



RODENHURST POULTRY UNIT, HIGH ERCALL, SHROPSHIRE

GEOPHYSICAL SURVEY REPORT

PLANNING REF. TWC/2020/0920

commissioned by Ian Pick & Associates on behalf of MS Walker

December 2020





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PROJECT INFO:

HA Project Code **HESH20** / NGR **SJ 5880 1579** / Parish **Rodington** / Local Authority **Telford and Wrekin Council** / OASIS Ref. **headland5-409338**

Manizon

PROJECT TEAM:

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Approved by **David Harrison**

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PROJECT SUMMARY

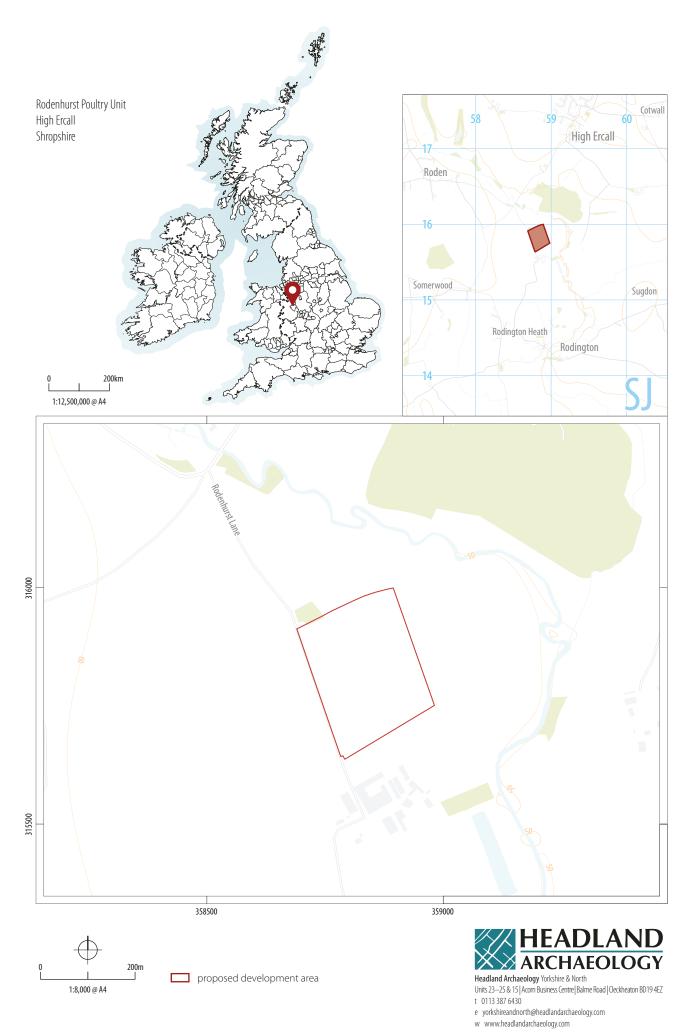
Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey of a 6-hectare site near High Ercall, Shropshire where a new poultry unit is proposed. No anomalies of clear archaeological potential have been identified by the survey although a localised cluster of pit-type anomalies and an isolated ditch may be of some interest. These anomalies are ascribed low to moderate archaeological potential. The majority of the site contains no anomalies of interest and therefore the archaeological potential over the majority of the site is assessed as low, corroborating the results of the Heritage Statement and Archaeological Desk Based Assessment.

