

An archaeological magnetometer survey

Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

Report: 2208HON-R-1

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Contents

1.	Introduction	.1
2.	Client	
3.	Copyright	
4.	Survey type and location	
5.	Summary	
6.	Standards	
7.	Aims and objectives	2
8.	Methodology	
9.	Survey Area	
10.	Archaeological background	3
11.	Results	
12.	Discussion	3
13.	Conclusions	.4
14.	Disclaimer	5
15.	Archive	5
16.	Acknowledgements	5
	Bibliography	
App	endix 1 Figures	.6
	endix 2 Tables	
App	endix 3 Project archive contents	17
Fig	ures	
rig	uics	
Eim	1. location man	_
Figu	re 1: location map	. /
Figu	ure 3: shade plot of processed data	15
rigu	are 4: shade plot of minimally processed data	11
Figu	re 5: grid plan and location	11
 1	1	
Tab	les	
Tr 11		•
	e 1: data analysis	
	e 2: methodology information	
	e 3: processed data metadata	
Tabl	e 4: minimally processed data metadata	.6

1 Introduction

This report presents the results of an archaeological magnetometer survey at the proposed development site listed in Section 4.

The survey was commissioned by AC Archaeology Ltd on behalf of Clients in advance of a planning application. The commissioning of this report was in keeping with the National Planning Policy Framework, Chapter 16, Paragraph 194 (Ministry of Housing, Communities & Local Government, 2021). The survey and report were completed in compliance with a Survey Method Statement (Substrata Ltd, 2021).

2 Client

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

3 Copyright

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4 Survey type and location

4.1 Survey

Method: shallow depth magnetometer survey Instrument: twin-sensor fluxgate gradiometer

Survey Date(s): Aug 2022

Investigation level: Level 2 (prospection and delineation)

Survey resolution: 1m by 0.25m

Survey Size: 1 ha

4.2 Location

Name: Land at Combe Farm Shop

Parish: Gittisham
County: Devon
Nearest Postcode: EX14 3AR
Survey centre NGR: SY 13953 99586
Survey centre NGR (E/N): 313953, 099586 (point)

Historic environment designation: None

OASIS ID: Substrat1-508896

5 Summary

An archaeological magnetometry survey was carried out on 1 hectare of land on the western periphery of the town of Honiton in East Devon. Five anomaly groups were detected of which 4 are considered to represent potential buried archaeological deposits. Two linear anomaly groups possibly relate to a former recorded field boundary present on historic map sources. Two groups possibly relate to heating events however the response is not typical.

6 Standards

The standards that were used to complete this survey are defined by the Chartered Institute for Archaeologists (2014b) and the Europae Archaeologiae Consilium (undated). The codes of approved practice to be followed are those of the Chartered Institute for Archaeologists (2014) and Archaeology Data Service (undated).

7 Survey aims and objectives

7.1 Aims

- 1. Within the framework set out in Chartered Institute for Archaeologists (2014b) and Europae Archaeologiae Consilium (undated), complete an archaeological geophysical survey and report which will, as far as possible, establish the presence or absence, extent and character of any buried archaeology within the survey area.
- 2. Provide sufficient information on the nature of any archaeological remains to facilitate the assessment of their interest prior to the determination of the planning application.

7.2 Objectives

- 1. Complete a magnetometer survey across the Survey Area.
- 2. Identify any magnetic anomalies that may be related to buried archaeology.
- 3. Within the limits of the technique and dataset, archaeologically characterise any such anomalies or patterns of anomalies.
- 4. Accurately record the location of the identified anomalies.
- 5. Produce a report based on the survey that is sufficiently detailed to inform any subsequent development on the survey area about the location and possible archaeological character of the recorded anomalies.

8 Methodology

The magnetometer survey was undertaken in accordance a Survey Method Statement (Substrata Ltd, 2021) using the standards specified in Section 6 to achieve the aims and objectives set out in Section 7. The survey method was selected to provide a relatively fast and cost-effective evaluation of any buried archaeology across the Survey Area (see Section 14).

