Substrata
Archaeological Geophysical Surveyors

An archaeological gradiometer survey

Land adjacent to Chudleigh Road Alphington, Exeter, Devon

Ordnance Survey E/N: 291850,89370 (point)

Report: 140620

Ross Dean BSc MSc MA MIfA

23 June 2014

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Accompanying CD-ROM

1 Survey description and summary

Type of survey:	twin-sensor fluxgate gradiometer
Date of survey:	March 2013
Area surveyed:	10 ha
Lead surveyor:	Ross Dean BSc MSc MA MIfA

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

Location

Site:	Land adjacent to Chudleigh Road, Alphington
District:	Exeter
County:	Devon
Nearest Postcode:	EX2 8FL
NGR:	SX 918 893
Ordnance Survey E/N:	291850,89370 (point)
OASIS number:	substrata1-182130
Archive:	At the time of writing, the archive of this survey will be held by Substrata.

Summary
This report was commissioned by AC Archaeology Ltd on behalf of clients. The location of the site is shown in Figure 7.

The survey area was situated within six fields, Fields 1 to 4, 6 and 7 as shown in Figure 1. Field 5 was excluded as it was the subject of an earlier geophysical survey undertaken as a component of a wider-scale assessment for the Land Southwest of Exeter Development Masterplan Area (Hughes and Valentin, 2010).

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

Forty-seven magnetic anomaly groups pertaining to potential archaeology were recorded across the six fields making up the survey area. None of the anomaly groups recorded related to features mapped by the Ordnance Survey on historical or modern maps. Two of the groups are likely to represent ring ditches or large round-houses. One group comprises a faint and disrupted set of anomalies that may indicate a single enclosure. Four of the groups may relate to two former ditched roads, tracks or field-lanes. Two groups are likely to reflect recent rubble deposits. The remaining magnetic anomaly groups recorded during the survey are most likely to relate to various phases of former fields and other enclosures not recorded on historical Ordnance Survey maps.

2 Survey aims and objectives

Survey aims
1. Define and characterise and detectable archaeological remains on the site.
2. Inform any future archaeological investigation of the area.

Survey Objectives
1. Complete a 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 Institute for Archaeologists (2011). The codes of approved practice that were followed are those of the Institute for Archaeologists (2008 and 2009) and Archaeology Data Service/Digital Antiquity Guides (undated). The document text was written using the house style of the Institute for Archaeologists (Institute for Archaeologists, undated).

4 Site description

Landscape
The survey area lies within gently rolling fields on the southwest of Exeter with housing to the north, farmland to the south and east and the A30 to the west as shown in Figure 7.

Land use at the time of the survey
The field designations are shown in Figure 1. Fields 1 and 2 were ploughed, sown and harrowed shortly before the survey was undertaken. Field 3 was grass pasture. Field 4 was under crop. Fields 6 and 7 were stubble.

Geology
The site is located on a solid geology of Permian Alphington Breccia Formation. The rocks are breccia with a reddish brown, clayey, silty, fine-grained matrix. The clasts are predominantly culm shale and sandstone, together with hornfels, chert, quartz-porphyry, and lava. Most clasts are less than 4cm; some range up to 0.1m and large boulders of porphyry are locally present. The superficial geology is not recorded in the source used (British Geological Survey, undated).

5 Archaeological background

All the fields comprising the survey area are designated as 'Modern closures adapting Medieval fields.' These modern fields have been created out of probable medieval enclosures. The sinuous medieval boundaries survive in places (Devon County Council, undated).

Appendix 4 provides a short summary of information obtained from the Devon and Dartmoor Historic Environment Record (HER) within 1000m of the proposed development site and relevant to the understanding of the gradiometer survey. Except where specifically cited, this information was obtained using the Heritage Gateway (English Heritage, undated 1).

The reader is advised that this summary should not be used outside the context of this report and is referred to the Devon HER for informed provision of the record.

There were no heritage assets were recorded within or immediately bordering the survey area.

Thirteen heritage assets within approximately 1000m of the survey centre (taken as Ordnance Survey E/N: 291850,89370) were identified as relevant to the understanding of the gradiometer data. All but one of these entries were over 200m south of the survey centre. The entries include a Bronze Age ring ditch with two cremation pits (entry MDV14539 481m southwest of the survey centre) and an Early Bronze Age to Early Iron Age Barrow cemetery (entry MDV17714 368m southeast of the survey centre). The remaining entries summarised in Appendix 4 record ditches, enclosures, linear features, pits and flints of Prehistoric, Bronze Age and unknown-date.

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 attempts to identify and characterise anomalies and anomaly groups that may pertain to archaeological deposits and structures.

The reader is referred to section 7.

6.1 Results

The survey area was situated within six fields, Fields 1 to 4, 6 and 7 as shown in Figure 1. Field 5 was excluded as it was the subject of an earlier geophysical survey undertaken as a component of a wider-scale assessment for the Land Southwest of Exeter Development Masterplan Area (Hughes and Valentin, 2010).

Figures 1 to 3 show the interpretation of the survey. They include the anomaly groups identified as pertaining to archaeological deposits along with their numbers. Table 1 is an extract from a detailed analysis of the survey data provided in the attribute tables of the GIS project on the accompanying CD-ROM.

Figures 1 to 3 along with Table 1 comprises the analysis of the survey data.

Plots of the processed data is provided in Figures 4 to 6 (appendix 1).

