

Substrata

Archaeological Geophysical Surveyors

Written Scheme of Investigation

**Earthwork east of Bucks Mills, North
Devon**

Centred on NGR (E/N): 235888,123491

Document 1901BUC-W-1

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28/04/2019

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Attachments:

ADS archiving estimate 1ha

1 Summary

Substrata Limited have been commissioned to undertake a level 3 archaeological geophysical survey by Cotswold Archaeology Limited as part of a programme of archaeological investigation

Most of the survey area lies within the site of the Scheduled earthworks (NHLE: 1002527), which over time have been labelled as an Iron Age hillfort/defended settlement or a Roman camp. Interpretations of the site are still in progress following the recent aerial and walkover surveys, although the results of geophysical survey across the full accessible area of the site are hoped to provide some clarification of the function of this enclosure, and whether it has been subject to more than just one phase of use (Arkley, 2019).

This Written Scheme of Investigation (WSI) was prepared in accordance with Chartered Institute for Archaeologists (2014b). It defines the location, methodology, reporting and project management of the survey.

2 Introduction

An archaeological geophysical survey has been proposed in

3 Site

Location:	Earthwork east of Bucks Mills,
Town and Civil Parish:	Woolfardisworthy
District:	Torridge
County:	Devon
Nearest Postcode:	EX39 5DN
NGR:	SS 35888 23491(point)
NGR (E/N):	235888,123491(point)
Historic environment designation:	Schedule earthwork (NHLE: 1002527)
Oasis ID:	substrat1-350222

3.1 Land use

Most of the survey area lies within the site of the Scheduled earthworks (NHLE: 1002527), parts of the western area of the site are under woodland, part of the eastern section is agricultural land. The area is made up of a mixture of gorse, nettles and brambles.

3.2 Topology

The field is bounded by fencing to the east and south, the western side is bound dense woodland. the northern boundary is a mixture of dense flora and woods beyond. The Site slopes to the NE, with the highest point at c. 144m above Ordnance Datum (aOD) in the south. This decreases to c. 133m aOD at the north of the Site.

3.3 Geology

The bedrock across the Site is Bude Formation - Sandstone. Sedimentary Bedrock formed approximately 310 to 319 million years ago in the Carboniferous Period. Local environment previously dominated by sub-aqueous slopes. (British Geological Survey, undated).