Data processing was undertaken using appropriate software (Table 2), with all anomalies being digitised and geo-referenced. The final report (this document) includes 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. The survey and report conform to the Chartered Institute for Archaeologists standard for geophysical survey (Chartered Institute for Archaeologists, 2014b) and Europae Archaeologiae Consilium (undated).

9 Survey Area

9.1 Location and description

The land surveyed, hereafter referred to as the Survey Area, comprises a plot of agricultural land described on the western outskirts of Honiton, East Devon (see Figure 1). It is bounded by Hayne lane and the A30 to the north, Hayne Farm shop to the east and agricultural fields to the south and west. The survey area is roughly level at 83m aOD (above Ordnance Datum.

9.2 Geology and sub-surface deposits

The underlying solid geology comprises Sidmouth Mudstone Formation. A Sedimentary bedrock formed between 250 and 228.4 million years ago during the Triassic period. (British Geological Survey undated).

Magnetometer survey can be recommended over any sedimentary geology. There are few significant distorting factors although a wide range of magnetic susceptibility in the parent rock results in a very variable background response to survey (English Heritage 2008, Table 4).

9.3 Soils

The soils within the Survey Area are freely draining slightly acid loamy soils (www.landis.org.uk, undated).

10 Archaeological background

10.1 Historic landscape characterisation

Modern

Modern enclosures: These modern fields have been created out of probable medieval enclosures. The sinuous medieval boundaries survive in places.

Post-Medieval

Medieval enclosures based on strip fields; This area was probably first enclosed with hedge-banks during the later middle ages. The curving form of the hedge-banks suggests that earlier it may have been farmed as open strip-fields.

10.2 Summary of the archaeological background

This section summarises heritage assets that are thought relevant to the survey data analysis and is not designed to be a comprehensive description of the archaeological background.

The Survey Area is situated in a general area where there is known survival of buried archaeological remains relating to the prehistoric and Roman military and civil periods.

Less than 100m to the north running roughly parallel to the A30 the line of a Roman Road (MDV1875) is recorded which connected Honiton to Exeter.

Adjacent to the eastern section of the site a prehistoric oval enclosure was excavated between 1997-1999 prior to the A30 improvements "Hayne Lane excavation in 1997 prior to A30 improvement scheme revealed the single ditched oval enclosure circa 81 metres by 35 metres with a single southwest facing entrance with slightly inturned terminals" (Fitzpatrick, A. P. + Butterworth, C. A. + Grove, J., 1999)

A findspot is recorded (MDV60750) within the survey area, 12 sherds of Late bronze/ early iron age pottery was recovered from an evaluation trench.

An trenching evaluation by Cotswold archaeology in 2017-2019 on the land adjacent to the east identified two incomplete roundhouses (MDV132824, MDV132825).

11 Results

11.1 Scope and definitions

This survey was designed to record magnetic anomalies. A magnetic anomaly is a local variation in the Earth's magnetic field. Such variations can result from differences in the magnetic properties of the underlying solid geology, superficial geology and other near-surface deposits including those altered and created by past human activities. Near-surface artefacts can also create magnetic anomalies.

The dimensions of magnetic anomalies mapped as representing potential buried archaeology do not represent the dimensions of any associated archaeology.

The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to buried archaeology.

11.2 Analysis

Figure 2 shows the interpretation of the survey data and includes the anomaly groups identified as possibly relating to buried archaeology along with their identifying numbers. Table 1 is an extract of the detailed analysis of the survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figure 2 and Table 1 comprise the analysis of the survey data.

Figure 3 is a plot of the processed data as specified in Table 3. Figure 4 is a plot of minimally processed data as specified in Table 4. Figure 5 shows the location of the survey grid and grid data files.

12 Discussion

12.1 General points

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 in the survey archive.

Data collection

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

Anomaly characterisation

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 mapped as potential archaeology when they are well defined in the data, associated with other significant anomaly groups or otherwise formed recognisable patterns as listed in Table 1.

Anomalies thought to relate to natural features and recent man-made objects such as manholes, water management equipment, drains, cables and other services are only mapped where they comprise significant magnetic responses across the dataset that need clarification.