Site: An archaeological gradiometer survey
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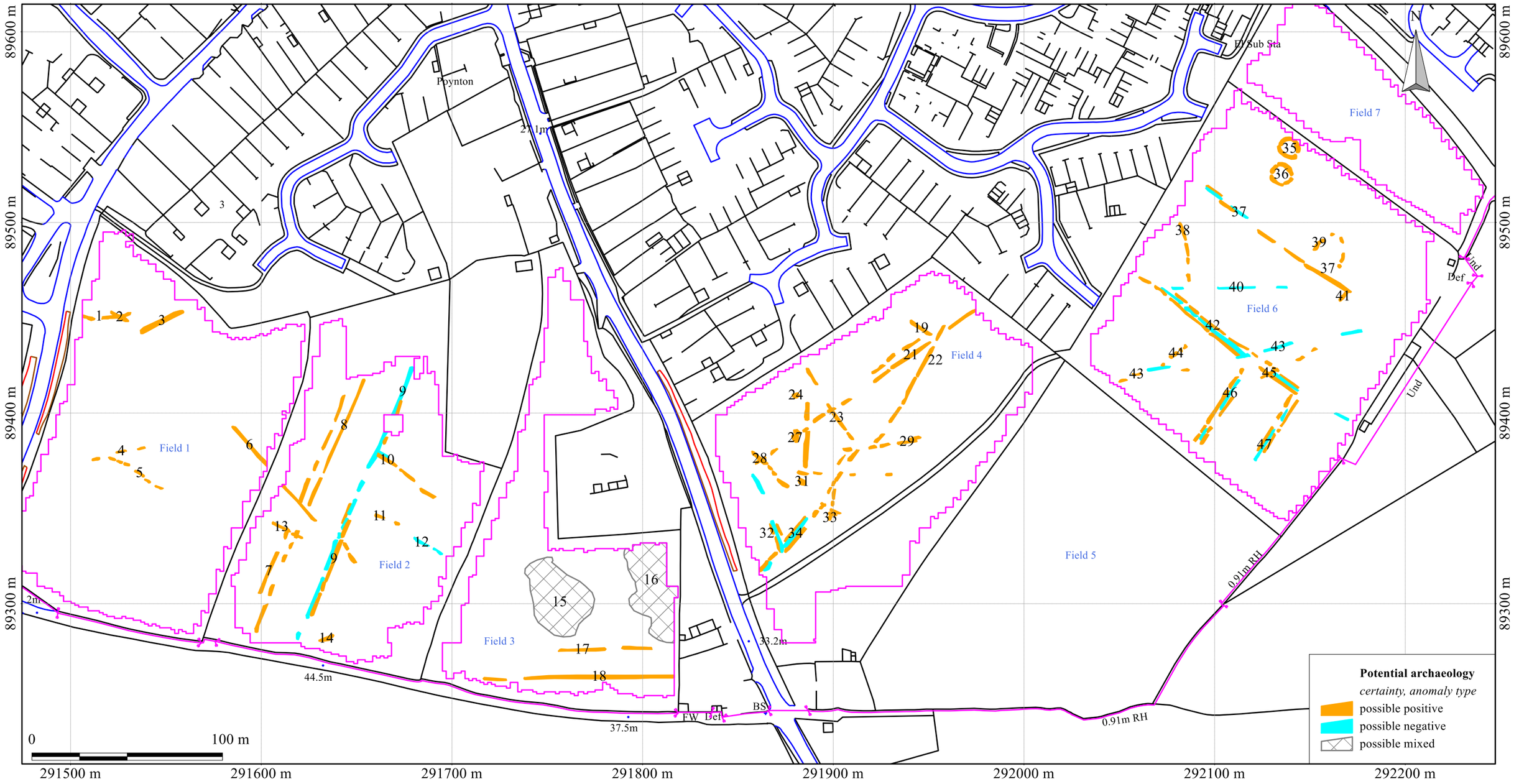
field number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments
1	1		possible positive	linear	archaeological or natural deposits	
	2		possible positive	linear	archaeological or natural deposits	
	3		possible positive	linear	archaeological or natural deposits	
	4		possible positive	disrupted linear		
	5		possible positive	disrupted curvilinear		
	6		possible positive	disrupted linear		anomaly group extends into field 2
2	7	8	possible positive	disrupted linear	track or road	anomaly group represents two parallel linear deposits in a form typical of a lane or track
	8	7	possible positive	disrupted linear	track or road	anomaly group represents two parallel linear deposits in a form typical of a lane or track
	9		possible positive & negative	disrupted linear	field boundary	anomaly group probably represents a field boundary, possibly a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries
	10		possible positive & negative	disrupted linear		
	11		possible positive	disrupted linear		
	12		possible negative	disrupted linear		
	13		possible positive	disrupted linear		
	14		possible positive	linear		
3	15		possible mixed	irregular	rubble	anomaly group is likely to represent rubble, possibly of relatively recent origin
	16		possible mixed	irregular	rubble	anomaly group is likely to represent rubble, possibly of relatively recent origin
	17		possible positive	disrupted linear		
	18		possible positive	disrupted linear		
4	19		possible positive	linear		
	20	21	possible positive	disrupted linear	field boundary and/or track edge	
	21	20	possible positive	disrupted linear	field boundary and/or track edge	
	22	34	possible positive	disrupted linear		
	23		possible positive	disrupted linear		
	24		possible positive	oval	filled hollow, natural or archaeological	
	25		possible positive	disrupted linear	archaeological or natural deposits	
	26		possible positive	oval	filled hollow, natural or archaeological	
	27		possible positive	oval	filled hollow, natural or archaeological	
	28		possible positive	disrupted curvilinear		
	29		possible positive	linear		
	30		possible positive	linear		
	31		possible positive	oval	filled hollow, natural or archaeological	
	32		possible positive & negative	linear	field boundary	anomaly group probably represents a field boundary, possibly a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries
	33		possible positive	disrupted linear		
	34	22	possible positive & negative	disrupted linear	field boundary	anomaly group probably represents a field boundary, possibly a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries
6	35		possible positive	sub-circular	ring ditch or round house	
	36		possible positive	sub-circular	ring ditch or round house	
	37		possible positive & negative	linear	field boundary	anomaly group probably represents a field boundary, possibly a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries
	38		possible positive	disrupted linear		
	39		possible positive	sub-circular	enclosure	
	40		possible negative	disrupted linear		
	41		possible positive	linear		
	42		possible positive & negative	disrupted linear	field boundary	anomaly group probably represents a field boundary, possibly a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries
	43		possible positive & negative	disrupted linear		anomaly group has magnetically positive and negative elements typical of a highly disrupted linear deposit or former routeway
	44		possible positive	disrupted linear or line of ovals		
	45		possible positive	disrupted linear		
	46		possible positive & negative	disrupted linear	field boundary	anomaly group probably represents a field boundary, probably a Devon bank, not recorded on any historical Ordnance Survey map
						but on the same alignment as the current field boundaries
	47		possible positive & negative	disrupted linear	field boundary	anomaly group probably represents a field boundary, probably a Devon bank, not recorded on any historical Ordnance Survey map but on the same alignment as the current field boundaries

