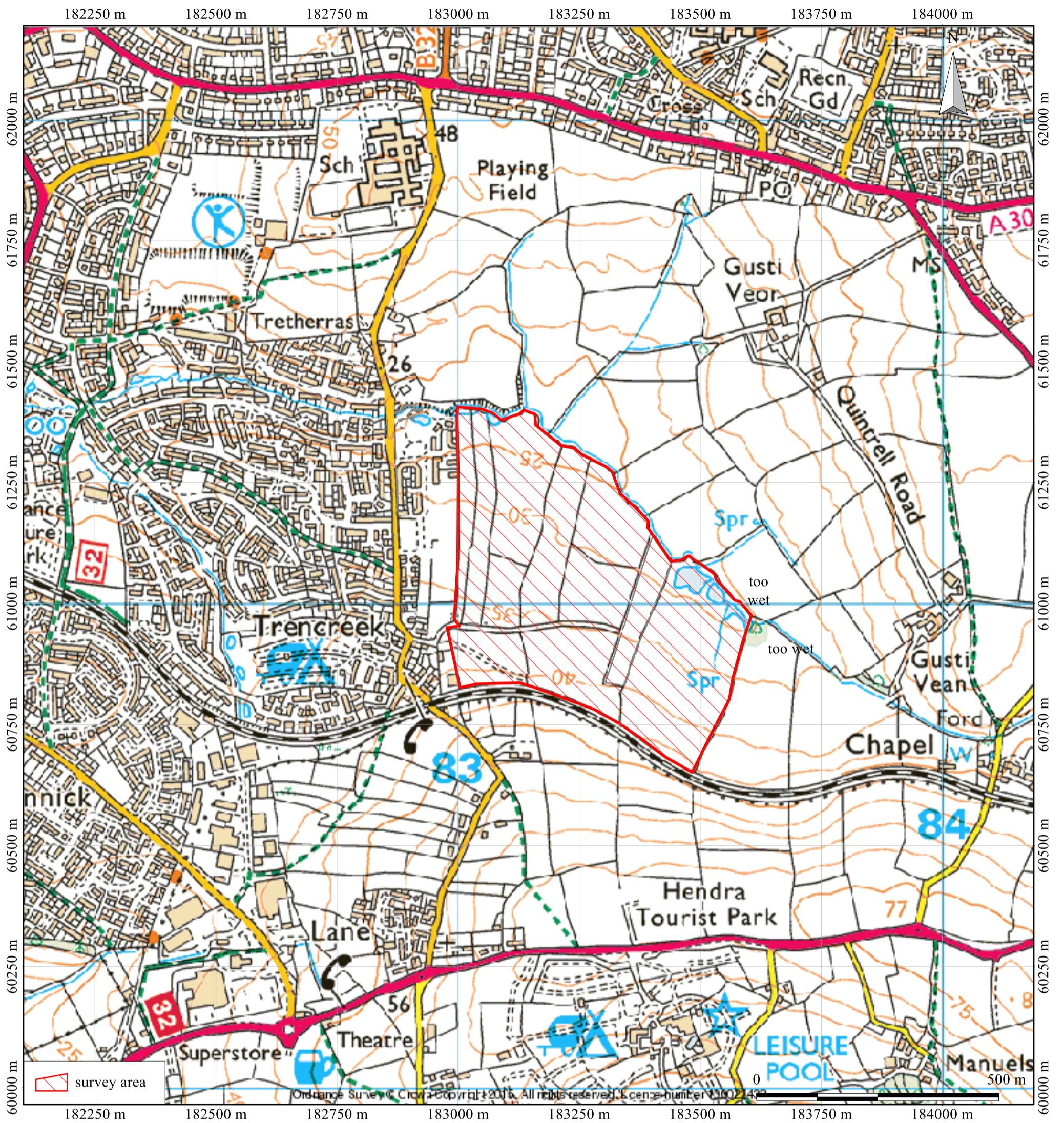
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Appendix 1 Analysis table and supporting plots

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.



British Grid
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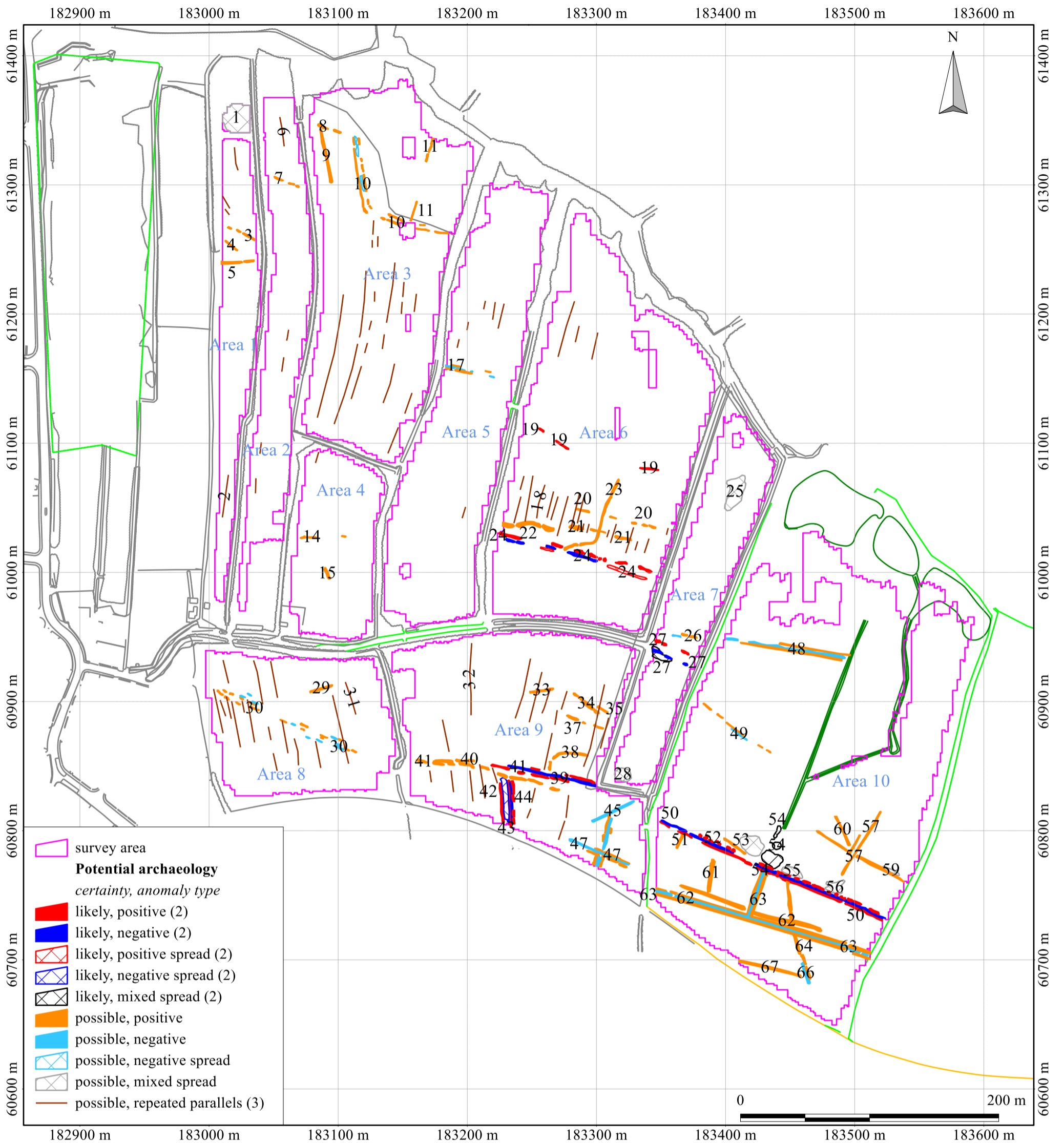
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An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 1: location map

