LAND ADJACENT TO THE BEECHES, SPRING GARDENS, WHITLAND, CARMARTHENSHIRE: GEOPHYSICAL SURVEY

DAT Archaeological Services

Prepared by Dyfed Archaeological Trust
For: Hayston Developments and Planning Ltd

REGISTERED ORGANISATION CIfA

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By

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EXECUTIVE SUMMARY

DAT Archaeological Services were commissioned to carry out a geophysical survey on land adjacent to The Beeches in Whitland, Carmarthenshire (centred on NGR SN 20599 16813).

The purpose of the survey was to provide a better indication of the archaeological potential of the site and if required, to enable targeting of further archaeological mitigation before or during the proposed development.

Aside from anomalies likely caused by previous groundworks the geophysical survey did not detect any features thought to be of archaeological origin within the proposed development area.

CRYNODEB GWEITHREDOL

Comisiynwyd Gwasanaethau Archeolegol DYAD i gynnal arolwg geoffisegol ar dir ger The Beeches yn Hendy-gwyn, Sir Gaerfyrddin (wedi'i ganoli ar NGR SN 20599 16813).

Pwrpas yr arolwg oedd rhoi gwell arwydd o botensial archeolegol y safle ac, os oedd angen, galluogi targedu lliniaru archeolegol pellach cyn neu yn ystod y datblygiad arfaethedig.

Ar wahân i anghysondebau a achoswyd yn debygol gan waith daear blaenorol, ni chanfu'r arolwg geoffisegol unrhyw nodweddion y credir eu bod o ddechreuad archeolegol yn yr ardal ddatblygu arfaethedig.

1. INTRODUCTION

1.1 Project Commission

1.1.1 DAT Archaeological Services were commissioned by Hayston Developments and Planning Ltd to undertake a geophysical survey within a proposed development area for residential dwellings, on land adjacent to The Beeches, Spring Gardens, Whitland, Carmarthenshire (centred on NGR SN 20599 16813; Figure 1 and 2).

1.1.2 The proposed development site lies roughly 160m southwest of a Roman enclosure (PRN 11782) that was excavated by DAT Archaeological Services in 2019 (Enright *et al* 2019). The excavation revealed a multi-period site that included a rectangular Roman enclosure, preceded by Iron Age settlement and followed by Medieval and post-medieval activity (Photo 1).

Photograph 1: Aerial view of rectangular Roman enclosure (PRN 11782) during its excavation in 2019.

1.1.3 During the scoping consultation the Development Management section of Dyfed Archaeological Trust (DAT-DM), in their capacity as archaeological advisors to the planning authority, recommended that the site adjacent to the Beeches should be archaeologically evaluated prior to determination initially through the non-invasive method of geophysical survey.

1.1.4 The geophysical survey was undertaken using a fluxgate gradiometer which detects subtle variations in the earth's magnetic field, which can indicate the presence of buried features such as ditches, pits, walls or postholes, which are not visible on the ground surface.

1.1.5 The purpose of the geophysical survey was to provide a better indication of subsurface features which could be indicative of archaeology.

1.1.6 It is believed that this report will accompany a planning application for the proposed dwelling. The results will allow for an informed decision on whether any further archaeological mitigation is required or not before or during the development programme.

1.2. Scope of the Project

1.2.1 The aim of the project was:

- To identify the presence/absence of any potential archaeological deposits through an initial gradiometer survey;
- To establish the character and extent of any potential archaeological remains within the site area that could be affected by the proposed works;
- To prepare a report and archive on the results of the geophysical survey.

1.3 Report Outline

1.3.1 This report provides a summary and discussion of the geophysical survey and its results and puts those results within their regional and national context.

1.4 Abbreviations

1.4.1 Sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded on the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Altitude is expressed to Ordnance Datum (OD). References to cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

1.5 Illustrations

1.5.1 Printed map extracts are not necessarily produced to their original scale.

1.6 Timeline

1.6.1 The following timeline (Table 1) is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text.

Table 1: Archaeological and historical imeline for Wales

Period	Approximate date	
Palaeolithic –	*c.*450,000 – 10,000 BC	**Prehistoric**
Mesolithic –	*c.* 10,000 – 4400 BC	
Neolithic –	*c.*4400 – 2300 BC	
Bronze Age –	*c.*2300 – 700 BC	
Iron Age –	*c.*700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – *c.* AD 410	**Historic**
Post-Roman / Early Medieval Period –	*c.* AD 410 – AD 1086	
Medieval Period –	1086 – 1536	