Table 1: data analysis



British Grid
centre X: 291860.86 m, centre Y: 89415.21 m

Scale: 1:2000 @ 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 1: survey interpretation, all fields

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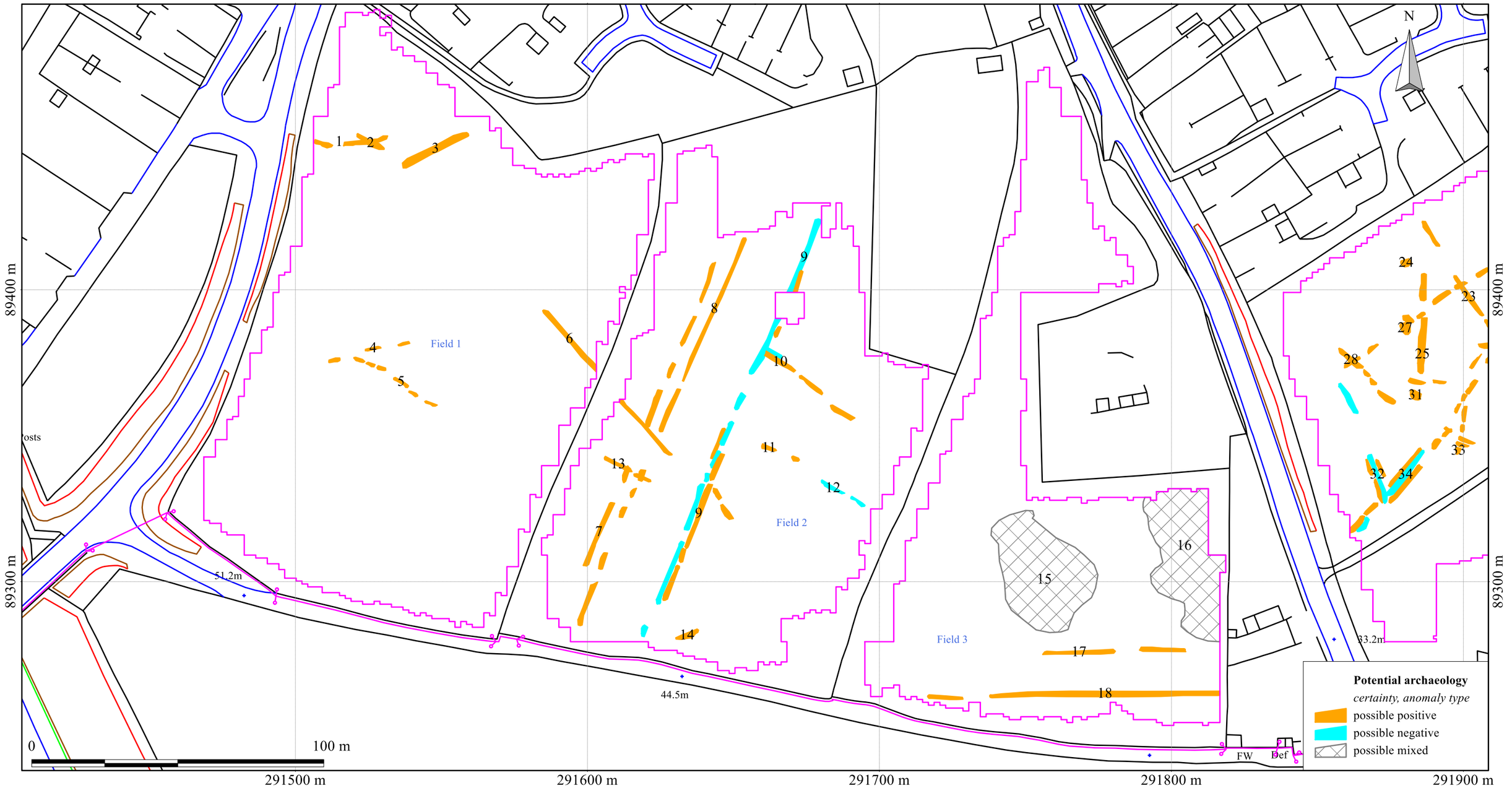

British Grid
centre X: 291657.43 m, centre Y: 89366.56 m

Scale: 1:1300 @ 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, fields 1 to 3

