

ARCHAEOLOGICAL
SERVICES
DURHAM UNIVERSITY

on behalf of
Mr G M Simpson

Land adjacent to Manor Farm
Catterick
North Yorkshire

geophysical survey

report 4293
October 2016

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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 of land adjacent to Manor Farm, Catterick, North Yorkshire. The works comprised one geomagnetic survey of approximately 0.5ha.
- 1.2 The works were commissioned by Mr G M Simpson and conducted by Archaeological Services Durham University.

Results

- 1.3 Four large, intense anomalies in the west of the area may reflect relatively recent ferrous items, however, an archaeological origin for the anomalies (such as kiln remains) cannot be ruled out on geophysical grounds alone. Several possible Roman kilns or ovens are recorded in the wider area; one was found to the immediate south-west of the proposed development area in the late 1980s.
- 1.4 Concentrations of ferrous/fired materials probably indicate dumps of waste or otherwise disturbed ground.
- 1.5 A ferrous pipe has been detected along the southern side of the existing track.

2. Project background

Location (Figure 1)

- 2.1 The proposed development area was located adjacent to Manor Farm, Catterick, North Yorkshire (NGR centre: SE 23637 97903). It is irregular in plan and covers an area of approximately 0.53ha. To the east is a residential estate on Garth Meadows, to the south is The Manor House on Chapmans Court, to the west is a former quarry site, containing a large pond, and to the north is agricultural land with a quarry just beyond.

Development proposal

- 2.2 The proposal is for a residential development, planning application reference number 16/00315/OUT.

Objective

- 2.3 The principal aim of the survey was to assess the nature and extent of any sub-surface features of potential archaeological significance within the proposed development area, 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.
- 2.4 The regional research framework *Yorkshire Archaeological Research Framework: research agenda* (Roskams & Whyman 2007) 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 period priorities for research: Neolithic; Romano-British; early medieval and high medieval.

Methods statement

- 2.5 The surveys have been undertaken in accordance with instructions from the client and national standards and guidance (see para. 5.1 below).

Dates

- 2.6 Fieldwork was undertaken on 29th September 2016. This report was prepared for October 2016.

Personnel

- 2.7 Fieldwork was conducted by Duncan Hale (Senior Archaeologist). Geophysical data processing and report preparation was by Duncan Hale, with illustrations by Dr Helen Drinkall. The Project Manager was Daniel Still.

Archive/OASIS

- 2.8 The site code is **CMF16**, for **Catterick Manor Farm 2016**. 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 **Online Access to the Index of archaeological investigations project (OASIS)**. The OASIS ID number for this project is **archaeol3-266146**.

3. Historical and archaeological background

- 3.1 A detailed archaeological desk-based assessment has been conducted for the proposed development (Archaeological Services 2016); a summary of the archaeological resource is presented here.

The archaeological resource

- 3.2 Although no previous archaeological works have been identified within the proposed development site, there have been a great many archaeological works undertaken within the wider study area. These have included desk-based assessments, watching briefs, geophysical surveys and excavations. There is known to be widespread occupation and other activity in the wider landscape from the prehistoric (notably Neolithic), Roman and Anglian periods, with extensive archaeological remains to the north and south of the study area, and the major Roman road 'Dere Street' lying to the west.
- 3.3 One excavation undertaken in 1987-88, known as Catterick Triangle (Site 425), was conducted immediately to the west and south-west of the current proposed development boundary. The excavations recorded Dere Street Roman road and associated remains including ditches and a possible kiln or oven (HER ENY3849; Cardwell & Wilson 2002, 219).
- 3.4 The proposed development area was located to the west and north of the focus of medieval settlement and may have been used for cultivation during this period.
- 3.5 A possible stone culvert recorded on the Historic Environment Record may relate to a feature on the 2nd edition Ordnance Survey map of 1891, and be of 19th-century date. The culvert may extend beneath a bridge beyond the proposed site boundary and mentioned in planning comments.
- 3.6 The south-western corner of the site has been disturbed and terracing along the northern boundary may be related to landscaping activity further to the north. There is anecdotal evidence for the informal use of the field for acquiring stone and the subsequent levelling of uneven land. All these activities may have truncated any archaeological resource that was present.

