ARCHAEOLOGICAL SERVICES
DURHAM UNIVERSITY

on behalf of
Beck Street Ltd

Land at Radcliffe Grange
Bamburgh
Northumberland

geophysical survey

report 5661
November 2021

Durham University

Contents

Figures

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1. Summary

The project

1.1 This report presents the results of a geophysical survey conducted in advance of proposed development at Radcliffe Grange, Bamburgh, Northumberland. The works comprised approximately 1ha of magnetometer survey.

1.2 The works were commissioned by Beck Street Ltd and conducted by Archaeological Services Durham University.

Results

1.3 One possible ditch feature, of unknown date or function, has been detected in the south-east of the area.

1.4 The majority of the survey area appears to be disturbed ground, perhaps containing deposits of rubble or similar magnetic materials. It has not been possible to identify any features of potential archaeological significance beneath these deposits.

2. Project background

Location (Figure 1)

2.1 The proposed development area (PDA) was located on land at Radcliffe Grange, near the west end of the village of Bamburgh, Northumberland (NGR centre: NU 17603 34724). To the north-west, north and east were residential properties; to the south and west was open farmland.

2.2 One survey of approximately 1ha was conducted in one field of rough pasture.

Development proposal

2.3 The development proposal is for the construction of a single dwelling with outbuildings, planning ref. 20/00470/PREAPP.

Objective

2.4 The aim of the survey was to assess the nature and extent of any sub-surface features of potential archaeological significance within the PDA, so that an informed decision may be made regarding the nature and scope of any further scheme of archaeological works that may be required in relation to the development.

2.5 The regional research framework *Shared Visions: The North-East Regional Research Framework for the Historic Environment* (Petts & Gerrard 2006) contains an agenda for archaeological research in the region, which is incorporated into regional planning policy implementation. In this instance, the scheme of works was designed to address the following research priorities: Early Medieval EMi. Landscape, EMii. Settlement; Later Medieval MDi. Settlement, MDii. Landscape, MDv. Churches and religion.

Methods statement

2.6 The surveys have been undertaken in accordance with instructions from the client, advice notes from the NCC Conservation Team and national standards and guidance (see para. 5.1 below).

Dates

2.7 Fieldwork was undertaken on 28th October 2021. This report was prepared for November 2021.

Personnel

2.8 Fieldwork and geophysical data processing were conducted by Richie Villis. This report was prepared by Duncan Hale, with illustrations by Janine Watson. The project manager was Peter Carne.

Archive/OASIS

2.9 The site code is **BRG21**, for **B**amburgh **R**adcliffe **G**range 20**21**. The survey archive will be retained at Archaeological Services Durham University and a copy supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** project (**OASIS**). The OASIS ID number for this project is **archaeol3-502825**.

Acknowledgements

2.10 Archaeological Services Durham University is grateful for the assistance of the landowner/tenant in facilitating this scheme of works.

3. Historical and archaeological background

3.1 The village of Bamburgh is perhaps best known for its castle, sitting high above the coast at the east end of the village; the castle was the seat of the former Kings of Northumbria. At the western end of the village was Bamburgh Friary, a Dominican friary founded in 1265 and dissolved in 1539; the PDA may lie between the medieval borough and the friary site, which lies just to the north-west of the PDA, though the precise extents of both are uncertain.

3.2 The earliest known archaeological evidence near the PDA comprises some prehistoric flints (HER 22024), which were recovered during test-pitting at Friary Farm, the former friary site to the north-west.

3.3 Magnetometer surveys at six locations around Bamburgh in 2004 (HER 13735) identified a possible curvilinear feature to the immediate west of the PDA and a possible Iron Age enclosure in the field to the south, however, this latter feature is now believed to be associated with a linear stone outcrop identified during a strip and record watching brief in 2010.

3.4 Several post-medieval buildings and wells are present close to the PDA.

4. Landuse, topography and geology

4.1 At the time of survey the PDA comprised one field of rough pasture. A spoilheap was present in the south-west corner of the field, a row of beehives was present in the north of the field and there was a metal trough in the north-central part of the field.

4.2 The PDA occupied a gentle north-facing slope with a mean elevation of approximately 25m OD. Environment Agency LiDAR data show an area of slightly raised ground in the central part of the PDA.