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British Grid
centre X: 183247.52 m, centre Y: 60997.95 m

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Scale: 1:3000 @ 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.

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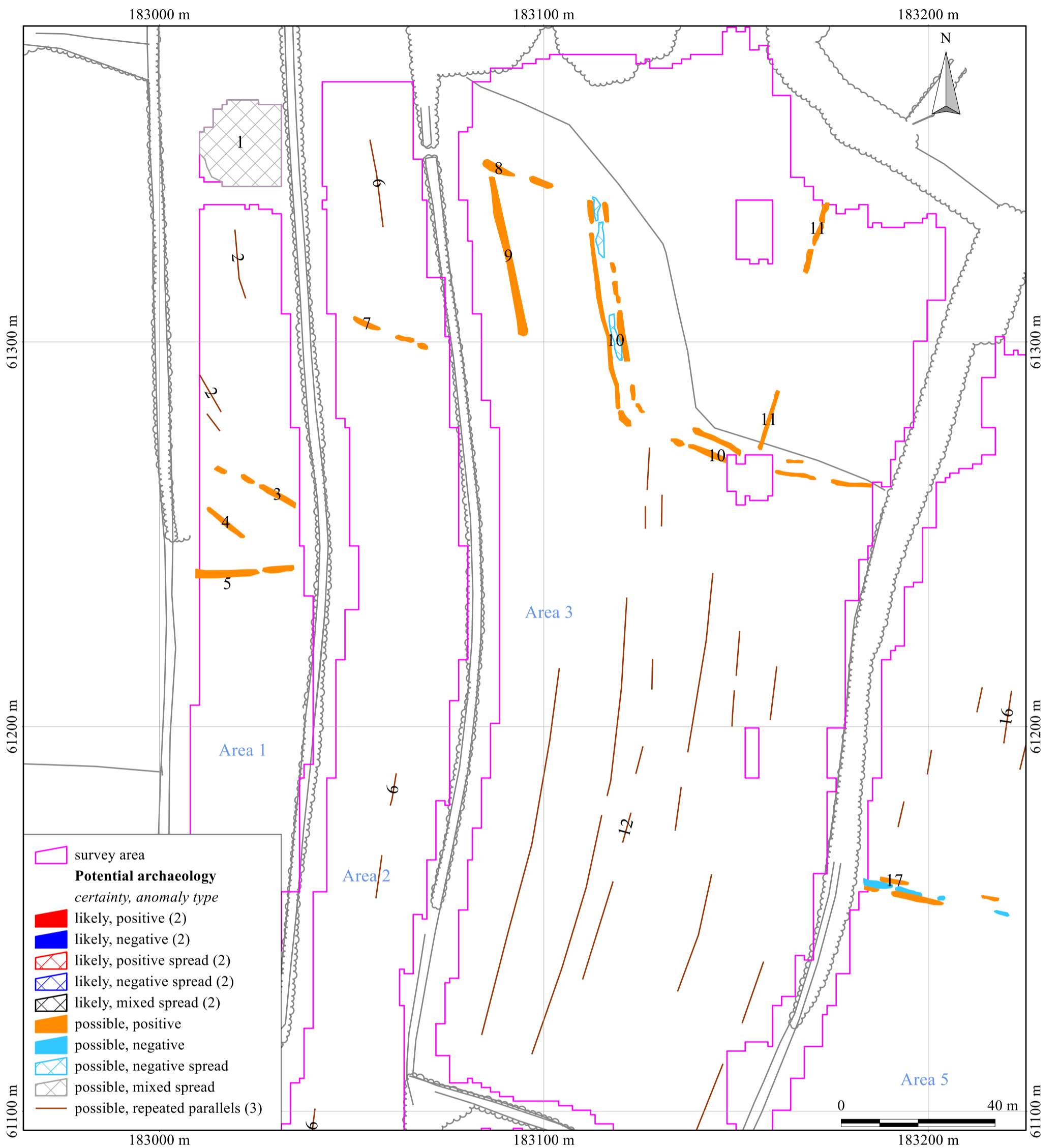
Figure 2: survey interpretation, all areas