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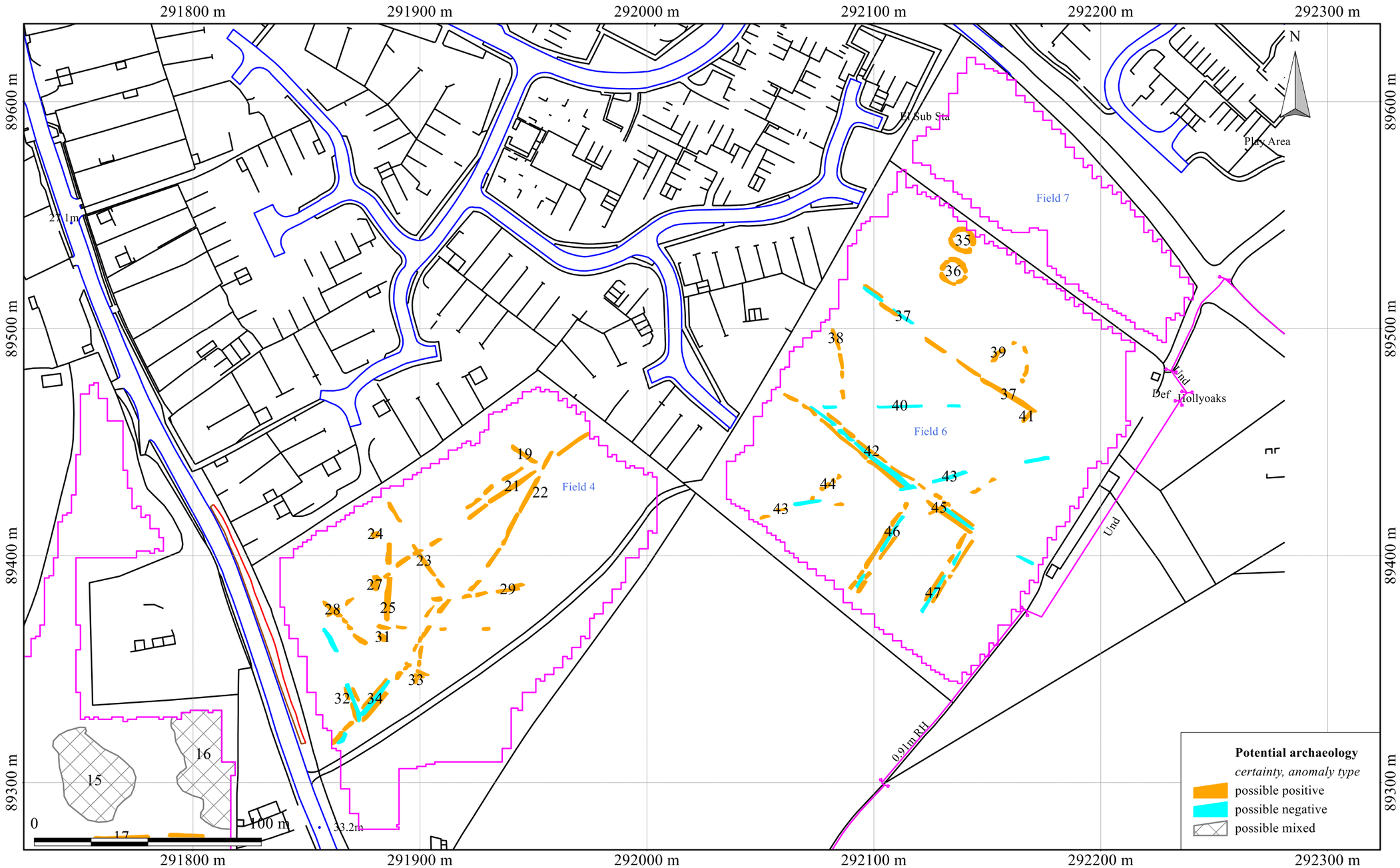

British Grid
centre X: 292024.27 m, centre Y: 89452.39 m

Scale: 1:1800 @ 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, fields 4, 6 and 7

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6.2 Discussion

Refer to Figures 1 to 3 (this section) and Figures 4 to 6 (appendix 1).

Not all anomalies or anomaly groups identified in the survey dataset are necessarily discussed below. All identified anomaly groups are recorded in the GIS project on the accompanying CD-ROM. Those anomaly groups possibly representing archaeological deposits are included in the data analysis (Table 1).

General points
There are distinct, parallel, closely spaced, linear patterns in the magnetic response in fields 1, 2, 6 and 7 as shown in Figures 4 to 6. These patterns reflect recent ploughing and crop sowing.

Anomalies though to relate to natural features were not mapped.

Recent man-made objects such as manholes, water management equipment or drains have not been mapped except where they comprise significant magnetic responses across the dataset.

Data collection along the field edges was restricted as shown in the figures due to the presence of magnetic materials and objects in and adjacent to the field boundaries. Strong magnetic responses mapped close to the field boundaries as seen in Figures 4 to 6 are likely to relate to these items except where indicated otherwise in Figures 1 to 3.

No anomalies pertaining to potential archaeological deposits or features were recorded in field 7.

Data relating to historical maps and other records
None of the magnetic anomaly groups recorded relate to features mapped by the Ordnance Survey on historical or modern maps.

Data with no previous provenance
Magnetic anomaly groups **7 and 8** in field 2 and groups **20 and 21** in field 4 may relate to two former ditched roads, tracks or field-lanes.

Groups **15 and 16** in field 3 reflect deposits of rubble which are visible as earthworks in the field and are likely to be recent.

Groups **35 and 36** are distinct in the dataset and are likely to represent ring ditches or large round-houses.

Group **39** comprises a faint and disrupted set of anomalies that may relate to a single enclosure.

The remaining magnetic anomaly groups recorded during the survey are most likely to relate to various phases of former fields and other enclosures not recorded on historical Ordnance Survey maps. Of these, groups **9** (field 2) **32, 34** (field 4), **42, 46 and 47** (field 6) follow the same trend as the modern field system and so could relate to Post-Medieval field enclosures now removed.

6.3 Conclusions

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

Forty-seven magnetic anomaly groups pertaining to potential archaeology were recorded across the six fields making up the survey area. None of the anomaly groups recorded related to features mapped by the Ordnance Survey on historical or modern maps. Two of the groups are likely to represent ring ditches or large round-houses. One group comprises a faint and disrupted set of anomalies that may indicate a single enclosure. Four of the groups may relate to two former ditched roads, tracks or field-lanes. Two groups are likely to reflect recent rubble deposits. The remaining magnetic anomaly groups recorded during the survey are most likely to relate to various phases of former fields and other enclosures not recorded on historical Ordnance Survey maps.