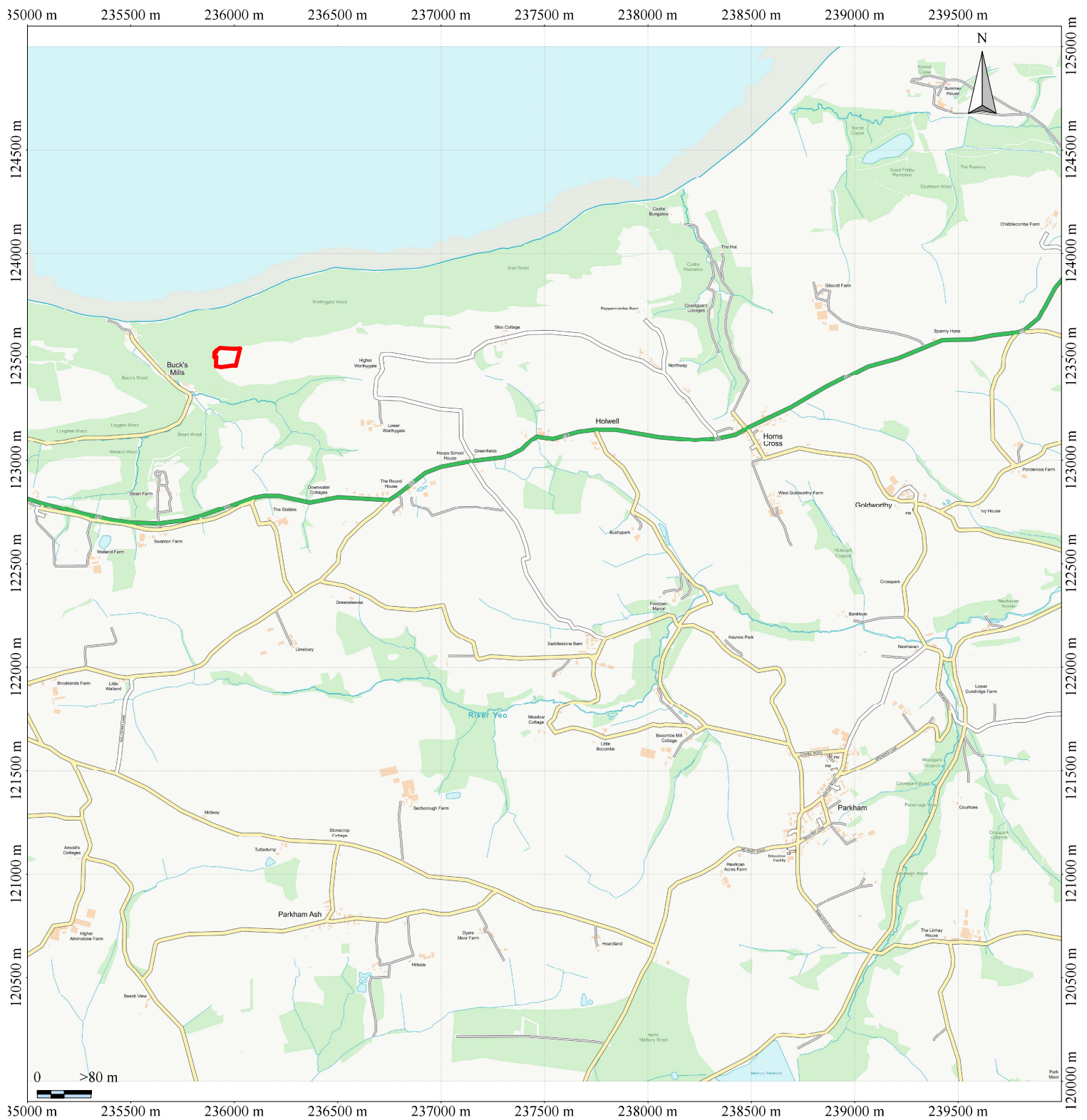
3.4 Soils

The soils within the survey area are Freely draining acid loamy soils over rock (www.landis.org.uk, undated)

4 Archaeological and historical background

4.1 Historic Landscape Characterisation

‘Undulating costal farmland’
(Devon County Council, undated)



British Grid
 centre X: 237500.00 m, centre Y: 122500.00 m

Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2018.
 All rights reserved. Licence number 100053143

Scale: 1:18000 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:

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

An archaeological magnetometer survey
 Earthwork east of Bucks Mills, North Devon
 Centred on NGR: 235888,123491
 Report: 1901BUC-R

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Figure 1: Location plan

4.2 Summary of archaeological background

The site in question has been interpreted as a sub-rectangular Iron Age earthwork enclosure/promontory fort, visible on aerial photographs and images derived from Lidar data, to the east of Buck's Mills.

Potential features of high significance may be anticipated.

5 Survey aims and objectives

5.1 Aims

Within the framework set out in Chartered Institute for Archaeologists (2014a), complete an archaeological geophysical survey and report to:

1. As far as possible inform on the presence or absence, character, extent and in some cases, apparent relative phasing of buried archaeology, in order to make an assessment of its merit in the appropriate context, which may lead to one or more of the following:
 - a. The formulation of a strategy to ensure further recording, preservation or management of the resource
 - b. The formulation of a strategy to mitigate a threat to the archaeological resource
 - c. The formulation of a proposal for further archaeological investigation within a programme of research' (ibid, 2014a: 4).
2. Provide in the report sufficient objective data to enable an informed and reasonable conclusion.

5.2 Objectives

1. Complete a Level 3 magnetometry survey (analyse in detail the shape of individual anomalies) geophysical 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 technique(s) 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.

6 Standards

The standards that will be used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and Historic England (2008). The codes of approved practice to be followed are those of the Chartered Institute for Archaeologists (2014b), Archaeology Data Service (undated) and EAC guidelines.

7 Methodology

7.1 Method

A magnetometer survey is required to provide a cost-effective geophysical evaluation of any buried archaeology to achieve the aims and objectives set out in Section 5 using the standards and guidance specified in Section 6.