Numerous dipole magnetic anomalies are present within the dataset. These are likely to represent recent ferrous objects. They are only mapped if they could influence the analysis of anomaly groups thought to have an archaeological origin.

Parallel, linear anomalies following the approximately north-south trend of the extant field boundaries (Figures 3 to 4) and not otherwise discussed below are likely to represent relatively recent ploughing disturbance.

12.2 Data relating to historic maps and other records

Anomaly Group 1 and 2 are ditch like features located in roughly the same position as a field boundary visible on tithe mapping of 1840. Later 1st edition and 2nd edition OS maps depict the boundary ever so slightly to the east.

12.3 Data with no previous archaeological provenance

Anomaly groups 3 and 4 are high positive/ negative anomalies that possibly represent thermoremanent features related to burning. It is possible that these anomalies may relate to modern deposits as the response is not entirely typical.

Potential modern and services

Anomaly Group 101 is an area of modern rubble related to land improvement.

13 Conclusions

The geophysical survey was successful in detecting anomalies of possible archaeological potential. Five anomaly groups were detected of which four are considered to represent buried archaeological deposits. Two groups (1,2) possibly represent parts of a former historic boundary. Two groups (3,4) possibly represent areas of burning, the response is not typical- a modern should not be ruled out. The survey area contained lot of high or low spikes which suggests this area has been effected by agricultural practices.

14 Disclaimer

The description and discussion of the results presented in this report are the authors', based on their 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.

15 Archive

15.1 Online Access to the Index of archaeological investigationS (OASIS)

OASIS ID: Substrat1-508896

The OASIS entry has been completed and the boundary file and report uploaded with six months delay in publication.

15.2 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as specified in Appendix 3.

15.3 Archaeological Data Service (ADS)

Depending on local authority policy, an archive may be deposited with the ADS as specified in Appendix 3.

15.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF or printed copy of the report will be submitted to the appropriate HER within six months of completion.

16 Acknowledgements

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

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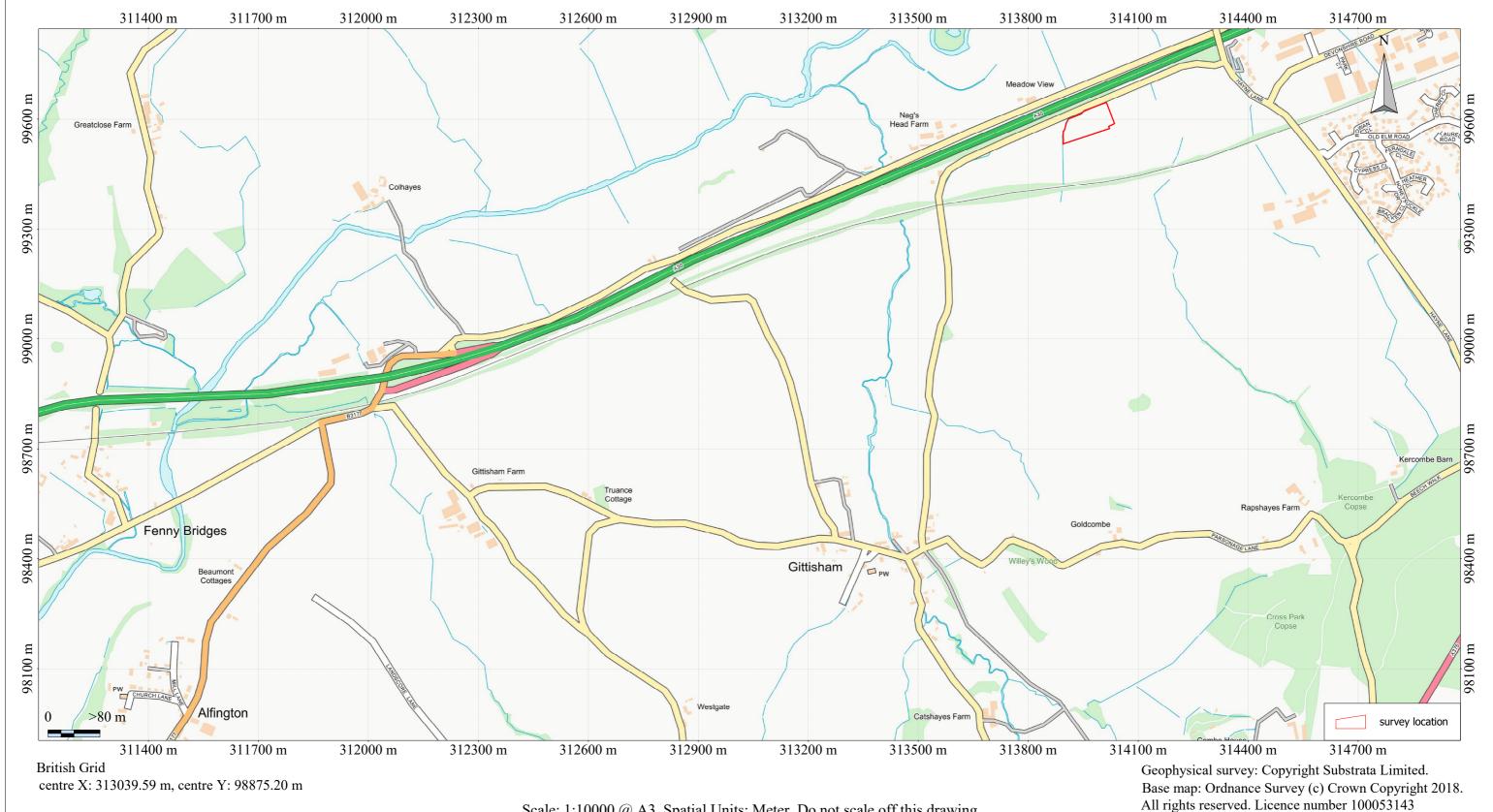
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Appendix 1 Figures