7 Disclaimer and copyright

The description and discussion of the results presented in this report are the authors, based on his interpretation of the survey data. Every effort has been made to provide accurate descriptions and interpretations of the geophysical data set. The nature of archaeological geophysical surveying is such that interpretations based on geophysical data, while informative, can only be provisional. Geophysical surveys are a cost-effective early step in the multi-phase process that is archaeology. The evaluation programme of which this survey is part may also be informed by other archaeological assessment work and analysis. It must be presumed that more archaeological features will be evaluated than those specified in this report.

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

8 Acknowledgements

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

9 Bibliography

Archaeology Data Service/Digital Antiquity Guides to Good Practice (undated): *Geophysical Data in Archaeology* [Online], Available: http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc [March 2014]

British Geological Survey (undated) *Geology of Britain viewer [Online], Available: http:// www.bgs.ac.uk/discovering Geology/geologyOfBritain/viewer.html* [June 2014]

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

Dean, R. (2013) *A gradiometer survey methodology statement, Land adjacent to Chudleigh Road, Alphington, Exeter, Devon.* Substrata unpublished document

Devon County Council (undated) *Historic Landscape Characterisation*, [Online], Available: http:// gis.devon.gov.uk/basedata/viewer.asp?DCCService=hlc [June 2014]

English Heritage (undated) *Heritage Gateway*, [Online], Available: http://www.heritagegateway.org.uk/ Gateway/advanced_search.aspx [June 2014]

Hughes, S. and Valentin, J. (2010) *Land Southwest of Exeter Development Masterplan Area: Archaeology and cultural heritage assessment, fieldwalking and geophysical survey*. AC Archaeology Report ACD114/2/0

Institute for Archaeologists (undated) *IfA house style*, [Online], Available: http:// www.archaeologists.net/sites/default/files/node-files/ifa_house_style.pdf [March 2014]

Institute for Archaeologists (2011) *Standard and guidance archaeological geophysical survey*. Reading: Author [Online], Available: http://www.archaeologists.net/sites/default/files/node-files/ Geophysics2010.pdf [March 2014]

Institute for Archaeologists (2009) *Code of conduct*. Reading: Author [Online], Available: http:// www.archaeologists.net/sites/default/files/node-files/code_conduct.pdf [March 2014]

Institute for Archaeologists (2008) *Code of approved practice for the regulation of contractual arrangements in archaeology*. Reading: Author [Online], Available: http://www.archaeologists.net/ sites/default/files/node-files/ifa_code_practice.pdf [March 2014]

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.

British Grid
centre X: 291860.86 m, centre Y: 89415.21 m

Scale: 1:2000 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 4: shade plot of processed data, all fields

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291500 m 291600 m 291700 m 291800 m 291900 m

89400 m

89300 m

N

Gradiometer processed data
nT
3
-3

44.5m

33.2m

BS

FW

Def

0 100 m

British Grid
centre X: 291657.43 m, centre Y: 89366.56 m

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

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Figure 5: shade plot of processed data, fields 1 to 3

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British Grid
centre X: 292024.27 m, centre Y: 89452.39 m

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

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Figure 7: shade plot of processed data, fields 4, 6 and 7

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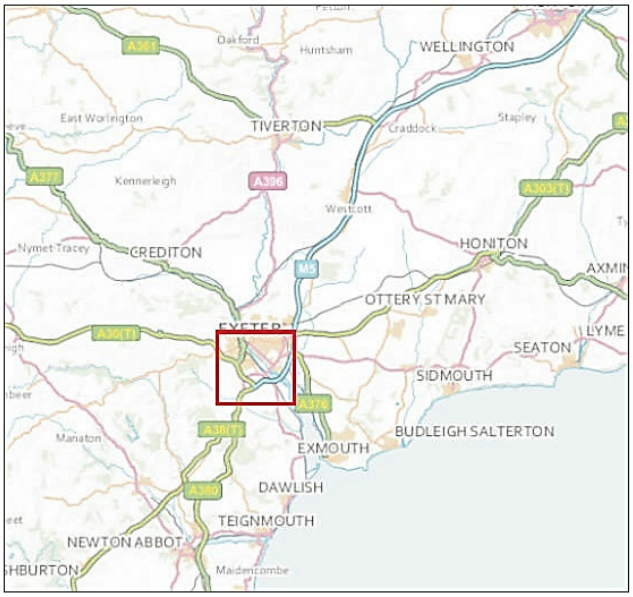