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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, mixed spread	irregular	rubble or near-surface bed rock		
	2		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
	3		possible, positive	disrupted linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
	4		possible, positive	linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
	5		possible, positive	linear			
2	6		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
3	7		possible, positive	disrupted linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
	8		possible, positive	disrupted linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
	9		possible, positive	linear		anomaly group is most likely to represent ridge-and-furrow but may represent a field boundary	
	10		possible, positive & negative spread	disrupted parallel linear	ditch-lined track	anomaly group may represent a former track or routeway, possibly with stony metalling	
	11		possible, positive	disrupted linear			
	12		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
4	13		possible, repeated parallels	linear	former ploughing traces - possible ride-and-furrow		
	14		possible, positive	disrupted linear			
	15		possible, positive	linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
5	16		possible, repeated parallels	linear	former ploughing traces - possible ride-and-furrow		
	17		possible, positive/negative/positive	disrupted linear	field boundary - Cornish bank	anomaly group is faint but is most likely to represent a former field boundary	
6	18		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
	19		likely, positive	multi-linear	field boundary	although very faint, the anomaly group coincides with and likely represents a former field boundary mapped by the OS between 1881-83 and 1973-74	Ordnance Survey maps 1881-83 1:2500 to 1981-91 1:2500
	20		possible, positive	disrupted linear		anomaly group may represent an archaeological deposit or is an expression of near-surface geology	
	21		possible, positive	disrupted linear		anomaly group may represent an archaeological deposit or is an expression of near-surface geology	
	22		possible, positive	disrupted linear		anomaly group may represent an archaeological deposit or is an expression of near-surface geology	
	23		possible, positive	disrupted curvilinear		anomaly group may represent a former field boundary or a combination of field boundary and remnant ridge-and-furrow	
	24		likely, positive/negative/positive	disrupted linear	field boundary - Cornish bank	anomaly group is faint but is most likely to represent a former field boundary a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
7	25		possible, mixed spread	irregular	archaeological deposit, recent rubble or near-surface bed rock		
	26	48	possible, positive & negative				
	27		likely, mixed spread/positive/negative	linear	rubble from former field boundary	anomaly group coincides with and is most likely to represent a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
	28		possible, mixed spread	irregular	archaeological deposit, recent rubble or near-surface bed rock		
8	29		possible, positive				
8	30		possible, positive & negative	disrupted linear spread	route way or other linear disturbance	anomaly group is most likely to represent a routeway between two extant field entrances or, less likely in this case, the line of disturbance caused by service pipe or cable laying	
8	31		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
	32		possible, repeated parallels	linear & curvilinear	former ploughing traces - possible ride-and-furrow		
9	33		possible, positive	linear			
	34		possible, positive	linear			
	35		possible, positive	linear			
	36		possible, positive	linear			
	37		possible, positive	disrupted linear			
	38		possible, positive	disrupted curvilinear			
	39	40	likely, positive/negative/positive	disrupted linear	field boundary - Cornish bank	anomaly group coincides with and is most likely to represent a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
	40	39	possible, positive	disrupted linear		anomaly group may represent an extension westwards of group 39	
	41		possible, positive	disrupted linear			
	42		likely, positive	linear	field lane edge	anomaly group coincides with and is most likely to represent a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
	43		likely, negative spread	linear	field lane	anomaly group coincides with and is most likely to represent a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
	44		likely, positive/negative/positive	disrupted linear	field boundary - Cornish bank	anomaly group coincides with and is most likely to represent a former field boundary mapped by the OS between 1881 and 1963	Ordnance Survey maps 1881-83 1:2500 to 1963 1:10560
	45		possible, negative	linear			
	46		possible, positive/negative/positive	disrupted linear	field boundary - Cornish bank		
	47		possible, positive/negative/positive	disrupted linear	field boundary - Cornish bank		
10	48	26	possible, positive/negative/positive	linear	field boundary - Cornish bank		
	49		possible, positive & negative	disrupted linear			
	50		likely, positive/negative/positive	disrupted linear	field boundary - possible Cornish bank	anomaly group coincides with and likely represents a former field boundary mapped by the OS between 1881 and sometime after 1991	Ordnance Survey maps 1881-83 1:2500 to 1981-91 1:2500
	51		possible, positive	linear			
	52		possible, positive	linear			
	53		possible, mixed spread	irregular	rubble		
	54		likely, mixed spread	irregular	rubble associated with former field wall	anomaly group coincides with and likely represents a former field boundary mapped by the OS between 1881 and 1973 - 83	Ordnance Survey maps 1881-83 1:2500 to 1973-83 1:10000
	55		possible, mixed spread	irregular	rubble		
	56		possible, mixed spread	irregular	rubble		
	57		possible, positive	parallel linear	ditched track or road		
	58	59	possible, positive	disrupted linear			
	59	58	possible, mixed spread	linear			
	60		possible, positive	linear		anomaly group may represent a linear archaeological deposit, a ploughing trace or a field drain	
	61		possible, positive	linear			
	62		possible, positive	disrupted linear			
	63		possible, positive/negative/positive	disrupted multilinear	field boundary - Cornish bank		
	64		possible, positive	disrupted linear			
	65		possible, positive	disrupted linear			
10	66		possible, negative	linear			
	67		possible, positive	linear			

Table 1: data analysis



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 centre X: 183095.02 m, centre Y: 61238.58 m