General Guidance

The anomalies represented in the survey plots provided in this appendix are magnetic anomalies. The apparent size of such anomalies and anomaly patterns are unlikely to correspond exactly with the dimensions of any associated archaeological features.

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.



Scale: 1:10000 @ 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. Not all instances are mapped.
- 5. Anomalies likely to represent recent deposits or ground disturbance, or geological and other natural deposits are not mapped unless relevant to potential buried archaeology.

An archaeological magnetometer survey Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

Report: 2208HON-R-1

Figure 1: Location map



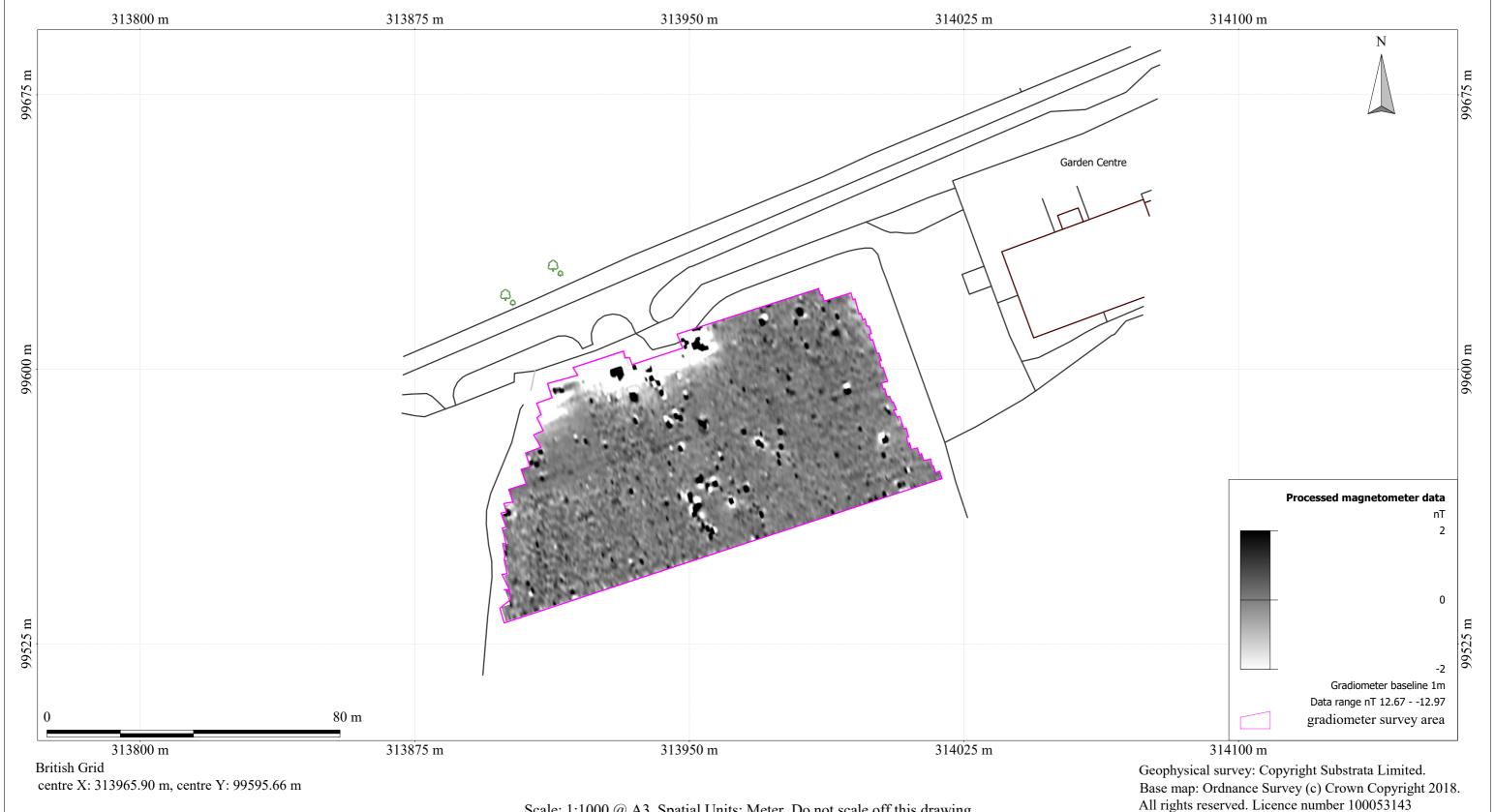
Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

- 1. All interpretations are provisional and represent potential archaeological deposits.
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An archaeological magnetometer survey Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

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Figure 2: survey interpretation



Scale: 1:1000 @ 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. Not all instances are mapped.
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An archaeological magnetometer survey Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

Report: 2208HON-R-1

Figure 3: processed magnetometer data



1. All interpretations are provisional and represent potential archaeological deposits.

- 2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological characterisation.
- 3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