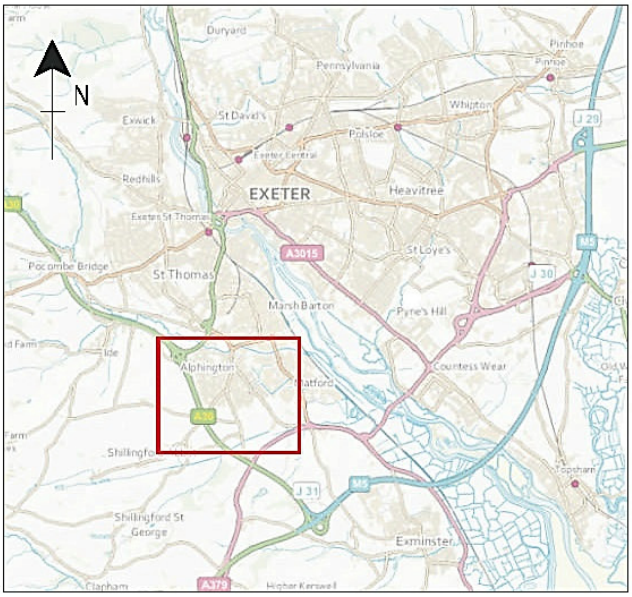

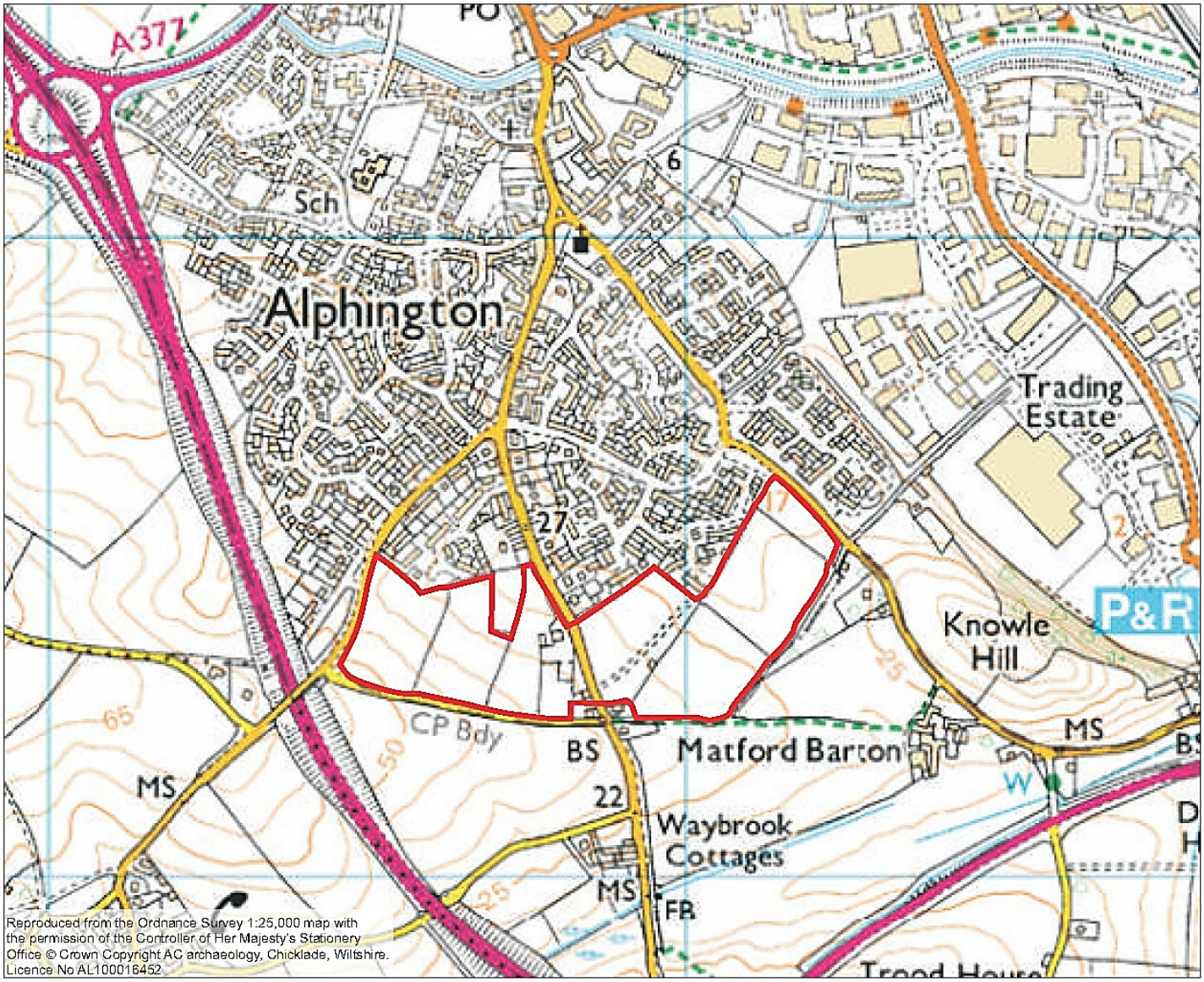

0 500m

Scale 1:10,000@A4

Site location

PROJECT

Chudleigh Road, Alphington, Exeter

TITLE

Figure 7: site location

AC archaeology

Appendix 2 Methodology Summary

<table>
<tr><th colspan="2">Table 2: methodology summary</th></tr>
<tr><td colspan="2">Documents
Survey methodology statement: Dean (2013)</td></tr>
<tr><td colspan="2">Methodology
1. The work was undertaken in accordance with the survey methodology statement. The geophysical (gradiometer) survey was undertaken with reference to standard guidance provided by the Institute for Archaeologists (2011) 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.</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td>Equipment
Instrument: Bartington Instruments grad601-2
Firmware: version 6.1</td><td>Data Capture
Sample Interval: 0.25-metres
Traverse Interval: 1 metre
Traverse Method: zigzag
Traverse Orientation: GN</td></tr>
<tr><td colspan="2">Data Processing, Analysis and Presentation Software
IntelliCAD Technology Consortium IntelliCAD 7.2
DW Consulting TerraSurveyor3
Manifold System 8 GIS
Microsoft Corp. Office Excel 2013
Microsoft Corp. Office Publisher 2013
Adobe Systems Inc Adobe Acrobat 9 Pro Extended</td></tr>
</table>

Appendix 3 Data processing

Table 3: gradiometer survey - processed data metadata
SITE Instrument Type: Bartington Grad 610 Units: nT Direction of 1st Traverse: 0 deg Collection Method: ZigZag Sensors: 2 @ 1.00 m spacing. Dummy Value: 32702 PROGRAM Name: TerraSurveyor Version: 3.0.25.1
Stats Max: 560.45 Min: -556.50 Std Dev: 25.78 Mean: -0.01 Median: 0.00 Processes: 7 1 Base Layer 2 Clip at 4.00 SD 3 De Stagger: Grids: All Mode: Both By: -2 intervals 4 De Stagger: Grids: swe13.xgd swe12.xgd swe11.xgd Mode: Both By: -1 intervals 5 De Stagger: Grids: swe14.xgd swe15.xgd swe16.xgd swe17.xgd swe18.xgd swe19.xgd swe20.xgd swe21.xgd Mode: Both By: -1 intervals 6 De Stagger: Grids: swe28.xgd swe29.xgd swe30.xgd swe33.xgd swe31.xgd swe32.xgd Mode: Both By: -1 intervals 7 DeStripe Median Sensors: All

Appendix 4 Summary of relevant entries from the Devon and Dartmoor Historic Environment Record (HER) within 1000m of the proposed development site

Source: Heritage Gateway (English Heritage, undated 1).
The reader is advised that this summary should not be used outside the context of this report and is referred to the Devon HER for informed provision of the record.