CONTENTS

1	INTRO	ODUCTION	1
	1.1	SITE LOCATION, TOPOGRAPHY AND LAND-USE	1
	1.2	GEOLOGY AND SOILS	1
2	ARCH	HAEOLOGICAL BACKGROUND	1
3	AIMS	5, METHODOLOGY AND PRESENTATION	2
	3.1	MAGNETOMETER SURVEY	2
	3.2	REPORTING	2
4	RESU	ILTS AND DISCUSSION	3
	4.1	FERROUS AND MODERN ANOMALIES	3
	4.2	AGRICULTURAL ANOMALIES	3
	4.3	POSSIBLE ARCHAEOLOGICAL ANOMALIES	3
5	CONC	CLUSION	3
6	REFEI	RENCES	4
7	APPE	ENDICES	13
	APPE	NDIX 1 MAGNETOMETER SURVEY	13
	APPE	NDIX 2 SURVEY LOCATION INFORMATION	14
	APPE	NDIX 3 GEOPHYSICAL SURVEY ARCHIVE	14
	APPE	NDIX 4 DATA PROCESSING	14
	APPEI	NDIX 5 OASIS DATA COLLECTION FORM: ENGLAND	15

LIST OF ILLUSTRATIONS

ILLUS 1 SITE LOCATION	VIII
ILLUS 2 PDA, LOOKING SOUTH-EAST	2
ILLUS 3 SURVEY LOCATION SHOWING GPS SWATHS AND PROPOSED DEVELOPMENT (1:1,2000)	5
ILLUS 4 PROCESSED GREYSCALE MAGNETOMETER DATA (1:1,200)	7
ILLUS 5 XY TRACE PLOT OF MINIMALLY PROCESSED MAGNETOMETER DATA (1:1,200)	9
ILLUS 6 INTERPRETATION OF MAGNETOMETER DATA (1:1,200)	11





RODENHURST POULTRY UNIT, HIGH ERCALL, SHROPSHIRE

GEOPHYSICAL SURVEY REPORT

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by Ian Pick & Associates (the Agent) on behalf of MS Walker (the Client), to undertake a geophysical (magnetometer) survey on land near High Ercall, Shropshire, where a new poultry unit is proposed (Telford and Wrekin Council Planning Ref TWC/2020/0920). The results of the survey will inform future archaeological strategy at the site.

The survey was undertaken in order to assess the impact of the proposed development on the historic environment and was undertaken in accordance with an Archaeological Written Scheme of Investigation (WSI) (Harrison 2020), which was submitted to and approved by High Hannaford, Senior Archaeological Advisor to Shropshire Council, with guidance within the National Planning Policy Framework (MHCLG 2019) and in line with current best practice (Chartered Institute for Archaeologists 2014, Europae Archaeologia Consilium 2016).

1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The Proposed Development Area (PDA) comprises a sub rectangular block of land, within a single field, immediately north of Rodenhurst Business Park and 2km south of the village of High Ercall, centred at SJ 5880 1579. The field is bound to the west by an access road to Rodenhurst Business Park, by the business park to the south and by the River Roden to the east.

The PDA is flat at approximately 56m AOD (Above Ordnance Datum). At the time of survey, the field was under a young rape crop (Illus 2).

The survey was carried out on the 19th November 2020.

1.2 GEOLOGY AND SOILS

The bedrock geology comprises Bridgenorth Sandstone Formation and is overlain by glaciolacustrine deposits (clay and silt) in the east and glaciofluvial deposits (sand and gravel) in the west (NERC 2020).

The soils are classified in the Soilscape 18 Association, characterised as slowly permeable, seasonally wet, loams and clays (Cranfield University 2020).

2 ARCHAEOLOGICAL BACKGROUND

A Heritage Statement and Archaeological Desk Based Assessment (Humble Heritage 2020) has established that the PDA lies in an area rich in archaeological remains of the prehistoric, Roman and medieval periods. These include (but are not limited to) a number of cropmark farmstead enclosures of Iron Age and/or Roman date to the north, northwest, and south of the PDA (Shropshire Historic Environment Record [HER] No. PRN 04929, PRN 28729, & PRN 02232 respectively), and a pit alignment (PRN 04390) of probable later prehistoric date to the west. A medieval fish-pond (Rough Marl fishpond PRN 04070) lies 130m to the northeast of the proposed site, and a medieval moated site (PRN 00142) lies c 400m to the east. This latter site is also a Scheduled Monument ('Moated site, ridge and furrow cultivation remains and a building platform immediately north of Lower Grounds' National Heritage List No. 1019298). There are several other non-designated heritage assets in the vicinity of the proposed development site. The PDA therefore has some archaeological and historical interest.