Magnetometry:

Survey area: Minimum: 0.5ha

Traverse heading: North (may change on site depending on conditions)

Equipment: Bartington grad601-2 gradiometer, gradiometer sensor separation 1m

Sample Interval: 0.125 metre

Traverse Interval: 1 metre

Data capture: automatic data logger

Traverse Method: Parallel (may change on site in order to maximise coverage)

Grid: 20m

7.2 Survey setout

1. The survey will use a temporary survey grid accurately positioned using a suitable GPS system.
2. The temporary grid will be co-registered to the Ordnance Survey National Grid using digital tiles provided by Substrata or suitable digital map tiles provided by the client.
3. The survey grid will be composed of continuous 20-metre square sub-grids with partial sub-grids to maximise the area surveyed where practical.
4. The survey grid location information and grid plan will be recorded in a GIS project.

7.3 Magnetometer survey equipment and data capture

1. The magnetometer survey will be completed using Bartington *grad601-2* (dual sensor) fluxgate gradiometer which is equipped with an automatic data logger.
2. The readings will be recorded on 1-metre traverses at 0.125-metre intervals using parallel traverses with an automatic data logger.
3. Sensor balance will be calibrated using one or more suitable locations at the start of the survey, after 30 minutes of surveying and then regularly every 2 hours.

8 Report preparation

8.1 Data processing

1. All processed and unprocessed data will be stored as interactively readable, georeferenced data within a GIS project.
2. Data processing will be undertaken using DW Consulting's TerraSurveyor 3.
3. All processing will be listed in the report along with the relevant metadata.

8.2 Interpretation

1. Anomalies assessed as relating to potential archaeology will be digitised and georeferenced in a GIS project and exported in full to AutoCAD 2013 format georeferenced files.
2. The anomaly abstraction and interpretation data will be layered and presented separately, by anomaly type.
3. The anomaly abstraction and interpretation data will be colour coded using Substrata's standard scheme to provide the most likely interpretation.
4. Anomalies will be numbered and catalogued in the text as systematic groups or individual anomalies as appropriate.
5. Anomalies assessed as relating to modern ground disturbance and/or natural deposits that impact on the analysis of the potential archaeological deposits will be recorded as in 1 to 4.

8.3 Contents

1. A written illustrated report will follow the completion of the field survey and will include a description of the aims, the method used, a discussion of the results, and interpretation of the potential archaeology.
2. The final report will include 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.
3. All geophysical survey report illustrations be generated from the GIS and will also be supplied in AutoCAD 2013 format.
4. The supplied illustrations will include a location plan of all survey grids, referenced to the Ordnance Survey National Grid.
5. Supplied illustrations will include greyscale plots of processed and unprocessed survey data.
6. The processed and unprocessed data supplied as GIS shape files will be georeferenced, ESRI ASCII grid files with "live", readable values in nanotesla.
7. The raster images used to display processed and unprocessed survey data in AutoCAD format will be in TIFF format, and externally referenced to the CAD illustration.
8. The supplied illustrations will include an abstraction and interpretation of all geophysical anomalies pertaining to potential buried archaeology located during the survey.

9 Publication and dissemination

1. PDF or JPG interim greyscale and ‘interpretive’ illustrations will be provided on request.
2. A single PDF of the final report will be provided, sub-divided into individual files smaller than 5Mb, at locations within the report convenient to the reader.
3. Two hard copies of the final report will be provided on request.
4. A copy of the report in a suitable format will be deposited with the relevant Historic Environment Service in due course.

10 Copyright

Substrata Limited will assign copyright to Cotswold Archaeology 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). The report will contain material that is non-Substrata Limited copyright or is the intellectual property of third parties. Such material is labelled with the appropriate copyright and is non-transferrable by Substrata Limited.

11 Archive deposition

1. The geophysical survey archive will comprise as a minimum survey and data metadata, digital data and the final report.
2. Additional files generated during the project will also be added to the full archive held by Substrata Limited and will include georeferenced GIS shape files of the survey grid, “live”, readable processed and unprocessed data files and the interpretation.
3. A strategy will be in place to ensure adequate storage, security and long-term accessibility of the archive. This will include a written procedure specifying the archiving process in line with Archaeology Data Service (undated b).
4. An OASIS entry will be completed and the entry number recorded in the final report.
5. an archive of the processed data, unprocessed data and metadata will be deposited with the Archaeological Data Service in line with Section 42 License requirements and the requirements of the local authority .
6. The Section 42 questionnaire will be completed by Cotswold Archaeology and disseminated with the final survey report. Substrata will forward a copy to the HER.