HER Number: **MDV10020**
Name: Castle Park Field Name west of Matford Barton
Summary: Field name implying the former existence of a castle.
Grid Reference: SX 921 891 (892m at N252 from survey location point)
Monument Type(s) and Dates: FIELD NAME (XVIII to XXI - 1751 AD to 2009 AD (Between))
Associated Monuments: MDV17714 Prehistoric Barrow Cemetery west of Matford Barton

HER Number: **MDV28914**
Summary: Large V-shaped ditch 2.1m wide and 1.15m deep
Grid Reference: SX 913 892 (576m at N253 from survey location point)
Monument Type(s) and Dates: DITCH (Unknown date)

HER Number: **MDV28655**
Summary: Single ditched subrectangular enclosure
Grid Reference: SX 913 890 (663m at N236 from survey location point)
Monument Type(s) and Dates: ENCLOSURE (Prehistoric - 698000 BC to 42 AD (Between)

HER Number: **MDV60783**
Name: Linear Feature north-west of Matford Barton
Summary: Linear feature shown on aerial photographs to the north of the Prehistoric barrow cemetery to the west of Matford Barton.
Grid Reference: SX 921 892 (302m at N124 from survey location point)
Monument Type(s) and Dates: LINEAR FEATURE (Unknown date)
Associated Monuments:
MDV17723 On Knowle Hill, Matford. Cambridge air photographs
MDV17714 Prehistoric Barrow Cemetery west of Matford Barton
Associated Events: EDV4558 - Excavation at Matford Barton, Exminste

HER Number: **MDV75891**
Name: Prehistoric Pits at Matford Barton
Summary: Several possibly Prehistoric pits were excavated to the south-west Of Matford Barton in 2009
Grid Reference: SX 923 891 (525m at N121 from survey location point)
Monument Type(s) and Dates: PIT (Unknown date)
Associated Monuments:
MDV75890 Matford Barton Farmhouse (Building)
MDV16130 Medieval Settlement at Matford, Alphington (Monument)
Associated Finds:
FDV1449 - TOOL (Upper Palaeolithic to Early Iron Age - 10000 BC to 700 BC)
FDV1450 - POT (Bronze Age - 2200 BC to 701 BC)
FDV1451 - POT (Medieval - 1066 AD to 1539 AD)
Associated Events: EDV4558 - Excavation at Matford Barton, Exminster

HER Number: **MDV105732**
Name: Rectilinear Enclosure Ditch, west of Matford Barton
Summary: Rectilinear enclosure ditch, west of Matford Barton. The feature contained crushed remains of a later prehistoric urn thought to be Bronze Age.
Grid Reference: SX 922 891 (442m at N249 from survey location point)
Monument Type(s) and Dates: RECTILINEAR ENCLOSURE (Middle Bronze Age - 1500 BC to 1001 BC (Between))
Associated Finds: FDV5454 - URN (Middle Bronze Age - 1500 BC to 1001 BC)
Associated Events:
EDV6352 - Land South-West of Exeter, Alphington (Ref: 5794)

EDV5322 - Geophysical Survey on Land Southwest of Exeter
EDV5326 - Assessment, Fieldwalking and Geophysical Survey of Land Southwest of Exeter

HER Number: **MDV14539**
Summary: Ring ditch with two cremation pits
Grid Reference: SX 914 892 (481m at N249 from survey location point)
Monument Type(s) and Dates: RING DITCH (Bronze Age - 2200 BC to 701 BC (Between)

HER Number: **MDV106252**
Name: Ditches and postholes on land south-west of Waybrook Cottages, Alphington
Summary: Discrete pits, postholes and ditches.
Grid Reference: SX 918 888 (572m at N185 from survey location point)
Monument Type(s) and Dates: DITCH (Unknown date), FIELD BOUNDARY (Unknown date)
Associated Events:
EDV5326 - Assessment, Fieldwalking and Geophysical Survey of Land Southwest of Exeter
EDV6291 - Archaeological Evaluation on Land Adjacent to Waybrook Cottages (Ref: AWC13)

HER Number: **MDV17714**
Name: Prehistoric Barrow Cemetery west of Matford Barton
Summary: Bronze Age barrow cemetery with at least nine barrows in a linear arrangement to the west of Matford Barton
Grid Reference: SX 921 891 (368m at N137 from survey location point)
Scheduled Monument 1012347
Monument Type(s): BARROW CEMETERY (Early Bronze Age to Early Iron Age - 2200 BC to 700 BC (Between))
Associated Monuments:
MDV10020 Castle Park Field Name west of Matford Barton (Monument)
MDV60783 Linear Feature north-west of Matford Barton (Monument)
MDV58489 Linear Feature south-west of Knowle Hill (Monument)
MDV17723 On Knowle Hill, Matford. (Monument)
Associated Finds:
FDV5459 - HUMAN REMAINS (Bronze Age - 2200 BC to 701 BC)
Associated Events
EDV4558 - Excavation at Matford Barton, Exminster
EDV6352 - Land South-West of Exeter, Alphington (Ref: 5794)