4.3 The underlying solid geology of the area comprises mid-late Mississippian limestone, sandstone, siltstone and mudstone of the Alston Formation, which are overlain by Devensian till.

5. Geophysical survey

Standards

5.1 The surveys and reporting were conducted in accordance with the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for archaeological geophysical survey* (2020); the *EAC Guidelines for the Use of Geophysics in Archaeology* (Schmidt *et al*. 2015); and the Archaeology Data Service & Digital Antiquity *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt 2013).

Technique selection

5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.

5.3 In this instance, based on previous work, it was considered possible that cut features such as ditches and pits might be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) could also be present.

5.4 Given the anticipated nature and depth of targets, and the non-igneous geological environment of the study area, a magnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This technique involves the use of magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

Field methods

5.5 A 30m grid was established across the survey area and related to the Ordnance Survey (OS) National Grid using a Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.

5.6 Magnetic gradient measurements were determined using a Bartington Grad601-2 dual fluxgate gradiometer. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was effectively 0.03nT, the sample interval was 0.25m and the traverse interval was 1m, thus providing 3,600 sample measurements per 30m grid unit.

5.7 Data were downloaded on site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

5.8 Geoplot v.4 software was used to process the geophysical data and to produce both a continuous tone greyscale image and a trace plot of the raw (minimally processed) data. The trace plot was examined but is not presented in this report. The greyscale image is presented in Figure 2; geophysical and archaeological interpretations are presented in Figures 3 and 4. In the greyscale image, positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. A palette bar relates the greyscale intensities to anomaly values in nanoTesla.

5.9 The following basic processing functions have been applied to the magnetometer data:

clip	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
zero mean traverse	sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities
de-stagger	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
interpolate	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

Interpretation: anomaly types

5.10 A colour-coded geophysical interpretation plan is provided. Two types of magnetic anomaly have been distinguished in the data:

positive magnetic	regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches
dipolar magnetic	paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths

Interpretation: features

5.11 A colour-coded archaeological interpretation plan is provided.

5.12 The data are characterised by a high concentration of very strong dipolar magnetic anomalies, which covers over half of the survey area. These anomalies almost certainly reflect ferrous and fired debris, such as building rubble, for example, and broadly correspond to the slightly raised ground noted in the LiDAR data. It has not been possible to identify any features of possible archaeological significance beneath these disturbance deposits.

5.13 A broad band of intense dipolar magnetic anomalies was detected across the southern part of the PDA. These anomalies are not likely to be of archaeological significance and may represent ferrous/fired materials, possibly a former track associated with the spoilheap in the south-west corner of the field.

5.14 One probable soil-filled feature has been identified in the south-east of the survey. This anomaly may reflect a former ditch-like feature, of unknown date or function.

5.15 A large dipolar magnetic anomaly in the north-central part of the survey corresponds to a metal trough. Other large dipolar anomalies at the edges of the survey reflect adjacent metal fences and a gate in the north-east. The only other anomalies detected here are small, discrete dipolar magnetic anomalies. These almost certainly reflect near-surface items of ferrous and/or fired debris, such as horseshoes and brick fragments.

6. Conclusions

6.1 Approximately one hectare of magnetometer survey was undertaken on land at Radcliffe Grange, Bamburgh, prior to proposed development.

6.2 One possible ditch feature, of unknown date or function, has been detected in the south-east of the area.

6.3 The majority of the survey area appears to be disturbed ground, perhaps containing deposits of rubble or similar magnetic materials. It has not been possible to identify any features of potential archaeological significance beneath these deposits.

7. Sources

CIfA 2020 *Standard and Guidance for archaeological geophysical survey*. Chartered Institute for Archaeologists

Petts, D, & Gerrard, C, 2006 *Shared Visions: The North-East Regional Research Framework for the Historic Environment*. Durham

Schmidt, A, 2013 *Geophysical Data in Archaeology: A Guide to Good Practice*. Archaeology Data Service & Digital Antiquity, Oxbow

Schmidt, A, Linford, P, Linford, N, David, A, Gaffney, C, Sarris, A & Fassbinder, J, 2015 *EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*. EAC Guidelines **2**, Namur

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Figure 1: Site location

site boundary

0 1km
scale 1:25 000 for A4 plot

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Figure 2: Magnetometer survey

