KWTB13/012

EDDER ACRES FARM

NEAR SHOTTON

COUNTY DURHAM

Geophysical Survey

August 2013

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION IfA

Edder Acres Farm near Shotton Colliery, County Durham

Report on Archaeological Geophysical Survey 2013

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Client: SKM Enviros

Project: KWTB13-Job 12

Edder Acres Farm near Shotton Colliery, County Durham

Report on Archaeological Geophysical Survey of Proposed Wind Turbine Site 2013

Introduction

This report describes a geophysical survey at the site of a proposed wind turbine at Edder Acres Farm, Shotton, County Durham.

The survey was commissioned by SKM Enviros and data collection undertaken by the Bartlet-Clarke Consultancy. Fieldwork took place on 17-18 July 2013.

The Site

The geophysical investigation is intended to meet the requirement, as stated in the WSI, for an initial non-intrusive survey to cover 1ha of land centred on the proposed turbine base, and a 20m tranche along the access route. Total survey coverage amounted to 2.45 ha.

The following notes are reproduced or summarised from the WSI.

Location and topography

The proposed development comprises a wind turbine with hard standing and an associated access road. The site is located within Edder Acres Farm, west of Shotton and the A19. The proposed turbine location is around grid ref NGR NX 405 392. The site is presently arable farmland which lies at an elevation of 110m OD.

The geology of the area is predominantly Ford Formation Dolostone with superficial sand, silt and clay deposits to the north-east. (http://www.bgs.ac.uk/). It can be described (less specifically) as Magnesian Limestone with glacial drift. These conditions should be appropriate for a magnetometer survey, a fact confirmed by magnetic susceptibility readings taken during the survey. Readings were between 20 and 45 (x 10^{-5} SI), which is comparable with the values observed at numerous sites where positive archaeological findings have been obtained.

It is sometimes the case on glacial drift deposits that magnetic stones in the topsoil will give rise to small background magnetic anomalies which need to be distinguished from archaeological features when interpreting the survey. Some of the background magnetic anomalies visible in the present survey (as outlined in light brown in the interpretation) may therefore be of geological origin.

Archaeological Background

The Durham HER records two archaeological sites within the 1km study area around the proposed development. These are the suggested site of Wingate deserted medieval village (6674) and a small colliery (6719). Outside the HER 1km study area finds of Roman metalwork have been made in Peterlee (13677) and Castle Eden (5916).

The development area therefore lies within an area of largely unknown archaeological potential. The site is currently arable farmland, and it is possible, therefore, that modern ploughing may have affected the survival of former earthworks and sub-surface remains. The HER records that ridge and furrow existed on the land prior to the site having been ploughed. This may be significant as this form of field system was in use between the Medieval and post-medieval period and can overlie and to an extent protect earlier remains

Survey Procedure

The method used for the investigation was a recorded magnetometer survey, with readings collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and plotted at 25cm intervals along each transect. The results of the survey are presented as a grey scale plot at 1:1250 scale (Illustration 2), and as a graphical (x-y trace) plot in Illustration 3.

The XY trace plot displays initial data which is effectively unprocessed apart from baseline corrections which are required for intelligibility. The grey scale plots are subject to weak low pass filtering to adjust background noise levels, but no more intrusive processing is applied to the magnetometer data. Comparison of the trace and grey scale plots allows the detected magnetic anomalies to be examined in profile and plan respectively.

An interpretation of the findings is shown superimposed on Illustration 3 (which permits the interpreted outlines to be compared with the underlying data), and is reproduced separately to provide a summary of the findings (Illustration 4). Colour coding has been used in the interpretation to distinguish different effects.

Features of possible archaeological interest are shown in red, and non-archaeological (mainly geological) disturbances in light brown. Recent disturbances are in a dark brown, and strong magnetic anomalies which are likely to represent ferrous objects are in blue. Possible cultivation effects are shown in green.

Field boundaries, as indicated on illustrations 2-4, have been traced approximately from the OS map used in the survey location plan (Illustration 1b).

The magnetometer survey was supplemented by background magnetic susceptibility readings taken at broad intervals across the site. Susceptibility information provides an indication of the strength of magnetic response to be expected from the site, and can be of help when interpreting the magnetometer survey, as commented on above.

Survey location

The survey grid was set out and tied to the OS grid using a differential GPS system. The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans.

Results

The survey of the access route covers a 20m strip alongside the existing track, which runs parallel to field boundaries from the north. It was originally intended to locate the survey strip on the same side of the boundary as the existing track, however, the existing E-W section of the track crosses the boundary (at A on illustration 4) so for completeness a 20m strip was covered on each side of the boundary to the east of point A. The location of the track appears in the data as magnetic disturbances caused by the metalling of the track (outlined in brown in illustrations 3 and 4).

The survey plots show that findings from the access route were minimal, but there could be features of possible interest from the 1ha turbine area.