4. Landuse, topography and geology

- 4.1 At the time of survey, the proposed development area comprised part of one pasture field. A track crossed the survey area aligned north-west/south-east. A metalled footpath also crossed the southern part of the site.
- 4.2 The ground within the proposed development area was undulating, partly as a result of former quarrying. The mean elevation was approximately 57m OD. The area is within the vale of the River Swale, which runs approximately 1km to the east. The North York Moors are to the east and the Pennine Dales to the west, with Catterick lying in the eastern part of the Swale-Ure interfluve.
- 4.3 The underlying solid geology of the area comprises Namurian mudstone, siltstone and sandstone of the Millstone Grit Group, which is overlain by river terrace deposits of sand and gravel.

5. Geophysical survey

Standards

- 5.1 The surveys and reporting were conducted in accordance with Historic England guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for archaeological geophysical survey* (2014); the CIfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); 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 and given the uncertain extent of quarrying at the site, 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) might also be present.
- 5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This technique involves the use of hand-held 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 5-10mm accuracy.
- 5.6 Measurements of vertical geomagnetic field gradient 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 nominally 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.3 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 greyscale image and trace plot are presented in Figures 2-3; the interpretations are provided in Figures 4-5. In the greyscale images, 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 geomagnetic data:

<i>clip</i>	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
<i>zero mean traverse</i>	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
<i>de-stagger</i>	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
<i>interpolate</i>	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. One type of geomagnetic anomaly has been distinguished in the data:

<i>dipolar magnetic</i>	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
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Interpretation: features

5.11 A colour-coded archaeological interpretation plan is provided.

5.12 The survey is characterised by strong dipolar magnetic anomalies.

5.13 A chain of broad, strong anomalies has been detected across the survey area, aligned north-west/south-east. These anomalies almost certainly reflect a ferrous service pipe along the southern side of the existing track.

5.14 A cluster of four large and intense dipolar magnetic anomalies has been detected at the western edge of the survey. These anomalies probably reflect substantial ferrous items, such as re-bars in concrete, or fired structures such as ovens or kilns. The anomalies are not characteristic of well-preserved *in situ* fired structures, however, they could reflect the collapsed or fragmentary remains of such structures. A possible kiln or oven was excavated to the immediate south-west of the survey area in 1987-88 (HER ENY3849; Cardwell & Wilson 2002, 219) and further possible kilns are recorded in the Historic Environment Record to the south-west of Catterick

Racecourse (MNY13253). Although the present geomagnetic anomalies may reflect ferrous items of recent date, an archaeological origin cannot be ruled out on the basis of the geomagnetic data alone.

- 5.15 The majority of the other anomalies detected here are small dipolar magnetic anomalies, some discrete and others in dense concentrations. These anomalies almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments, for example, and in most cases have little or no archaeological significance. Concentrations of such anomalies are often indicative of dumps of debris or otherwise disturbed ground.
- 5.16 A large anomaly in the south-east of the survey reflects adjacent existing structures.
- 5.17 The survey has not identified any anomalies indicative of a stone culvert, though such anomalies could easily be obscured by the many stronger anomalies detected across the site.