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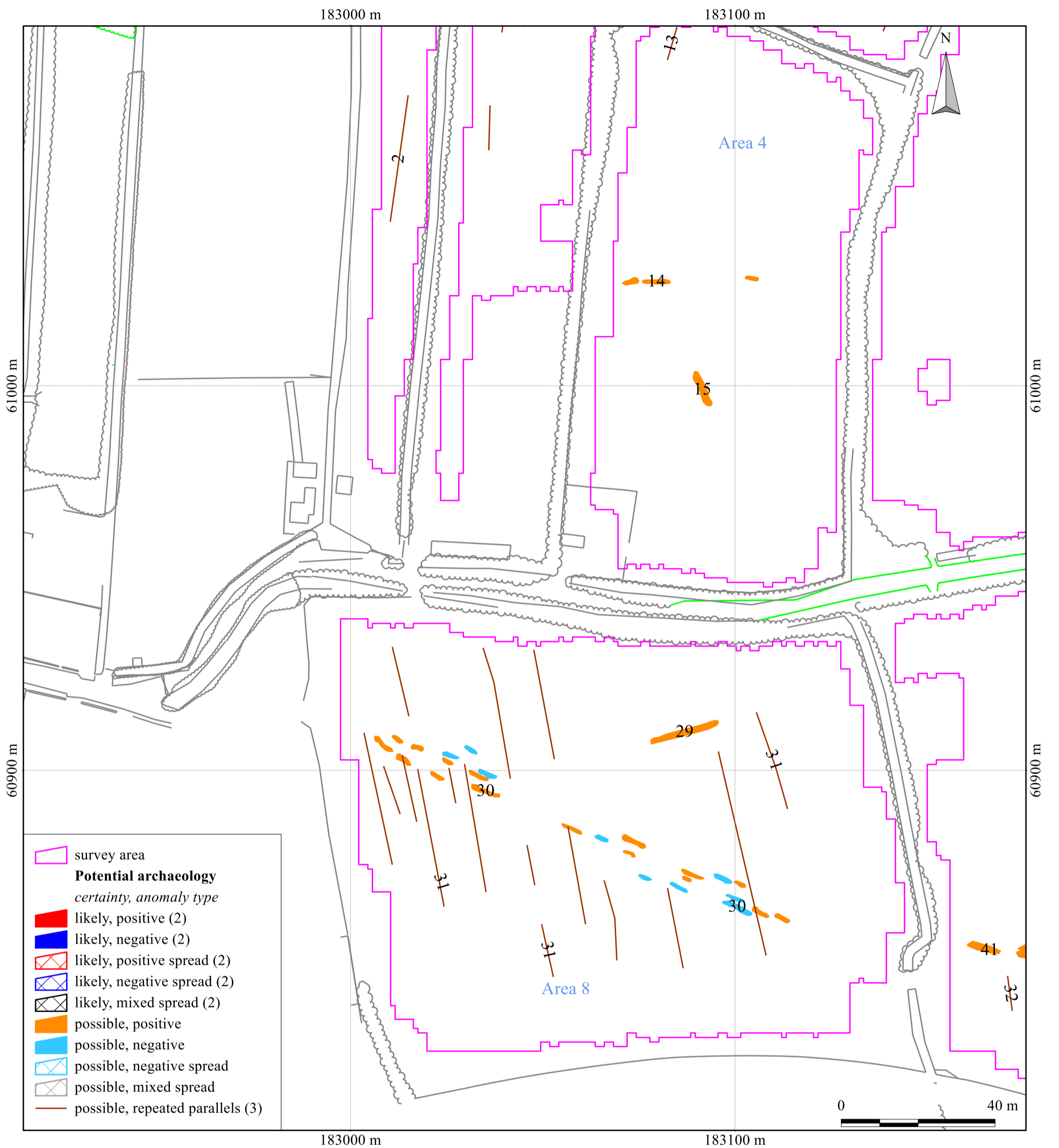
Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

- 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.

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Figure 3: survey interpretation, area 1,
 area 2 and area 3

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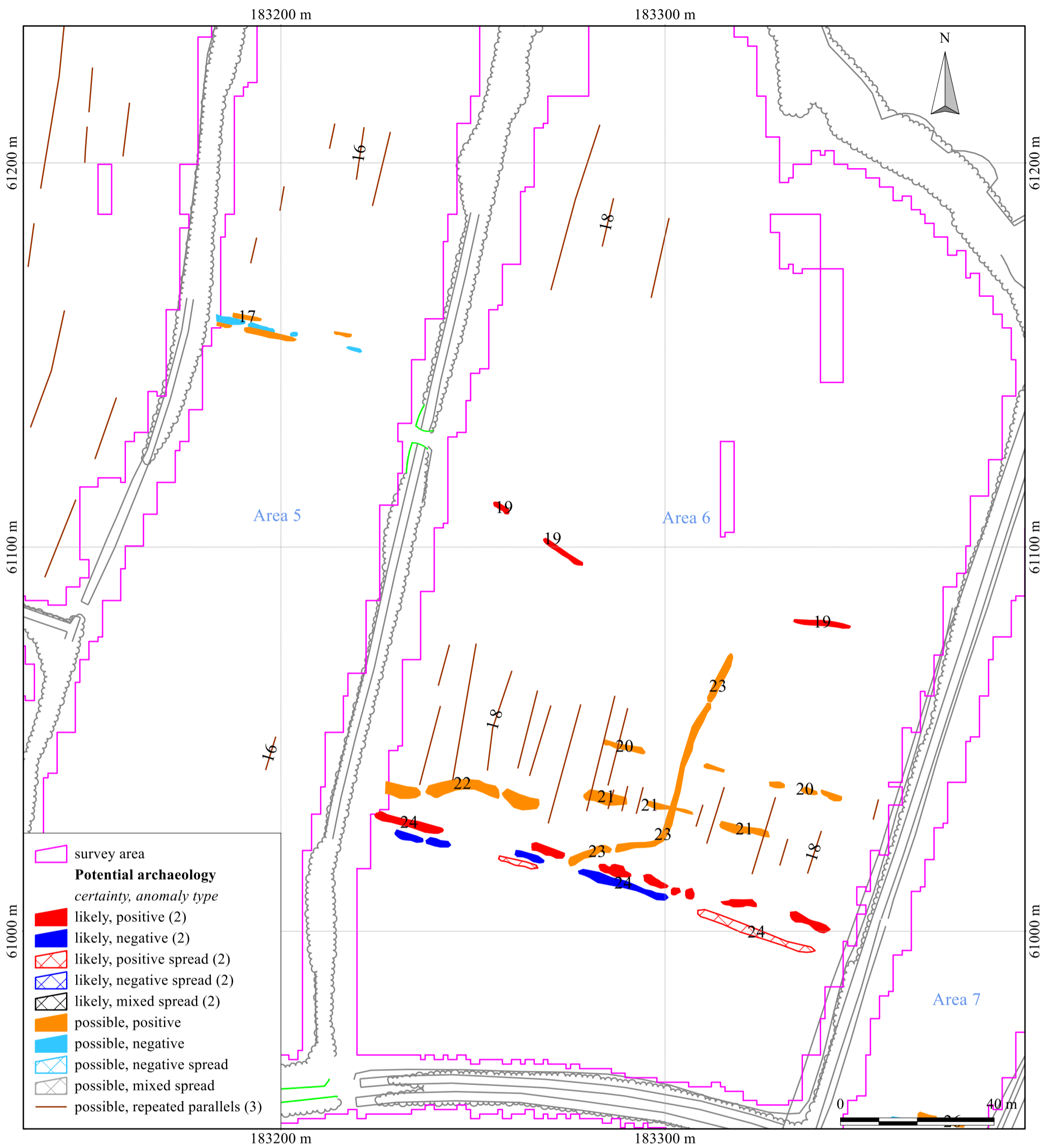
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Figure 4: survey interpretation, area 4 and area 8