Access track

A 35m length at the northern end of the track could not be surveyed because the field team were pursued (and stung) by a swarm of bees from hives in this area. A sequence of linear features (as at B) is visible in the north-south section of the access route. These are marked in green as possible cultivation effects, but do not align with the present field boundaries (as might be expected for modern ploughing). They could perhaps therefore represent traces of ridge and furrow, as mentioned in the WSI. There are no identifiable findings from the remainder of the access route, other than disturbances caused by the existing track.

Turbine site

Findings here include various linear markings and pit-like features (as outlined in red). The site is at an elevated location where subsurface features may have been subject to plough erosion, but parts of the linear magnetic anomalies C and D remain clearly defined. They may represent former boundaries, or part of a ditched enclosure.

Other possible features may be present nearby. It is difficult to draw a clear distinction between the stronger individual magnetic anomalies (which could represent silted pits of possible archaeological relevance) and the natural background activity, but some of the stronger examples of potential pits (identified from their profiles in the graphical plot; Illustration 3) are outlined in red. These are clustered mainly (around E) to the south and east of linear features C and D, although some are present elsewhere.

The remaining finding is a north-south strip of disturbed readings (F) at the west of the turbine site. The disturbances are comparable to those on the access track (near A), and so could perhaps represent a former track or boundary. The strong disturbance at G is a metal instrument mast. A north-south cultivation pattern (green) is visible in parts of the survey area.

Conclusions

The survey has detected linear markings which could relate to former ridge and furrow cultivation, but there are no other identifiable findings along the access route.

Distinct (but perhaps partly eroded) ditch-like linear features are visible within the turbine site. There are also a number of individual magnetic anomalies of a kind which could represent silted pits (as are often seen at ancient settlement sites). These are not all clearly distinguishable from the natural background magnetic activity, but the possibility remains that some could be of archaeological origin.

References

[1] Archaeological Evaluation at Edder Acres Farm near Shotton Colliery, County Durham. Written Scheme of Investigation, Version 1. Headland Archaeology Ltd. June 2013.