0 50m
scale 1:1000 for A4 plot

site boundary

magnetometer survey

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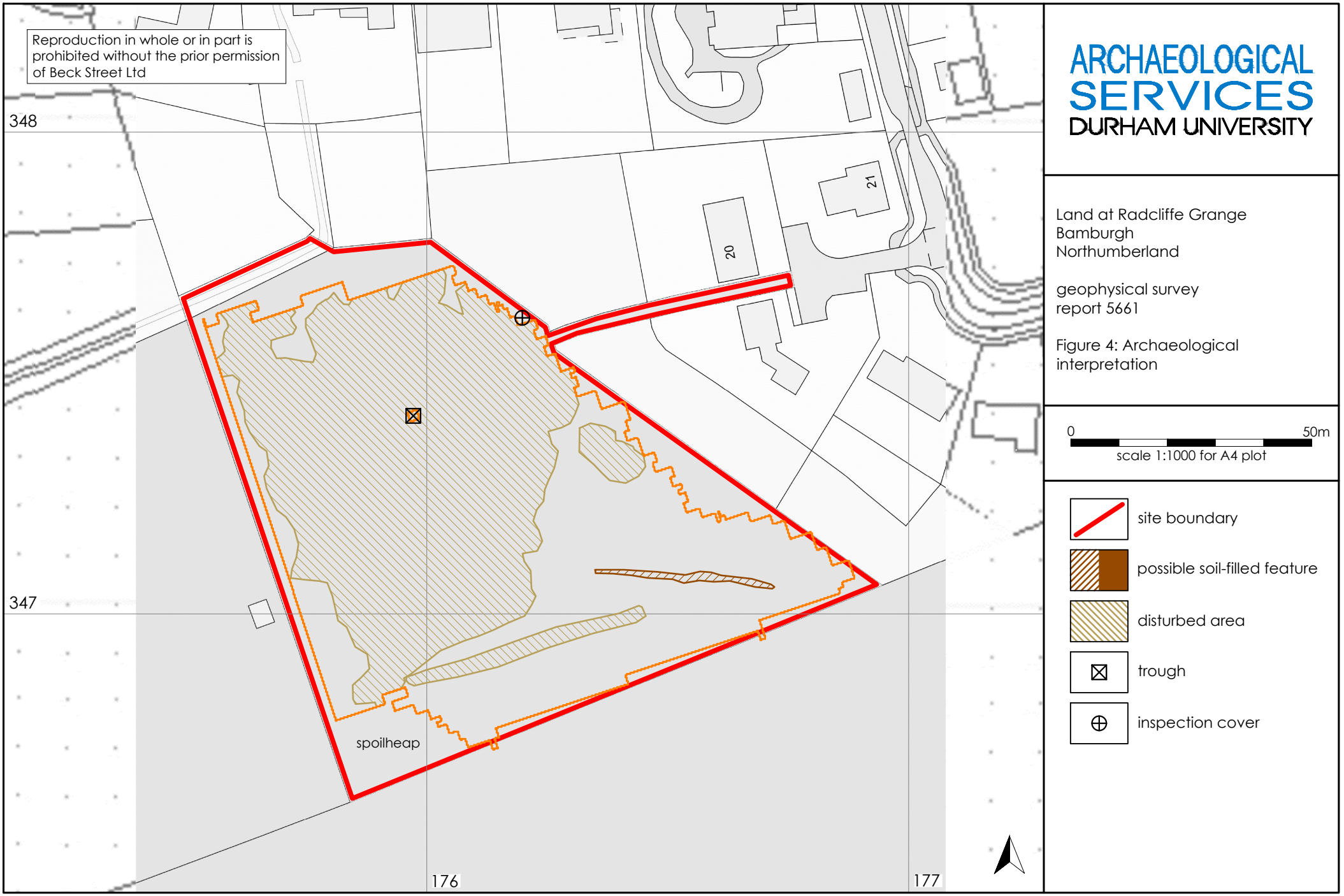
Figure 3: Geophysical interpretation

0 50m
scale 1:1000 for A4 plot

site boundary

dipolar magnetic anomaly

positive magnetic anomaly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348
347
176
177
20
21
spoilheap
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Figure 4: Archaeological interpretation
0
50m
scale 1:1000 for A4 plot
site boundary
possible soil-filled feature
disturbed area
trough
inspection cover