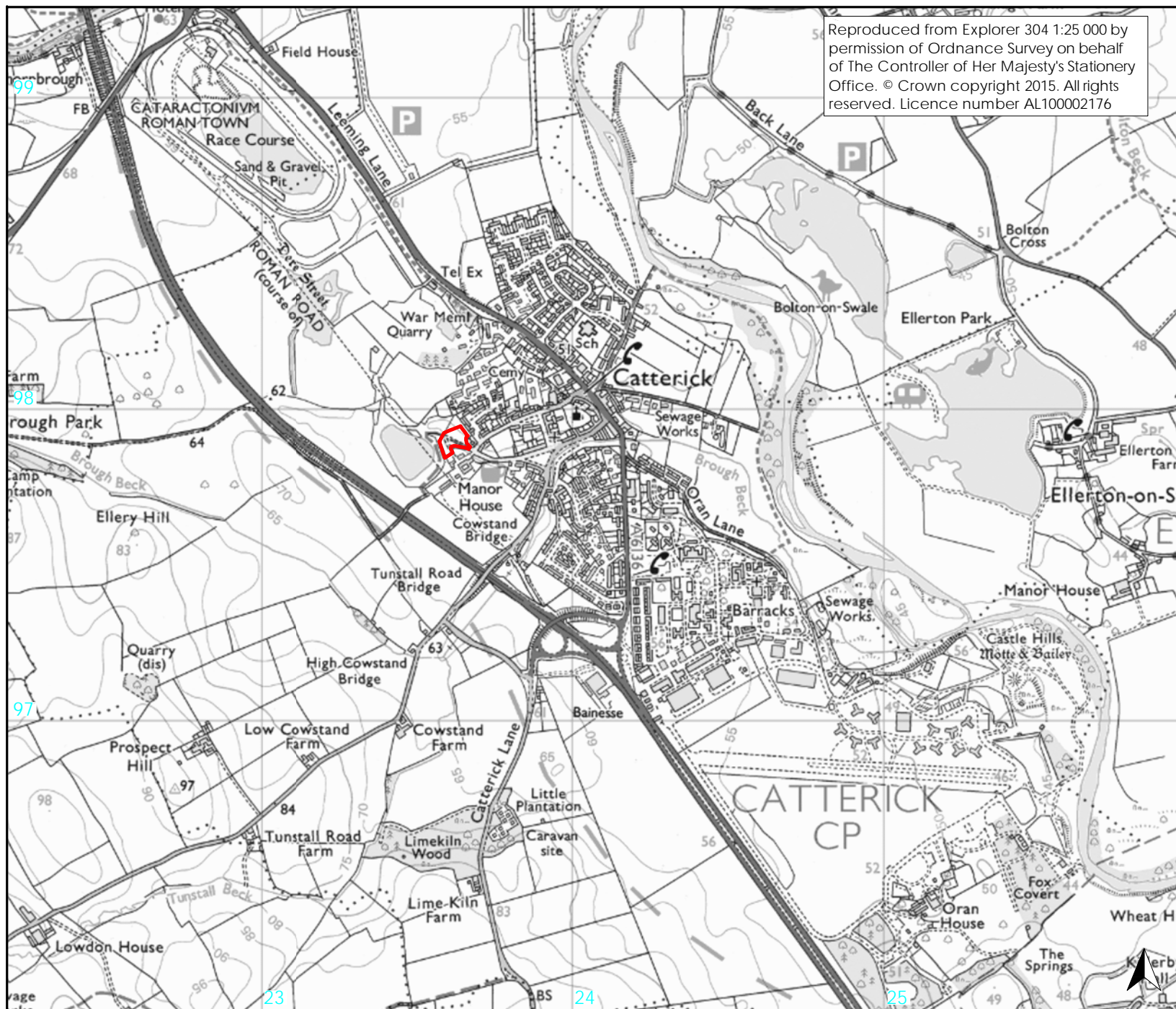
6. Conclusions

- 6.1 A geomagnetic survey was undertaken on land adjacent to Manor Farm, Catterick, prior to proposed development.
- 6.2 Four large, intense anomalies in the west of the area may reflect relatively recent ferrous items, however, an archaeological origin for the anomalies (such as kiln remains) cannot be ruled out on geophysical grounds alone. Several possible Roman kilns or ovens are recorded in the wider area; one was found to the immediate south-west of the proposed development area in the late 1980s.
- 6.3 Concentrations of ferrous/fired materials probably indicate dumps of waste or otherwise disturbed ground.
- 6.4 A ferrous pipe has been detected along the southern side of the existing track.

7. Sources

- Archaeological Services 2016 *Land adjacent to Manor Farm, Catterick, North Yorkshire: archaeological desk-based assessment*. Unpublished report **4252**, Archaeological Services Durham University
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- CIfA 2014 *Standard and Guidance for archaeological geophysical survey*. Chartered Institute for Archaeologists
- David, A, Linford, N, & Linford, P, 2008 *Geophysical Survey in Archaeological Field Evaluation*. Historic England
- Gaffney, C, Gater, J, & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*. CIfA Technical Paper **6**, Chartered Institute for Archaeologists
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Schmidt, A, 2013 *Geophysical Data in Archaeology: A Guide to Good Practice*.
Archaeology Data Service & Digital Antiquity, Oxbow