HER Number: **MDV31399**
Name: Prehistoric Axe from 3 Waybrook Cottages
Summary: Prehistoric flint axe found in the garden of 3 Waybrook Cottages
Grid Reference: SX 919 890 (373m at N172 from survey location point)
Monument Type(s) and Dates: FINDSPOT (Neolithic - 4000 BC to 2201 BC (Between))
Associated Finds: FDV4050 - AXE HEAD (Early Neolithic to Unknown - 4000 BC)
Associated Events: EDV4558 - Excavation at Matford Barton, Exminster

HER Number: **MDV37929**
Summary: Three waste flakes, one possibly utilised
Grid Reference: SX 916 895 (282m at N297 from survey location point)
Monument Type(s) and Dates: ARTEFACT SCATTER (Prehistoric - 698000 BC to 42 AD (Between)

HER Number: **MDV37439**
Name: Prehistoric Rectilinear Enclosure
Grid Reference: SX 916 891 (368m at N223 from survey location point)
Protected Status: SHINE: Prehistoric rectilinear enclosures north west of Waybrook Cottages
Monument Type(s) and Dates: ENCLOSURE (Prehistoric - 698000 BC to 42 AD (Between))

Description: Parts of several intercutting rectilinear enclosures with the corner of another to the north recorded as a cropmark in 1986 from aerial photograph analysis. Site lies to the east of the A30 road between Warkham Lane to the north and Waybrook Lane to the south.

HER Number: **MDV105733**
Name: Ditches, field to west of Matford Barton
Summary: A number of ditches were identified during a trench evaluation in a field to the west of Matford Barton. Prehistoric evidence is recorded in the same field including a Scheduled Barrow Cemetery.
Grid Reference: SX 921 890 (447m at N146 from survey location point)
Monument Type(s) and Dates: DITCH (Lower Palaeolithic to Post Medieval - 698000 BC to 1750 AD (Between))
Associated Finds:

FDV5455 - ANIMAL REMAINS (Unknown date)
FDV5456 - FLINT (Prehistoric - 698000 BC to 42 AD)
FDV5457 - SHERD (Early Bronze Age to Late Iron Age - 2200 BC to 42 AD)
FDV5458 - SHERD (Post Medieval to Modern - 1540 AD to 2013 AD)

Associated Events: EDV6352 - Land South-West of Exeter, Alphington (Ref: 5794)

Appendix 5 Geophysical surveying techniques

1 Introduction

Substrata offers magnetometer and earth resistance surveying. We also provide other archaeology-specific geophysical surveys such as ground penetrating radar and resistivity. The particular method or combination of methods used depends on local soil conditions and the survey requirements. These methods are capable of delivering fast and accurate assessments of the archaeology of both large and small sites.

Further details can be found on our website at www.substrata.co.uk.

2 Magnetometer surveying

Standard magnetometer surveys are the workhorse of archaeological surveying when speed and cost-effectiveness are important. Identifiable archaeological features include areas of occupation, hearths, kilns, furnaces, ditches, pits, post-holes, ridge-and-furrow, timber structures, wall footings, roads, tracks and similar buried features.

Magnetometer surveying is used to detect and map small changes in the earth's magnetic field caused by concentrations of ferrous-based minerals within the soil and subsoil, and by materials buried beneath the surface. While most of these changes are too small to affect a compass needle, they can be detected and mapped by sensitive field equipment. During surveys the different magnetic properties of top-soils, sub-soils, rock formations and archaeological features are recorded as variations against a background value. Subsequently magnetic anomalies resulting from potential archaeology can be identified and interpreted.

Bartington grad601-2 gradiometers

A gradiometer is a type of magnetometer and is sensitive to relatively small changes in the earth's magnetic field. Our primary surveying instruments are Bartington Grad601-2 (dual sensor) fluxgate gradiometers with automatic data loggers. They are specifically designed for field use by archaeologists. The Bartington gradiometers provide proven technology in archaeological magnetic surveying and offer fast, accurate set-up and survey rates. They are sensitive to depths of between 0 and 1.5m below ground level, with optimum sensitivity at depths of 1m or less.

Multiple sensor arrays

A technique relatively new to commercial archaeological surveying but well understood in academic circles involves the use of multiple magnetometer sensors towed behind a quad bike or similar vehicle. With multiple sensors and the use of on-board GPS units, it is possible to achieve faster survey rates at competitive commercial rates when compared to the use of multiple instruments and the techniques discussed above provided the ground is suitable for the vehicle and array. Substrata is pleased to announce that we now offer this service on suitable larger sites

3 Earth resistance surveying

Earth resistance surveying is an excellent tool for detecting buried archaeology. Its relatively slow rate of survey compared to magnetometer surveys means that it usually employed in commercial surveys when a detailed understanding of buried building remains is required. This technique measures changes in the electrical resistance of the ground being surveyed. In practice, the recording of differences in the electrical resistance of near-surface deposits and structures allows the detection and interpretation of masonry and brick foundations, paving and floors, drains and other cavities, large pits, building platforms, robber trenches, ditches, graves and similar buried features.

Resistance to electrical current flow in the ground depends on the moisture content and structure of the soil and other materials buried beneath the surface. For example, the higher the moisture content of a soil, the less resistant it is to electrical current flow. A ditch completely buried beneath the present ground surface is likely to have an infill soil different to that surrounding the ditch in terms of compactness and composition. As a result, the soil filling the buried ditch will retain moisture in a different way to the surrounding soil which means it will

have an electrical resistance at variance with the surrounding environment. By passing a small current through the ground it is possible to detect, record, plot and interpret such changes in electrical resistance.

For earth resistance surveying Substrata uses the Geoscan Research RM15 series multi-probe resistance meters and purpose-built automatic data-loggers. The Geoscan MPX15 multiplexer is an integral part to the instrument configuration and facilitates multi-probe arrays which speed up survey area coverage rates and, if required, facilitate simultaneous multiple-depth data collection.