ILLUS 2 PDA, looking south-east

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide enough information to establish the presence/absence, character and extent of any archaeological remains within the PDA. This will therefore enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, if present.

The specific archaeological objectives of the geophysical survey were:

- to gather enough information to inform the extent, condition, character and date (as far as circumstances permit) of any archaeological features and deposits within the PDA;
- > to obtain information that will contribute to an evaluation of the significance of the scheme upon cultural heritage assets; and
- > to prepare a report summarising the results of the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as

buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10–15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Terrasurveyor V3.0.35.1 (DWConsulting) software was used to process and present the data.

3.2 REPORTING

A general site location plan is shown in Illus 1 at a scale of 1:8,000. Illus 2 is a site condition photograph. Illus 3 is a 1:2,000 survey location plan showing the direction of survey as GPS swaths and the proposed development footprint. The magnetic data is presented in greyscale and XY trace formats, at a scale of 1:2,000, in Illus 4 and Illus 5. Illus 6 is an interpretation plot of the data also at a scale of 1:2,000.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the composition and location of the site archive. Data processing details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Harrison 2020), guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (ClfA 2014). All illustrations from Ordnance Survey (OS) mapping are reproduced with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.

4 RESULTS AND DISCUSSION

Ground conditions were good throughout contributing to a high standard of data collection. A variable magnetic background has been identified throughout the PDA characterised by frequent and evenly dispersed discrete areas of magnetic enhancement.

Against this background several anomalies have been identified and cross-referenced to specific examples on the interpretation figure (Illus 6), where appropriate.

4.1 FERROUS AND MODERN ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being present as a result of manuring or tipping/infilling. There is no obvious clustering to these ferrous anomalies which might indicate an archaeological origin. Far more probable is that the 'spike' responses are likely caused by the random distribution of ferrous debris in the upper soil horizons.

Bands of magnetic disturbance along the survey limits are due to the proximity of perimeter fencing and buildings in the south-west and is of no archaeological interest.

4.2 AGRICULTURAL ANOMALIES

Analysis of historical Ordnance Survey mapping indicates that two field boundaries have been removed from within the PDA since the publication of the first edition OS map in 1881. These former boundaries have been detected by the survey as fragmentary linear anomalies (FB1 and FB2). The anomalies are caused by the magnetic contrast between the soil-fill of the infilled boundary ditch and the surrounding soils.

Series of faint parallel linear trend anomalies identified in the south-west of the PDA on a north-east/south-west orientation are characteristic of the medieval and post-medieval practice of ridge and furrow cultivation. The anomalies are due to the magnetic contrast between the soil-filled furrows and the ploughed-down ridges. Ridge and furrow cultivation is recorded on the Shropshire HER in the surrounding landscape and whilst it may be of local historical interest is unlikely to be considered of any archaeological significance in this context.

In the east of the PDA more broadly spaced, low magnitude linear anomalies are typical of land drains.

4.3 POSSIBLE ARCHAEOLOGICAL ANOMALIES

A localised cluster of high magnitude anomalies is identified west of FB1 in the north-west of the PDA. These anomalies may be of archaeological interest, perhaps being due to soil-filled pits. However, no clear pattern is discernible from the cluster or any other archaeological evidence to support this interpretation and the anomalies could be due to agricultural activity such as tipping, infilling or other ground disturbance, perhaps associated with the removal of the adjacent field boundary, FB1.

In the south-west of the PDA a faint low magnitude curvilinear anomaly, D1, is identified on a north-east/south-west orientation. The anomaly is due to a soil-filled ditch. The ditch appears at right-angles to FB1 which may infer some contemporaneity, with D1 perhaps being due to a drainage ditch or a field boundary removed prior to the publication of the first edition OS map. However, an archaeological origin cannot be dismissed.