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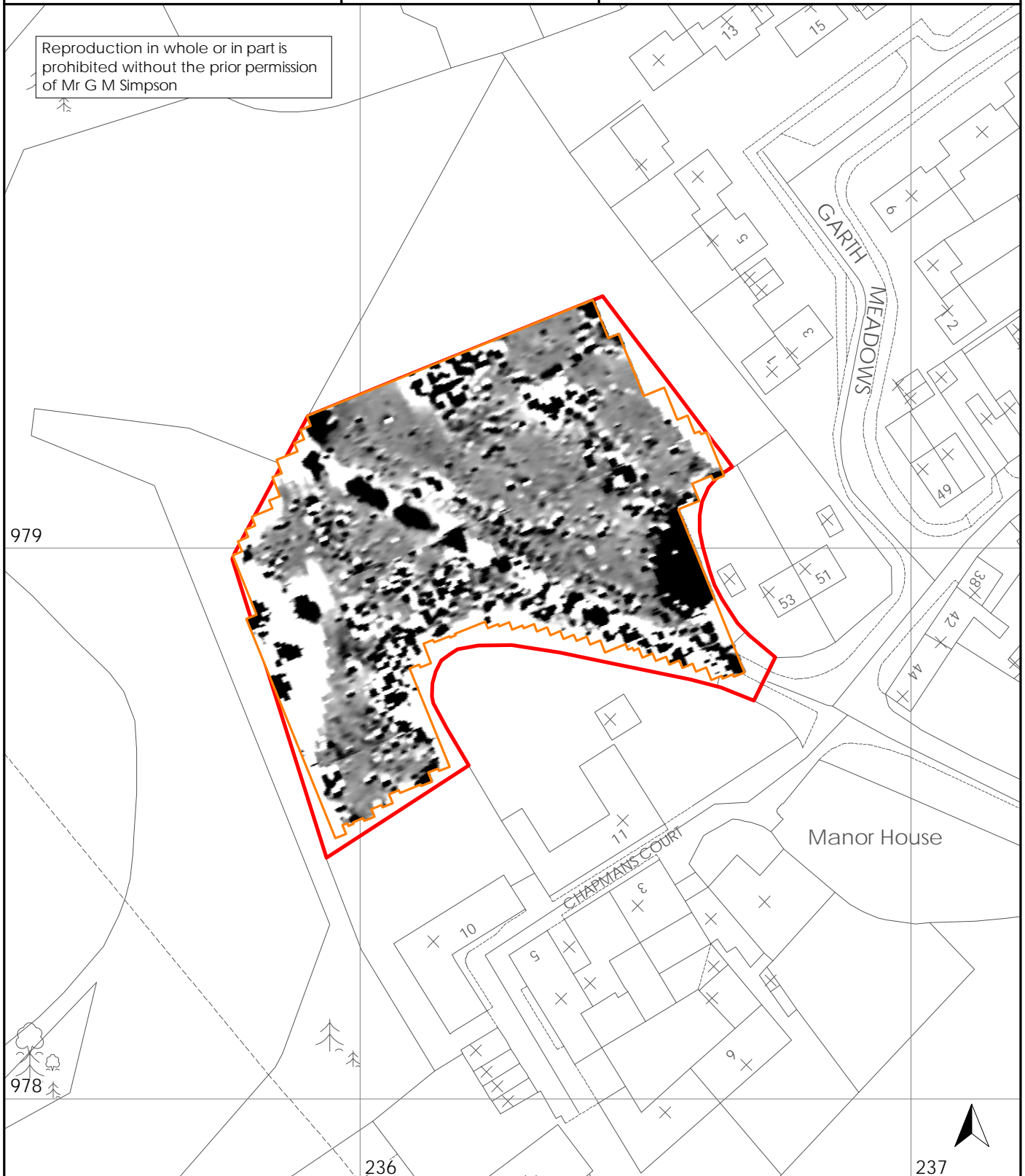
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Figure 1: Site location

0 800m
scale 1:17 500 for A4 plot

 proposed development area

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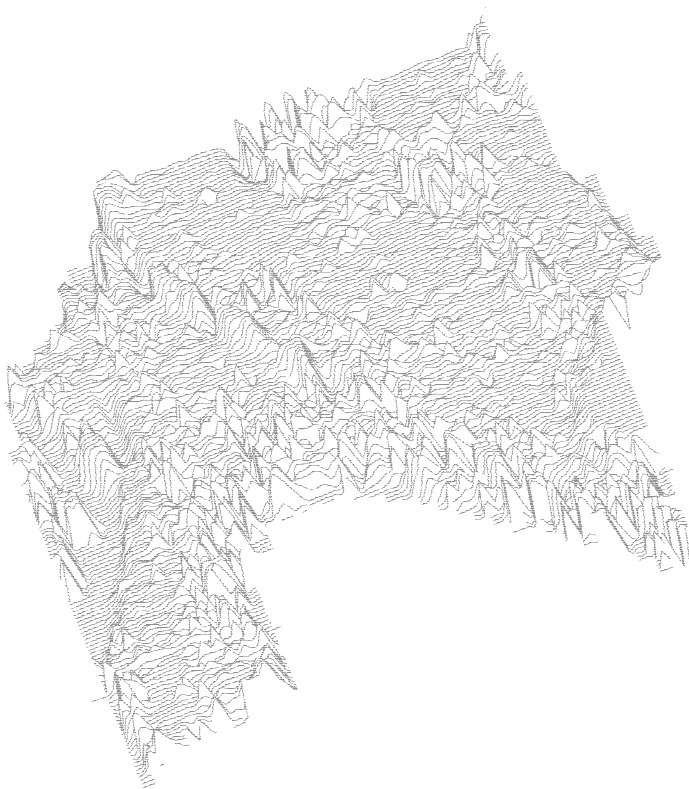
proposed development
area