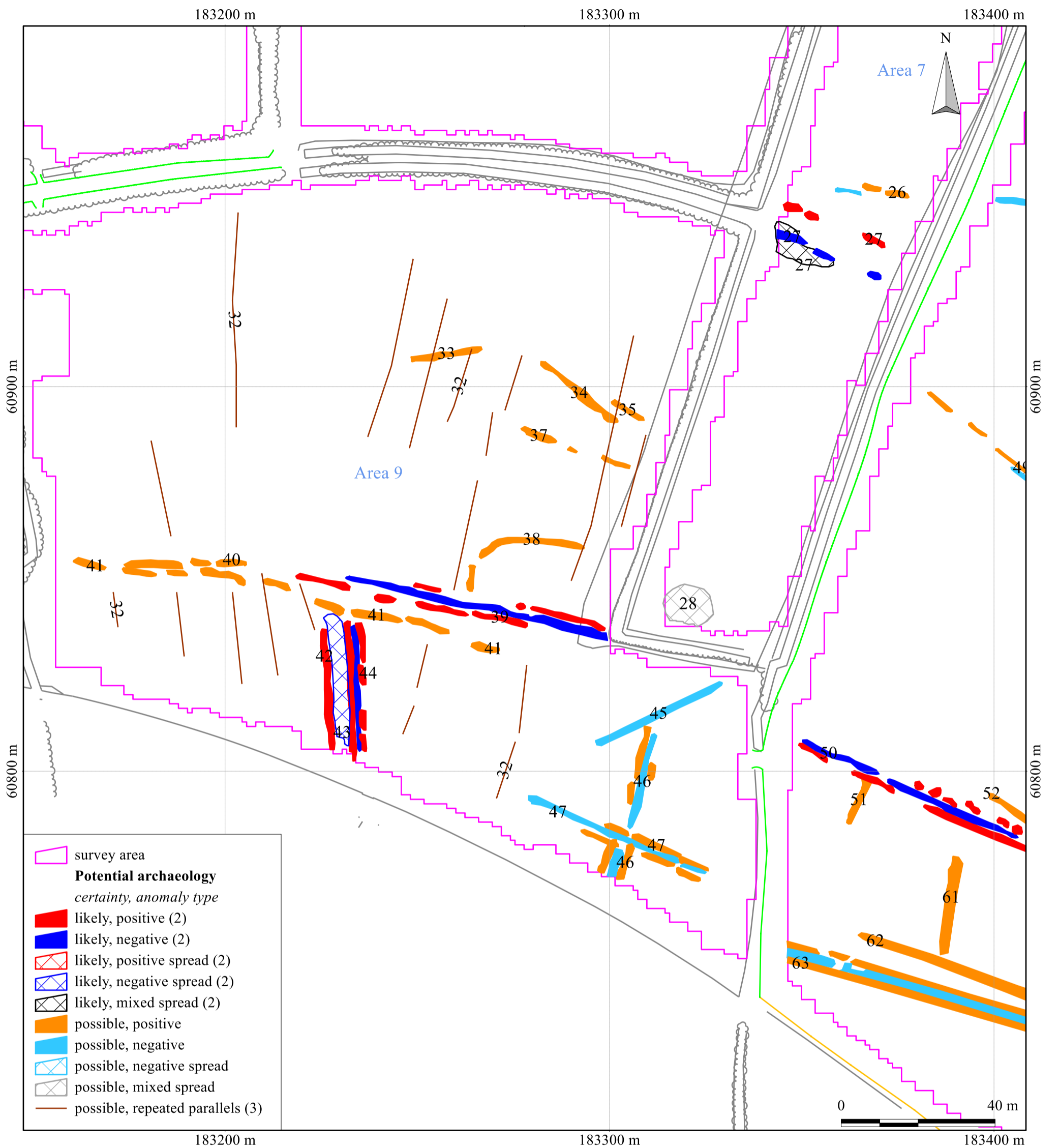
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Figure 5: survey interpretation, area 5 and area 6