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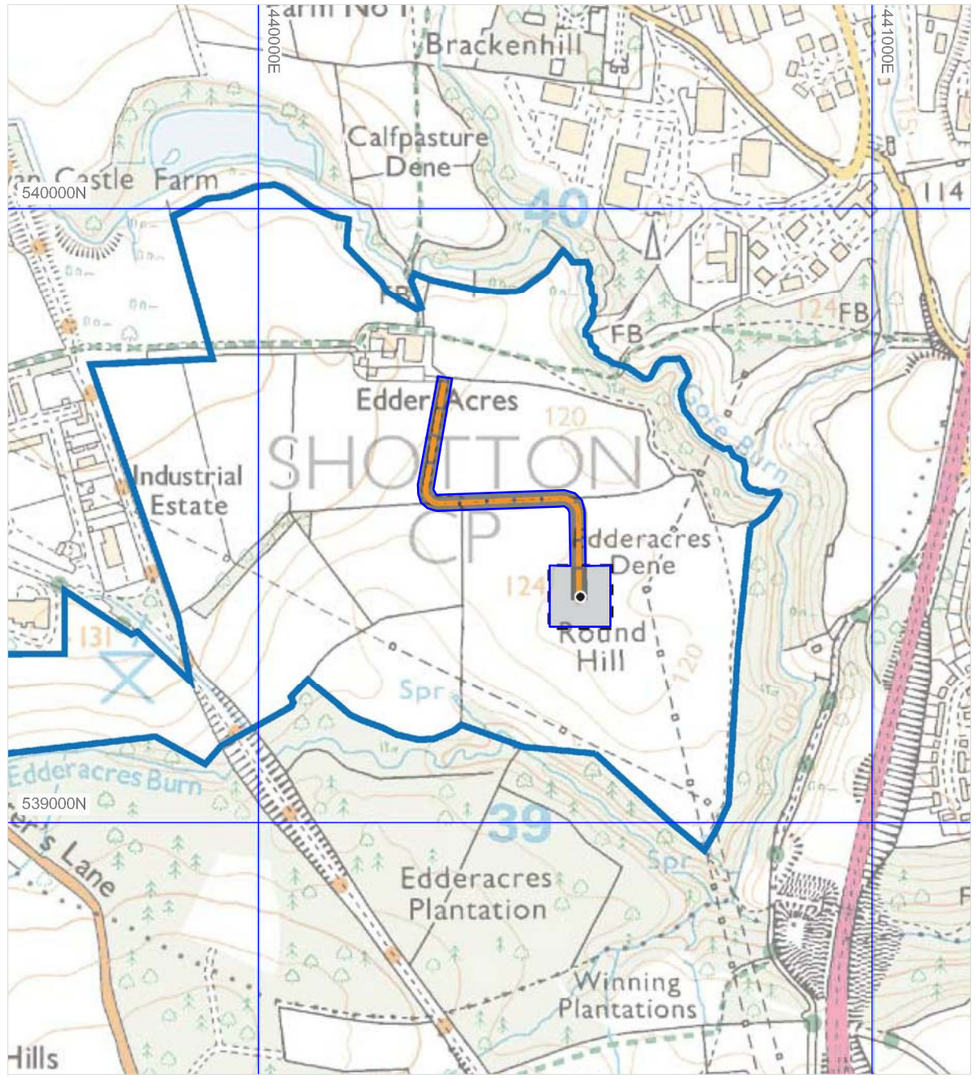
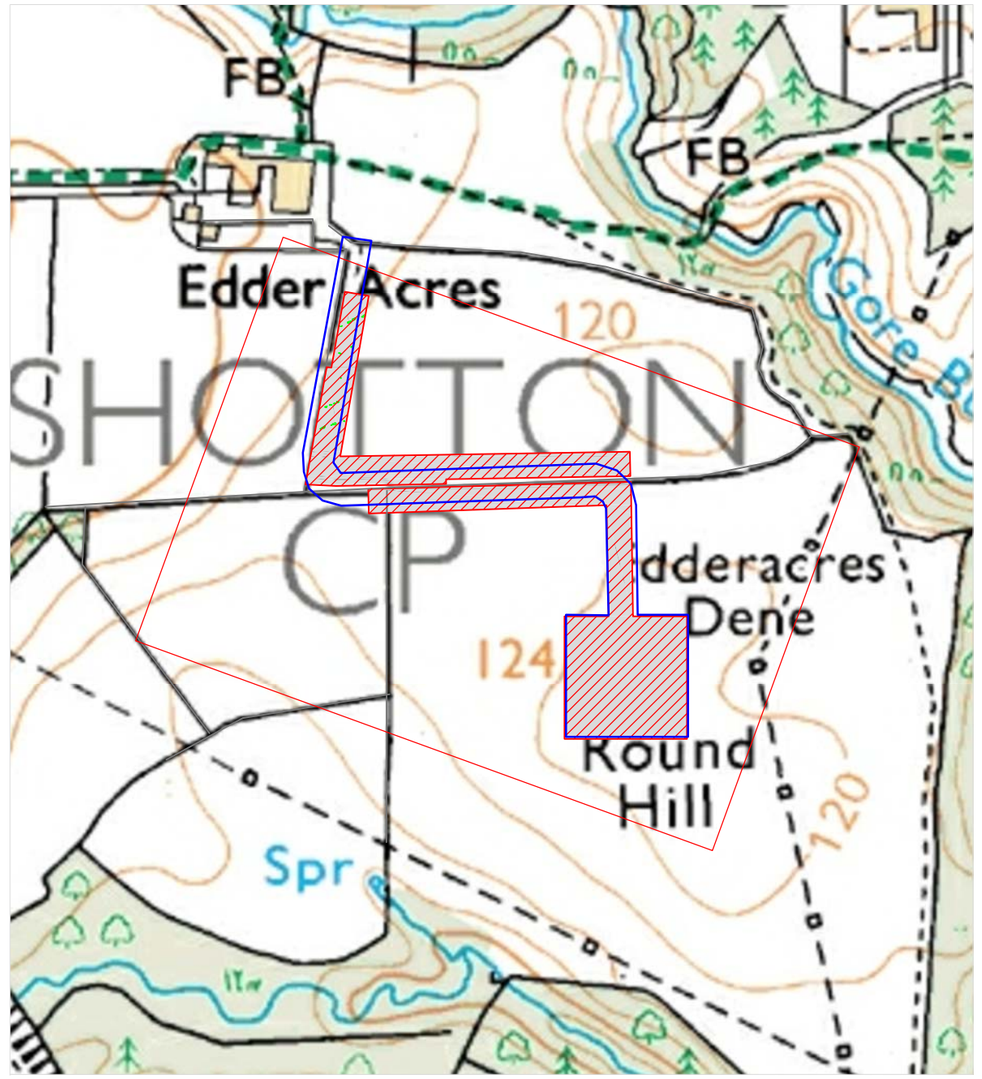


1a Location of proposed valuation area (from WSI Illustration 1) 1:10000



1b Survey coverage 1:5000

Approximate extent of evaluation area

Survey coverage

Location of 1:1250 illustrations (2 -4)

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Illustration 1: Location of magnetometer survey area and illustrations 2-4

0 1:5000 250m

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for Headland Archaeology

beehives
(+ bees)

N

2.2nT
-2.0

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Illustration 2: Magnetometer survey
(greyscale plot)

0 1:1250 50m

beehives
(+ bees)

50 nT

N

50 nT

magnetic anomalies (archaeological ?)

magnetic anomalies
(natural / non-archaeological ?)

strong magnetic disturbances (recent ?)

cultivation ?

strong magnetic disturbances
(mainly ferrous)

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Illustration 3: Magnetometer survey
(with interpretation)

0 1:1250 50m

beehives
(+ bees)

440400E

539500N

N

B

A

C

D

E

F

G

magnetic anomalies (archaeological ?)

magnetic anomalies
(natural / non-archaeological ?)

strong magnetic disturbances (recent ?)

cultivation ?

strong magnetic disturbances
(mainly ferrous)

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Illustration 4: Summary of findings

0 1:2000 100m

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