magnetic survey

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0 50m
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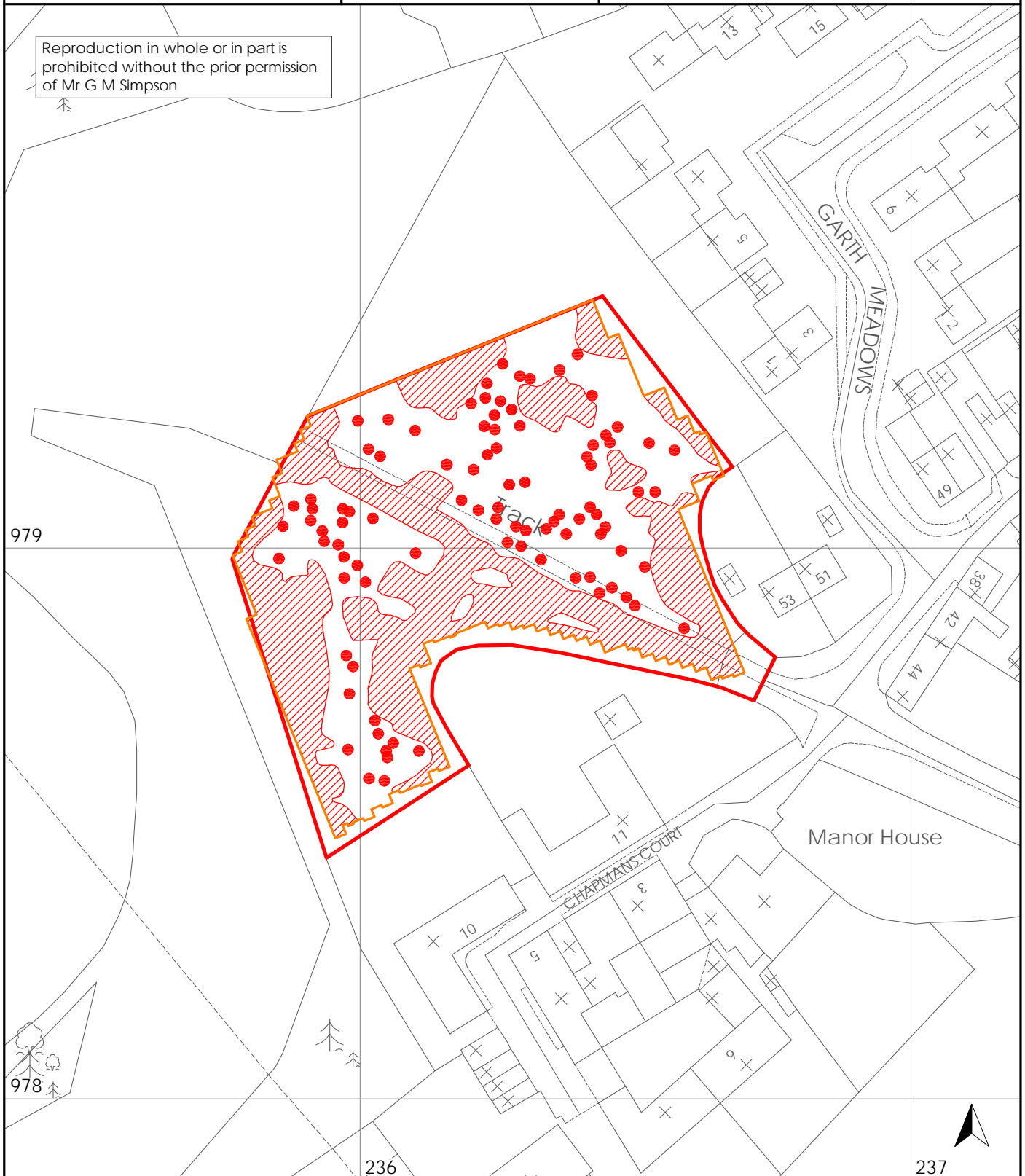
Figure 3: Trace plot of geomagnetic data