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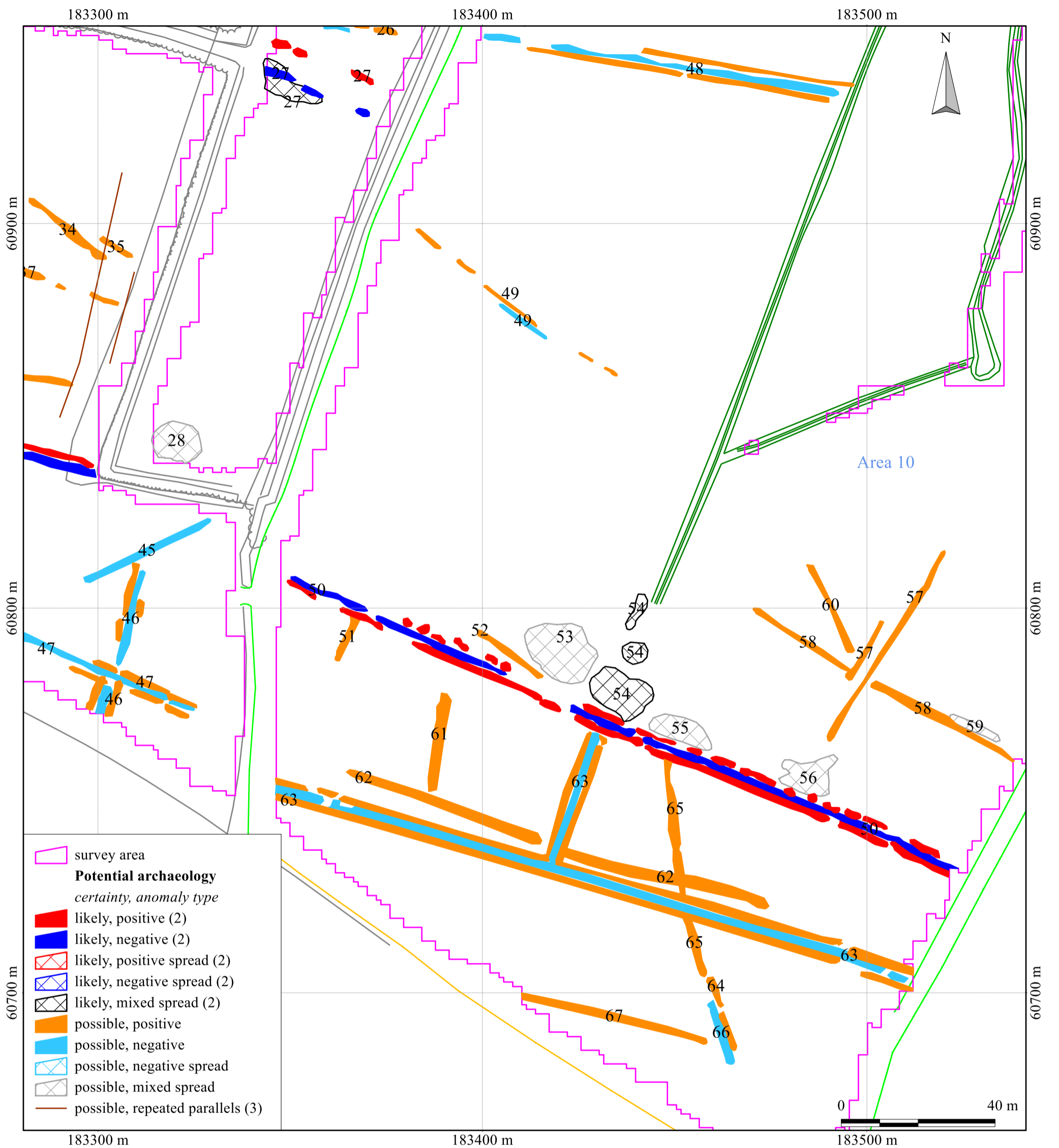
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Figure 6: survey interpretation, area 7 and area 9

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Figure 7: survey interpretation, area 10

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Figure 8: shade plot of processed data, all areas

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British Grid
 centre X: 183095.02 m, centre Y: 61238.58 m

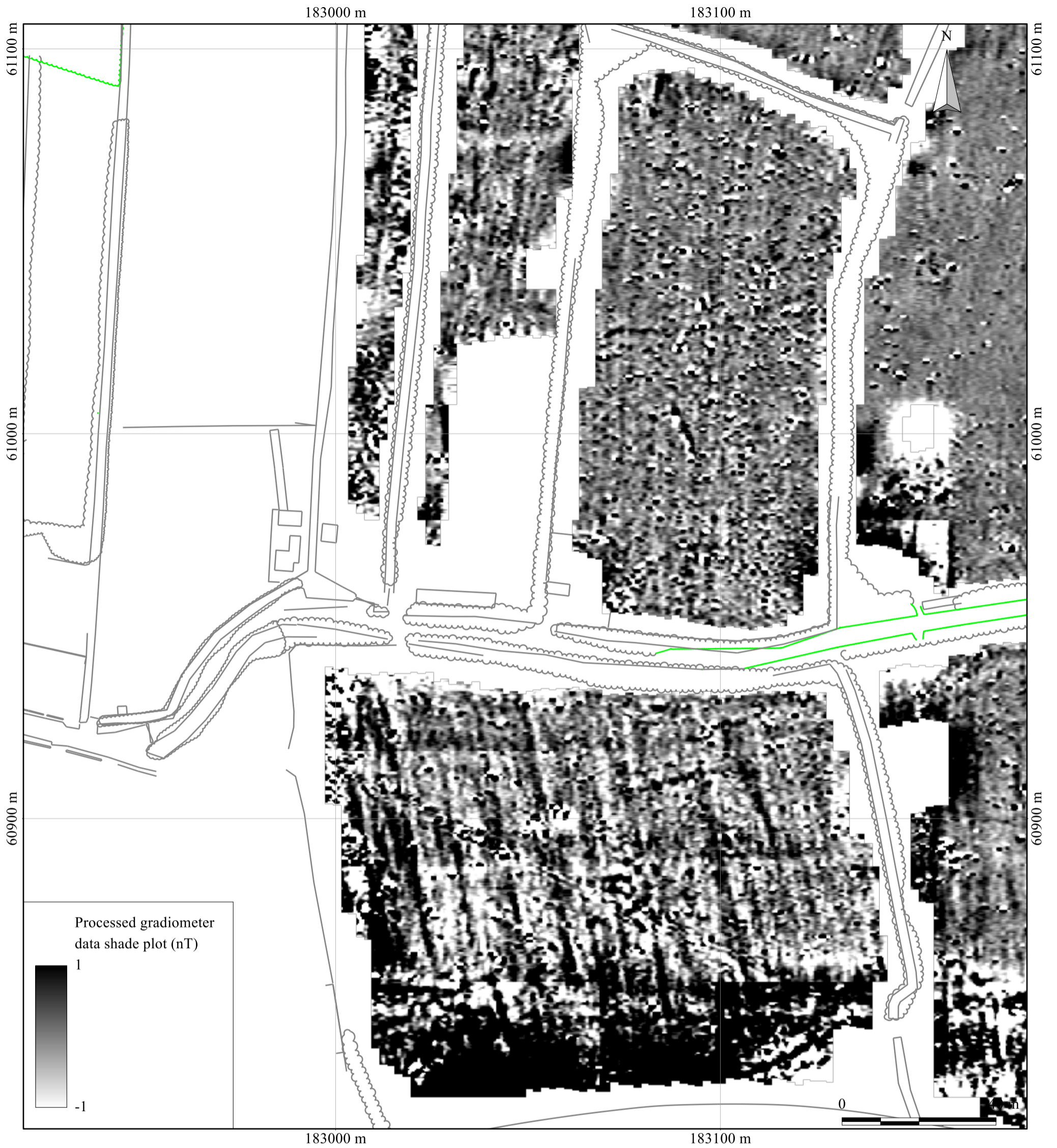
Geophysical survey: Copyright Substrata 2015.
 Base map: West Country Land Surveys Ltd Copyright 2011,
 All rights reserved.