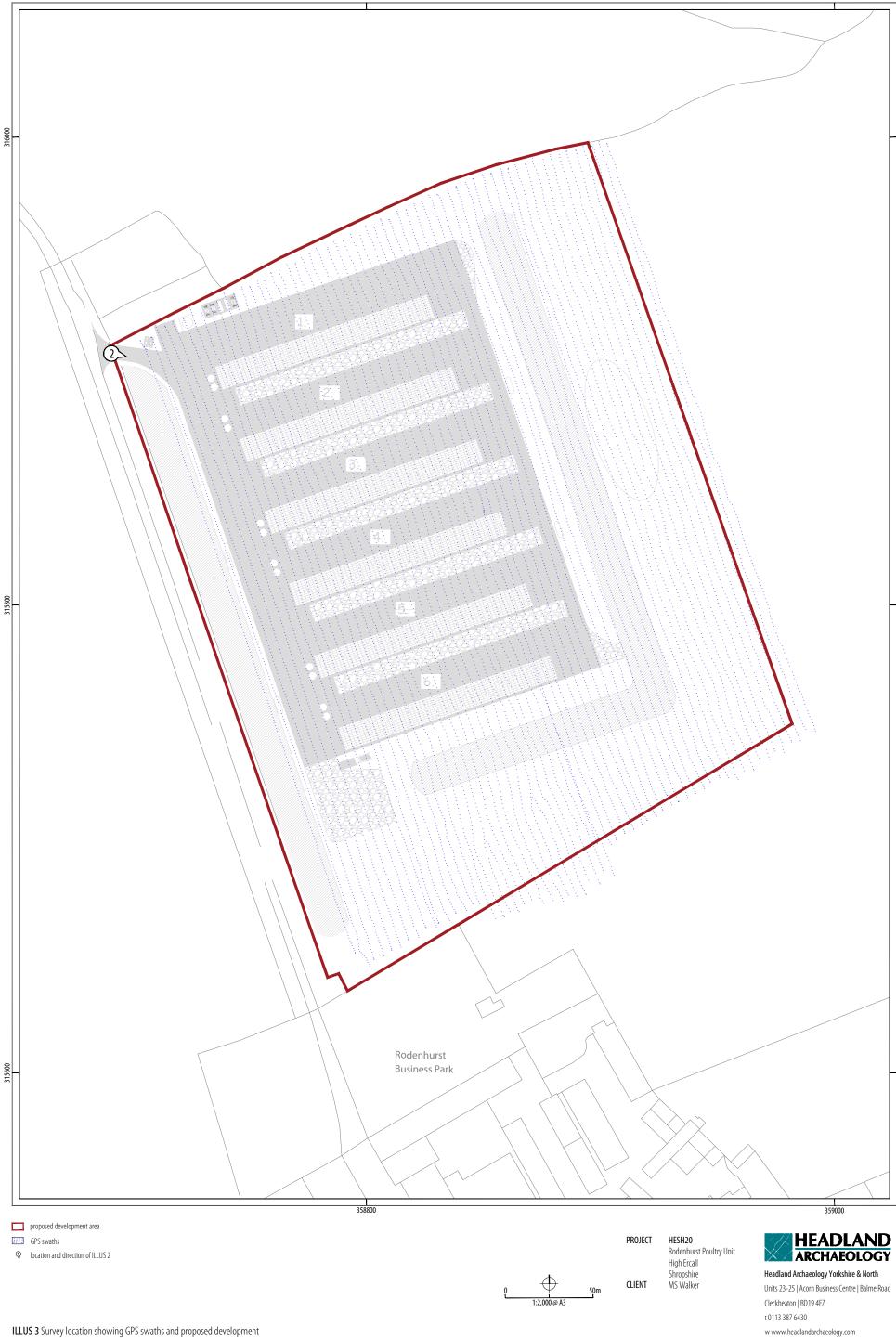
5 CONCLUSION

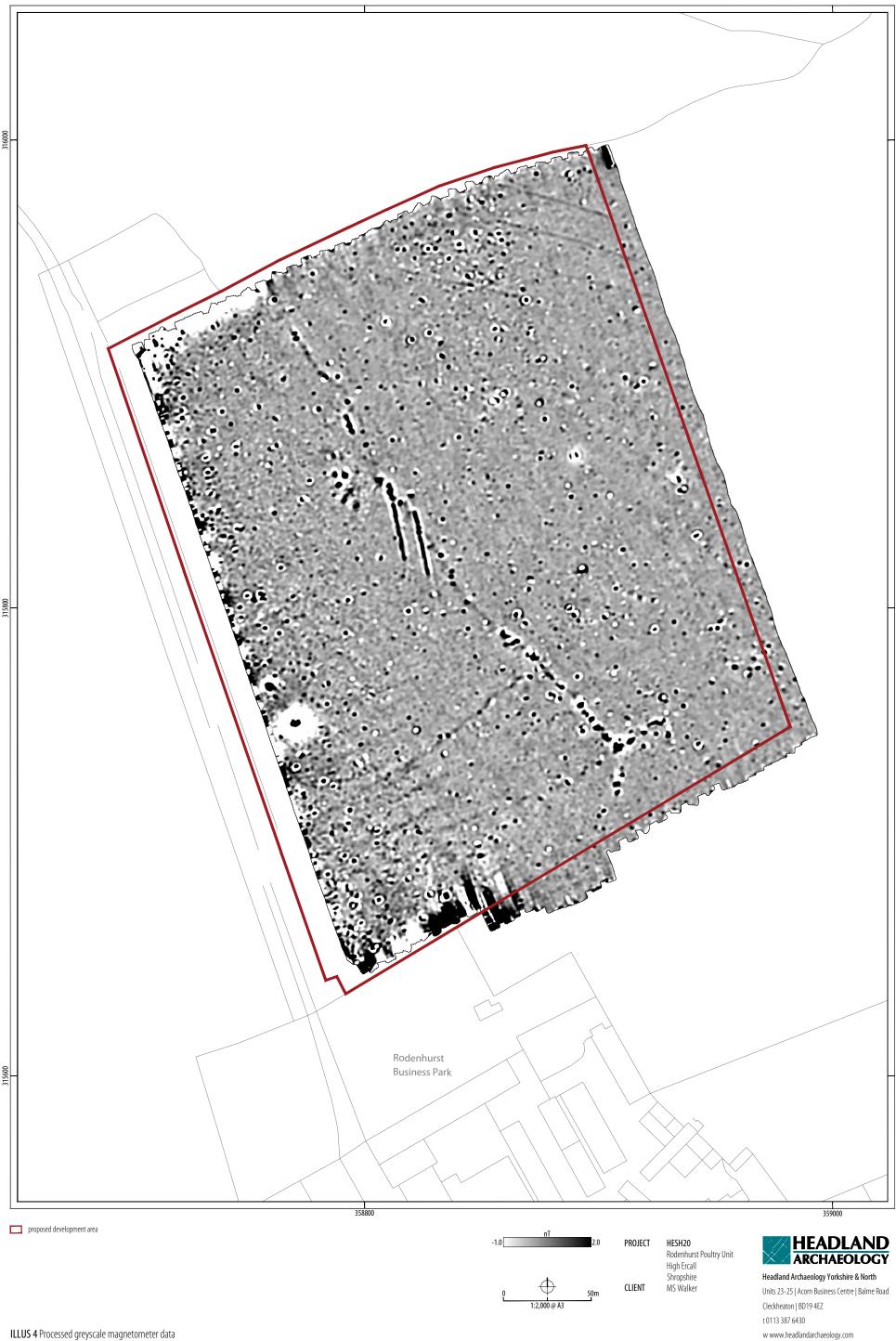
The survey has successfully evaluated the PDA and has not identified any anomalies of clear archaeological potential mostly identifying anomalies which reflect the former agricultural landscape. However, a localised cluster of pit-type anomalies and an isolated ditch may be of some interest. These anomalies are ascribed low to moderate archaeological potential. Most of the PDA contains no anomalies of interest and therefore the archaeological potential over the most of the PDA is assessed as low, corroborating the results of the Heritage Statement and Archaeological Desk Based Assessment.