12 Programme

1. Prior to survey commencement the following will be addressed by Cotswold Archaeology Limited:
 - a. Access to the land has been agreed by all relevant parties, including crop owners, stock owners and tenant farmers.
 - b. Steep topography has been agreed with Substrata Limited as suitable for surveying.
 - c. Farmland has been confirmed as grass pasture, stubble, low crops that will not suffer damage by trampling or ploughed land.
 - d. If ploughed, the land must be harrowed before the survey can commence.
 - e. If the ploughed land has been seeded, the crop owner’s agreement that the land can be walked and surveyed must be secured.
 - f. Areas of high vegetation have been identified and agreed with Substrata Limited as suitable for surveying. If at all possible, the high vegetation will have been cleared and removed from the survey area.
 - g. Livestock has been removed from the survey areas or it has been agreed that livestock will be moved and corralled within the survey areas by owners during the survey.
 - h. Any temporary fencing has been removed if at all possible.
 - i. Any electric fencing has been switched off or Substrata Limited has been made aware of live fencing.
 - j. Every reasonable effort has been made to remove large steel and iron objects (for example, vehicles and fencing) which will affect the magnetic survey results.
2. The survey is expected to be completed over 1 working day using 1 survey team.
3. Preliminary results will be available 3 working days after survey completion if required.
4. A draft report will be available by no later than 2 working weeks after survey start or

- sooner with prior agreement.
5. A complete report will be available by no later than 1 working week after receiving notification of changes by Cotswold Archaeology or sooner with prior agreement.
 6. An invoice will be issued after the complete report has been accepted by Cotswold Archaeology Limited and the OASIS record (Section 12, 4) has been completed by Substrata Limited.
 7. Should ARS archiving be required (Section 12, 5), a further pre-survey agreed invoice will be issued after archiving is completed.

13 Staffing and volunteers

1. Contractor liaison, monitoring and client liaison will be managed by Zoe Arkley, Senior Heritage Consultant, Cotswold Archaeology Limited.
2. All stages of the Substrata survey programme will be managed by Mark Edwards BA
3. The survey and initial data processing will be undertaken by Mark Edwards BA (hon), Director, Substrata Limited. This may involve other Substrata Limited sub-contractors and, if so, will be approved by Zoe Arkley prior to the survey start.
4. Local volunteers will be invited to join the survey under the responsibility of the North Devon AONB (the end client)
5. At least one first aider and one member of staff from Cotswold Archaeology will be present. 20mx20m grids will be surveyed in a parallel pattern to allow for all fitness levels.

14 Health and safety

1. Substrata Limited will take sole responsibility for observing all current legal requirements concerning their employees' or, if appropriate, sub-contractors health and safety.
2. A copy of Substrata Limited's health and safety policy and our a risk assessment for the survey will be provided prior to the survey start.
3. All people on site shall receive a copy of Substrata Limited's risk assessment of the site and will be advised of the correct procedures to minimise personal injury.

15 Monitoring

Cotswold Archaeology Limited reserve the right to undertake on-site monitoring without prior notification.

16 Contingency

Not applicable.

17 Bibliography

Archaeology Data Service (undated a) *Somerset and Exmoor Historic Landscape Characterisation* [Online], Available: http://archaeologydataservice.ac.uk/archives/view/somersetexmoor_hlc_2013/ [April 2019]

Archaeology Data Service (undated b) *Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology, 2nd Edition* [Online], Available: http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc [April 2019]

British Geological Survey (undated) *Geology of Britain viewer, 1:50000 scale data* [Online], Available: http://www.bgs.ac.uk/discovering_Geology/geologyOfBritain/viewer.html [March 2019]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey* [Online], Available: http://www.archaeologists.net/sites/default/files/CifAS&GGeophysics_1.pdf [March 2019]

Chartered Institute for Archaeologists (2014b) *Code of conduct* [Online], <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf> [February 2019]

EAC guidelines <http://old.european-archaeological-council.org/files/>

eac_guidelines_2_final.pdf (accessed May 2019)

Ministry of Housing, Communities & Local Government, (2018). National Planning Policy Framework. [pdf] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/728643/Revised_NPPF_2019.pdf

Historic England (2008) *Geophysical Survey in Archaeological Field Evaluation* [Online], Available: <https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/> [April 2018]

LandIS (undated) *Cranfield Soils and Agrifood Institute Soilscales* [Online], Available: <http://www.landis.org.uk/soilscales/> [March 2019]