- 4. Not all instances are mapped.
- 5. Anomalies likely to represent recent deposits or ground disturbance, or geological and other natural deposits are not mapped unless relevant to potential buried archaeology.

An archaeological magnetometer survey Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

Report: 2208HON-R-1

Figure 4: unprocessed magnetometer data



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

An archaeological magnetometer survey Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

Report: 2208HON-R-1

Figure 5: grid plan and control points

Appendix 2 Tables

Site: Land at Combe Farm Shop, Honiton Centred on NGR: 313953, 099586

plot	anomaly	associated	anomaly characterisation	anomaly form	additional archaeological	comments	supporting evidence
	group	anomaly groups	certainty & class		characterisation		
	1	2	possible, positive	linear	possible former boundary	spacially relates to boundary	Tithe map
	2	1	possible, positive	linear	possible former boundary	spacially relates to boundary	Tithe map
	3		high positive, negative	ovoid	possible heating event?	not a typical response. may relate to modern dumping	
	4		high positive, negative	ovoid	possible heating event?	not a typical response. may relate to modern dumping	
	101		likely, modern	random	likely modern ground improvement	possible rubble mixture	

Table 1: data analysis

Grid

Method of Fixing: DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.

Composition: 30m by 30m grids

Recording: Geo-referenced and recorded using digital map tiles.

DGPS used: Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra

Explorer 7 as the survey control program.