6 REFERENCES

- Chartered Institute for Archaeologists (ClfA) 2014 Standard and guidance for archaeological geophysical survey (Reading) http://www.archaeologists.net/sites/default/files/ClfAS%26GGeophysics 2.pdf accessed 21 November
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- Ministry of Housing, Communities and Local Government MHCLG) 2019 National Planning Policy Framework https://assers.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/81017/NPPF_Feb_2019_revised.pdf accessed 21 November 2020
- Natural Environment Research Council (NERC) 2018 *British Geological Survey* http://www.bgs.ac.uk/ accessed 21 November 2020









7 APPENDICES

APPENDIX 1 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes) These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Lightning-induced remnant magnetisation (LIRM) LIRM anomalies are thought to be caused in the near surface soil horizons by the flow of an electrical currents associated with lightning strikes. These observed anomalies have a strong bipolar signal which decreases with distance from the spike point and often appear as linear or radial in shape.

Linear trend This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

APPENDIX 2 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics3). The data will be stored in an indexed archive and migrated to new formats when necessary.

APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

2020 by Headland Archaeology (UK) Ltd File Name: HESH20-Report-v1.pdf

APPENDIX 5 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-409338

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Project name Rodenhurst Poultry Unit, High Ercall, Shropshire

Short description of the project Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey of a 6-hectare site near High Ercall, Shropshire where a new

poultry unit is proposed. No anomalies of clear archaeological potential have been identified by the survey although a localised cluster of pit-type anomalies and an isolated ditch may be of some interest. These anomalies are ascribed low to moderate archaeological potential. The majority of the site contains no anomalies of interest and therefore the archaeological potential over the majority of the site is assessed as low, corroborating

the results of the Heritage Statement and Archaeological Desk Based Assessment.

Project dates Start: 19.11.2020 End: 19.11.2020

Previous/future work No / Yes

Any associated project reference codes HESH20 - Contracting Unit No.

Any associated project reference codes TWC/2020/0920 - Planning Application No.

Type of project Field evaluation

Site status None

Current Land use Cultivated Land 4 - Character Undetermined

Monument type None

Monument type None

Significant Finds None

Significant Finds None

Methods & techniques "Geophysical Survey"

Development type Farm infrastructure (e.g. barns, grain stores, equipment stores, etc)

Prompt National Planning Policy Framework - NPPF

Position in the planning process After outline determination (eg as a reserved matter)

Solid geology (other)Bridgenorth sandstone formationDrift geologyLacustrine clays, silts and sands

 Drift geology
 Glacial sand and gravel

 Techniques
 Magnetometry

PROJECT LOCATION

Country England

Site location Shropshire Telford and Wrekin Rodington Rodenhurst Poultry Unit, High Ercall

Study area 6 hectares

Site coordinates SJ 5880 1579 52.737830532687—2.610285968882 52 44 16 N 002 36 37 W Point

PROJECT CREATORS

Name of Organisation Headland Archaeology

Project brief originator Local Authority Archaeologist and/or Planning Authority/advisory body

Developer

Project design originator Headland Archaeology

Project director/manager Harrison David

Project supervisor Heykoop Peter

Type of sponsor/funding body

RODENHURST POULTRY UNIT, HIGH ERCALL, SHROPSHIRE HESH20

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Physical Archive Exists?

No

Digital Archive recipient

In house

Digital Contents

"none"

Digital Media available

"Geophysics"

Paper Archive Exists?

No

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Grey literature (unpublished document/manuscript)

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Harrison David

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