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

An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 9: shade plot of processed data, area 1,
 area 2 and area 3

Substrata
 Office 1, 5 Mill Street
 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 183049.26 m, centre Y: 60962.93 m

Geophysical survey: Copyright Substrata 2015.
 Base map: West Country Land Surveys Ltd Copyright 2011,
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Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 10: shade plot of processed data, area 4 and area 8

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 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 183263.33 m, centre Y: 61092.11 m

Geophysical survey: Copyright Substrata 2015.
 Base map: West Country Land Surveys Ltd Copyright 2011,
 All rights reserved.

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

An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 11: shade plot of processed data, area 5 and area 6

Substrata
 Office 1, 5 Mill Street
 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 183277.92 m, centre Y: 60850.19 m

Geophysical survey: Copyright Substrata 2015.
 Base map: West Country Land Surveys Ltd Copyright 2011,
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Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 12: shade plot of processed data, area 7 and area 9

Substrata
 Office 1, 5 Mill Street
 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 183410.99 m, centre Y: 60807.78 m

Geophysical survey: Copyright Substrata 2015.
 Base map: West Country Land Surveys Ltd Copyright 2011,
 All rights reserved.

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

An archaeological gradiometer survey
 Land at Chapel Gover, Newquay, Cornwall
 Centred on NGR (E/N):183260,61030 (point)
 Report: 1511CHA-R-1

Figure 13: shade plot of processed data, area 10

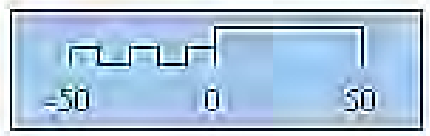
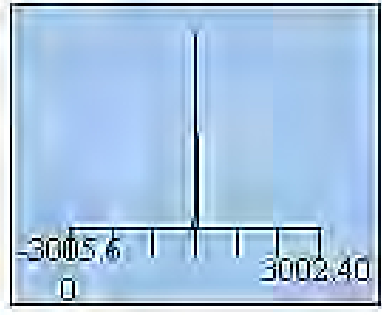
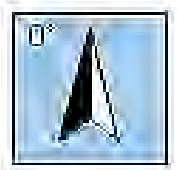
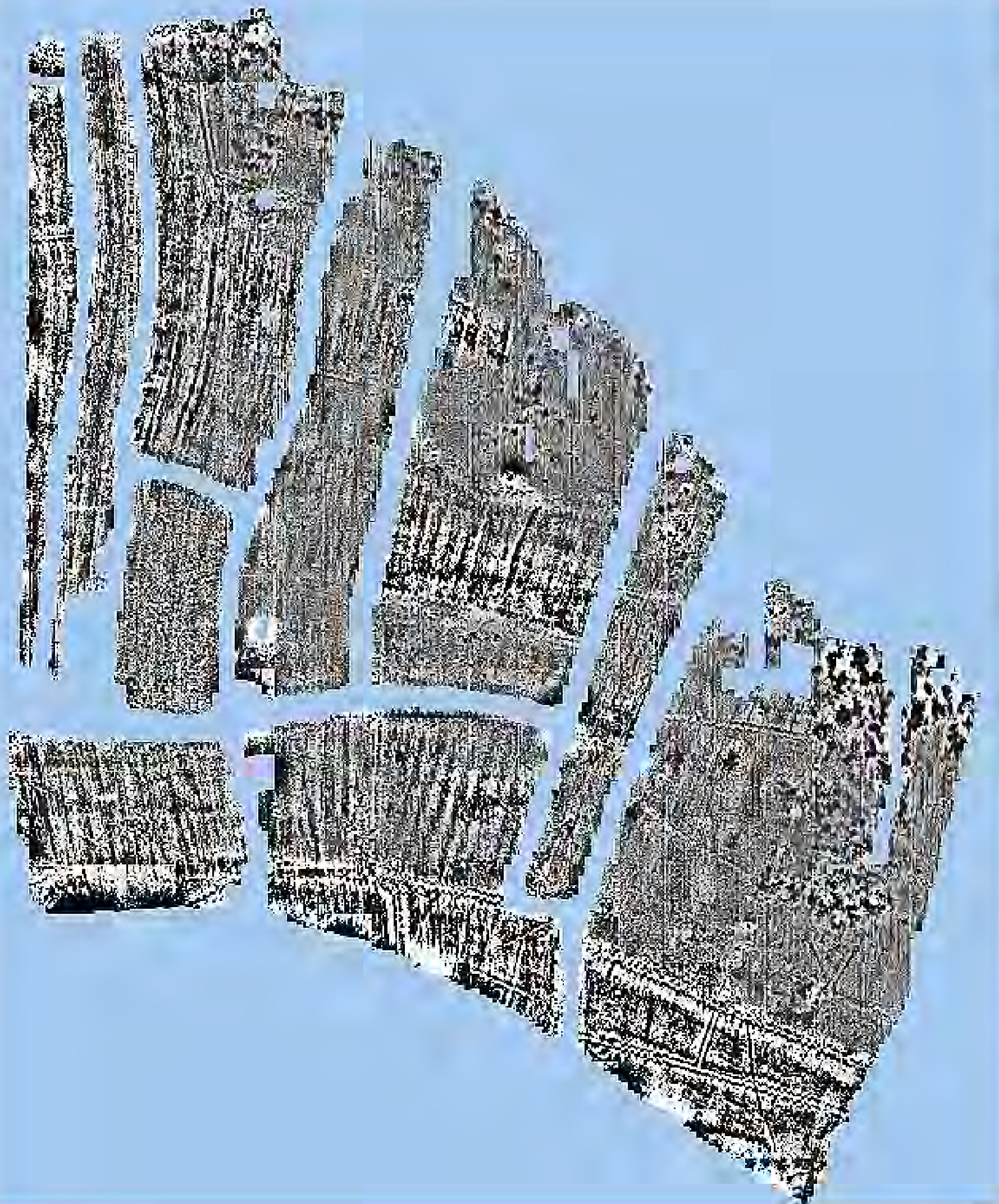
Substrata
 Office 1, 5 Mill Street
 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk