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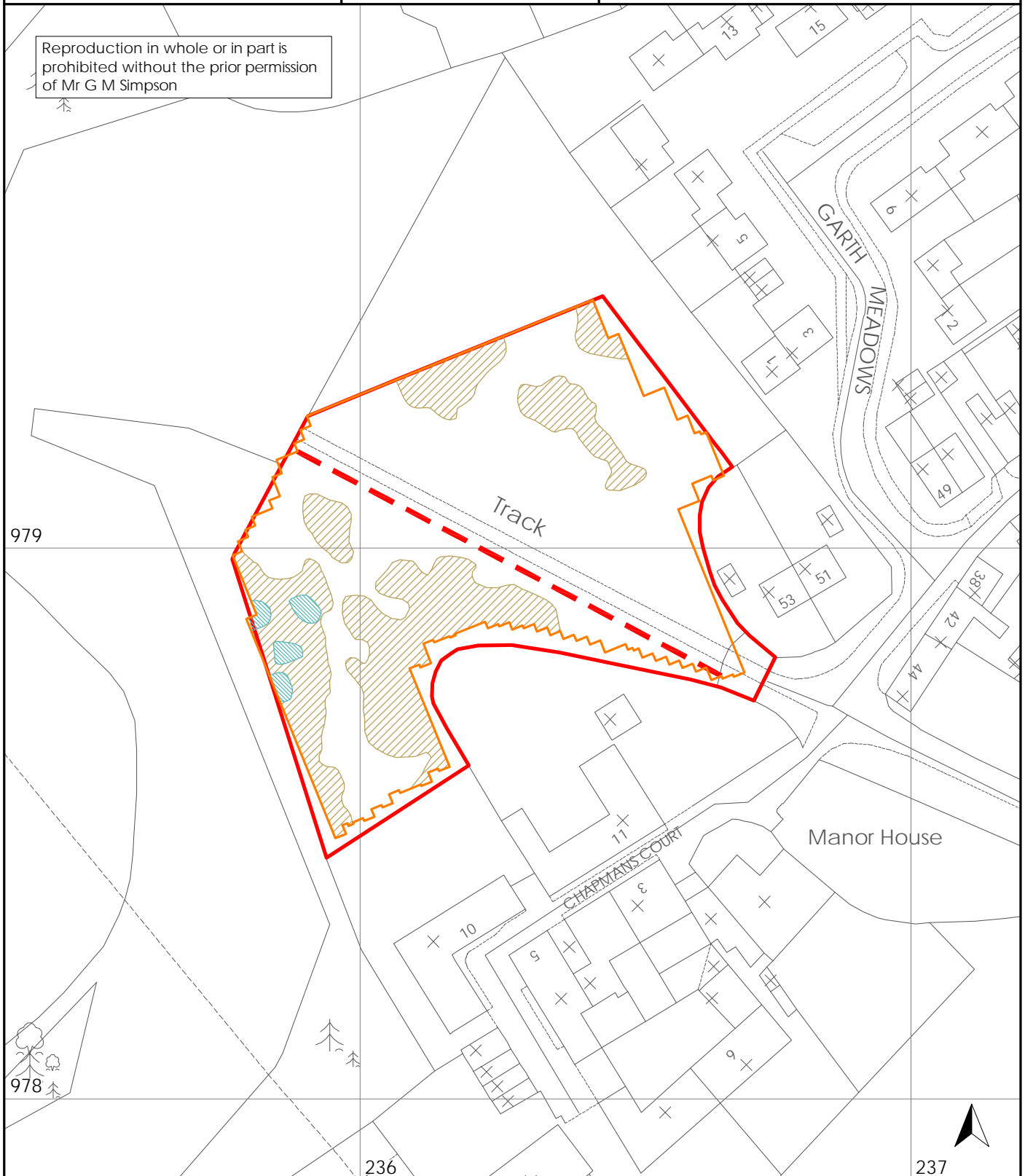
 proposed development
area

 magnetic survey

 dipolar magnetic
anomaly

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proposed development
area

magnetic survey

disturbed area

possible kiln

service

0 50m
scale 1:1000 for A4 plot