Equipment

Instrument: Bartington Instruments grad601-2

Firmware: version 6.1

Data Capture

Sample Interval: 0.25m Traverse Interval: 1 metre Traverse Method: zigzag

Traverse Orientation: GN

Data Processing, Analysis and Presentation Software

IntelliCAD 8.4

DW Consulting TerraSurveyor3

Manifold System 8 GIS

Microsoft Corp. Office 365: Excel, Publisher, Word Adobe Systems Inc Adobe Acrobat 9 Pro Extended

Table 2: methodology information

Description:

Instrument Type: Grad 601 (Magnetometer)

Units: nT

Direction of 1st Traverse: 0 deg Collection Method: ZigZag

2 @ 1.00 m spacing. Sensors:

Dummy Value: 32702

Dimensions

Composite Size (readings): 1200 x 120 Survey Size (meters): 150 m x 60 m Grid Size: 30 m x 30 m

X Interval: 0.125 m (surveyed @ 0.25 m) Y Interval: 0.5 m (surveyed @ 1 m)

Stats

Max: 12.67 Min: -12.97Std Dev: 1.55 Mean: -0.23Median: -0.02

Processes: 12 1 Base Layer

- 2 Clip at 1.00 SD
- 3 Clip at 2.00 SD
- 4 DeStripe Median Sensors: All
- 5 Range Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Right edge
- 6 Range Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Bottom edge
- 7 Range Match (Area: Top 0, Left 240, Bottom 29, Right 359) to Bottom edge
- 8 Range Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Bottom edge
- 9 Range Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Right edge
- 10 Range Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Bottom edge
- 11 De Stagger: Grids: All Mode: Outbound By: -2 intervals
- 12 Interpolate: X & Y Doubled.

Note: Input to the GIS results in slight changes to the stats shown above. The data stored in the archives (Appendix 3) will have the above metadata and the values quoted in the report figures will be those quoted in this metadata table.

Description:

Instrument Type: Grad 601 (Magnetometer)

Units: nT

Direction of 1st Traverse: 0 deg Collection Method: ZigZag

Sensors: 2 @ 1.00 m spacing.

Dummy Value: 32702

Dimensions

Composite Size (readings): 600 x 60 Survey Size (meters): 150 m x 60 m Grid Size: 30 m x 30 m

X Interval: 0.25 m Y Interval: 1 m

Stats

Max: 2381.60 Min: -1735.10 Std Dev: 35.03 Mean: -0.46 Median: -0.30

Processes: 1 1 Base Layer

Note: Input to the GIS results in slight changes to the stats shown above. The data stored in the archives (Appendix 3) will have the above metadata and the values quoted in the report figures will be those quoted in this metadata table.

Table 4: Unprocessed raw data metadata

Appendix 3 Project archive contents

A3.1 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as follows:

Report: Adobe PDF (.pdf), Microsoft Publisher (.pub)
Raw grid data files: DW Consulting TerraSurveyor 3 (.xgd) and

Raw data composite files: CSV (.xyz)

Minimally processed data composite files: DW Consulting TerraSurveyor 3 (.xgd) and

CSV (.xyz)

Final data processing composite files: DW Consulting TerraSurveyor 3 (.xgd) and

CSV (.xyz)

GIS project: GIS project Manifold 8 (.map)

Survey interpretation: ESRI shape files AutoCAD version of the survey interpretation: AutoCAD (.dwg)

(if generated)

All project working files: IntelliCAD 8.4

Microsoft Corp. Office 365: Excel, Publisher,

Word

Adobe Systems Inc Adobe Acrobat 9 Pro

Extended

A3.2 Online Access to the Index of archaeological investigationS (OASIS)

Metadata: online form
Georeferenced survey boundary file: ESRI shape file
Report: Adobe PDF (.pdf)

A3.3 Archaeological Data Service

Depending on local authority policy, an archive may be deposited with the ADS as follows:

Raw data composite file: CSV (xyz)

Processed data plot: rendered images in TIFF format

Survey grid plot: image in TIFF format
Details of data processing: image in TIFF format

Interpretation plot: rendered images in TIFF format

Metadata: Microsoft Excel format

A3.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF copy of the report will be submitted to the appropriate HER within 6 months of the completion of this report via the OASIS process or by other means, depending on the relevant HER process.