Appendix 2 Methodology Summary

Table 2: methodology summary	
<p>Documents Written Scheme of Investigation: Brown (2015) 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. 2. The geophysical survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014a), Historic England (2010) and Archaeology Data Service/Digital Antiquity Guides (undated). 3. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system. 4. Data processing was undertaken using appropriate software, with all anomalies assessed as relevant being digitised and geo-referenced. 5. 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</p> <ul style="list-style-type: none"> □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates. □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ 30m by 30m grids □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ Geo-referenced and recorded using digital map tiles. □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program. 	
<p>Equipment</p> <ul style="list-style-type: none"> □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ Bartington Instruments grad601-2 □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ version 6.1 	<p>Data Capture</p> <ul style="list-style-type: none"> □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ 0.25m □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ 1 metre □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ zigzag □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ GN
<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: gradiometer survey - processed data metadata	
Instrument Type:	Bartington Grad 610
Units:	nT
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 0.00 m spacing.
Dummy Value:	32702
Dimensions	
Composite Size (readings):	3000 x 630
Survey Size (meters):	750 m x 630 m
Grid Size:	30 m x 30 m
X Interval:	0.25 m
Y Interval:	1 m
Stats	
Max:	58.61
Min:	-54.12
Std Dev:	3.15
Mean:	0.09
Median:	0.00
PROGRAM	
Name:	TerraSurveyor
Version:	3.0.28.1
Processes: 25	
1	Base Layer
2	Clip at 1.00 SD
3	DeStripe Median Sensors: All
4	De Stagger: Grids: All Mode: Both By: -2 intervals
5	De Stagger: Grids: b1.xgd Mode: Both By: 1 intervals
6	DeStripe Median Traverse: Grids: k6+j2.xgd k13.xgd l6.xgd l16.xgd k23.xgd l23+f18.xgd j3+k7.xgd k12.xgd l7.xgd l15.xgd k24.xgd l24.xgd j4.xgd k11.xgd l8.xgd l14.xgd l27.xgd l25.xgd j5.xgd k10.xgd l9.xgd l13.xgd l26.xgd j6.xgd j11.xgd l10.xgd l12.xgd j7.xgd j10.xgd l11.xgd
7	DeStripe Median Traverse: Grids: h25.xgd h30.xgd g25.xgd h26+h34.xgd h31.xgd g26.xgd l33+h27+j22.xgd h32.xgd g27.xgd
8	DeStripe Median Traverse: Grids: i22+h34.xgd i2.xgd i23+h35.xgd i3.xgd i24+h36.xgd i4.xgd i25.xgd i5.xgd j33.xgd j34+i6.xgd
9	DeStripe Median Traverse: Grids: j6.xgd j11.xgd j7.xgd j10.xgd j8.xgd j9.xgd
10	DeStripe Median Sensors: j32.xgd j35+i7.xgd j31.xgd j36.xgd
11	DeStripe Median Traverse: Grids: a5.xgd a6+f5.xgd
12	DeStripe Median Traverse: Grids: a12.xgd b4.xgd m1.xgd a21.xgd c11.xgd d4.xgd a11.xgd b5.xgd m2.xgd a22.xgd c12.xgd d5.xgd a10.xgd b6.xgd m3.xgd a23.xgd c13.xgd d6.xgd a9.xgd m4.xgd b14.xgd a24.xgd c14.xgd d7.xgd
13	DeStripe Median Traverse: Grids: c1.xgd a20.xgd c10.xgd d3.xgd m1.xgd a21.xgd c11.xgd d4.xgd d17.xgd
14	DeStripe Median Traverse: Grids: n1.xgd b13.xgd a25.xgd c15.xgd d8.xgd d13.xgd d18.xgd n2.xgd n5.xgd a26.xgd c16.xgd d9.xgd d12.xgd d19.xgd n3+f23.xgd n4.xgd a27.xgd c17.xgd d10.xgd d11.xgd f22.xgd a28.xgd
15	Edge Match (Area: Top 570, Left 0, Bottom 629, Right 119) to Right edge
16	Edge Match (Area: Top 390, Left 480, Bottom 419, Right 599) to Bottom edge
17	DeStripe Median Traverse: Grids: n6.xgd h1.xgd n7+h11.xgd h2.xgd n8+h9.xgd h3.xgd n9+h10.xgd h4.xgd n10+h12.xgd h5.xgd n11+h13.xgd h6.xgd h14.xgd h7.xgd h16.xgd h8.xgd h17.xgd h18.xgd h19.xgd h20.xgd h21.xgd h22.xgd
18	DeStripe Median Traverse: Grids: k27+m5.xgd m6.xgd m7.xgd m8.xgd m9.xgd m10.xgd m11.xgd m12.xgd m13.xgd n21.xgd n20.xgd n19.xgd
19	DeStripe Median Traverse: Grids: n12+j14.xgd j15+n13.xgd n14+j16.xgd n15+j17.xgd n16+j18.xgd n17+j19.xgd
20	Edge Match (Area: Top 210, Left 2760, Bottom 329, Right 2879) to Left edge
21	De Stagger: Grids: e22.xgd Mode: Both By: 1 intervals
22	De Stagger: Grids: k11.xgd l8.xgd k10.xgd l9.xgd Mode: Both By: -2 intervals
23	Edge Match (Area: Top 30, Left 720, Bottom 179, Right 839) to Right edge
24	Edge Match (Area: Top 90, Left 2760, Bottom 179, Right 2879) to Left edge
25	Edge Match (Area: Top 90, Left 2880, Bottom 179, Right 2999) to Left edge

Appendix 4 Raw data plots



Instrument Type: Bartington Grad 610
 Units: nT
 Direction of 1st Traverse: 0 deg
 Collection Method: ZigZag
 Sensors: 2 @ 0.00 m spacing
 Dummy Value: 32702

Dimensions
 Composite Size (readings): 3000 x 630
 Survey Size (meters): 750 m x 630 m
 Grid Size: 30 m x 30 m
 X Interval: 0.25 m
 Y Interval: 1 m

Stats
 Max: 3002.40
 Min: -3005.60
 Std Dev: 46.95
 Mean: 0.06
 Median: 0.00

PROGRAM
 Name: TerraSurveyor
 Version: 3.0.28.1

Processes: 2
 1 Base Layer
 2 DeStripe Median Sensors: All

Figure 14: shade plot of minimally processed data