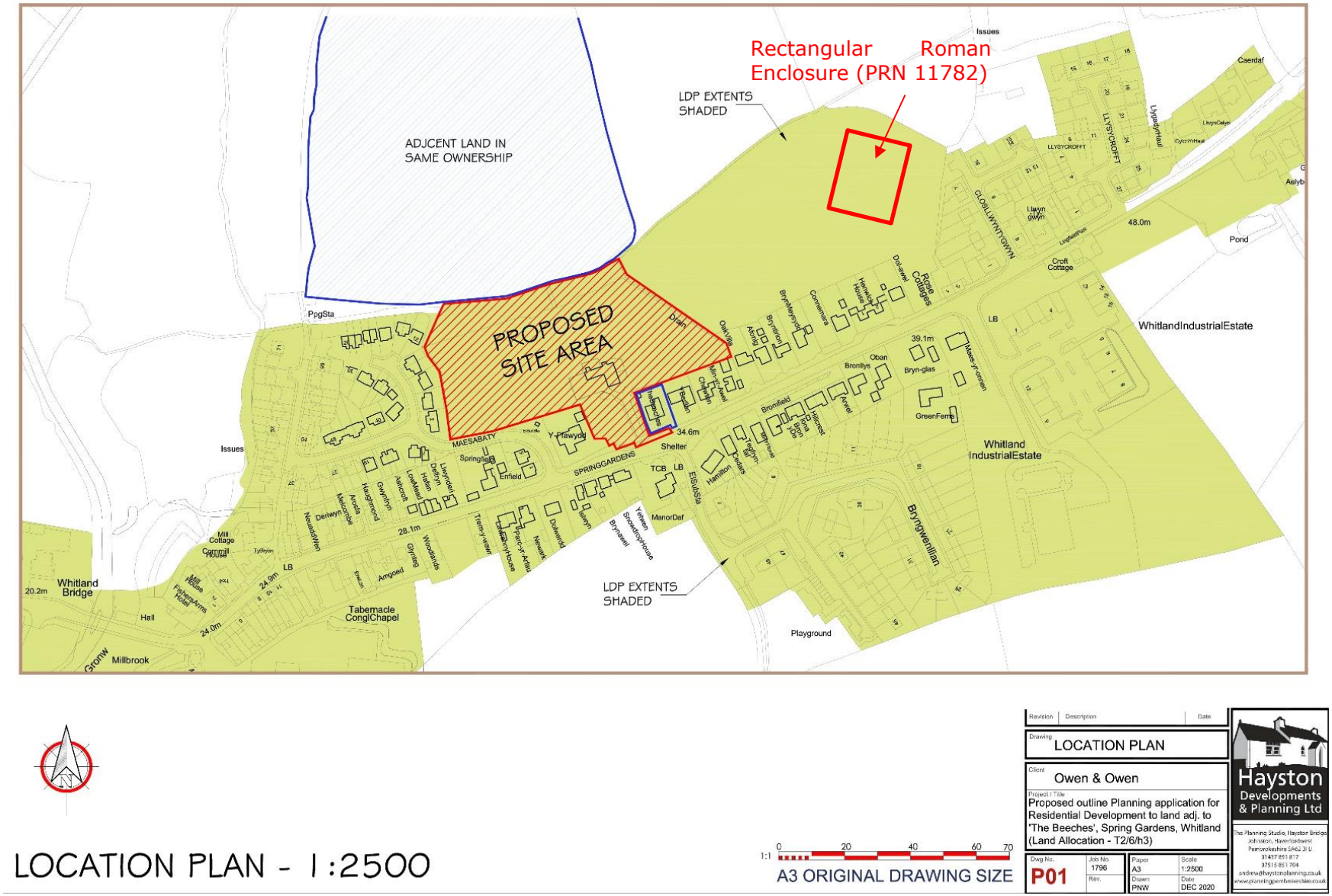
Post-Medieval Period[1] –	1536 – 1750
Industrial Period –	1750 – 1899
Modern –	20th century onwards

[1] The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust

Source: Open Source data hub. Miniscale: A simple overview map of great Britain. Credit OS, ONS.

Site Location

Figure 1: General site location



LOCATION PLAN - 1:2500

1:1 0 20 40 60 70

A3 ORIGINAL DRAWING SIZE

Revision	Description	Date

Drawing: LOCATION PLAN

Client: Owen & Owen

Project / Title: Proposed outline Planning application for Residential Development to land adj. to 'The Beeches', Spring Gardens, Whitland (Land Allocation - T2/6/h3)

Dwg No.	Job No.	Paper	Scale
P01	1796	A3	1:2500
	Rev.	Drawn PNW	Date DEC 2020

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Figure 2: Location plan of development area (provided by client).

2. THE SITE

2.1 Site Location and Topography

2.1.1 The proposed development site lies to the north of Spring Gardens in the town of Whitland, Carmarthenshire. The area is currently laid to grass (Photos 2 and 3).

2.1.2 The British Geological Survey records the bedrock geology as didymograptus Bifidus beds – Mudstone, a sedimentary rock formed approximately 461 – 466 million years ago in deep-sea environments (BGS online).

Photograph 2: View westwards across the proposed development area.

Photograph 3: The eastern edge of the development area. View southeast.

2.2 Archaeological Potential

2.2.1 The proposed development site on land adjacent to the Beeches, Whitland lies some 160m southwest of a large multi-period site excavated and recorded by DAT Archaeological Services in 2019 (Enright *et al* 2019). The excavations recorded a large ditched rectangular defended enclosure of Roman date (PRN 11782, Photo 1), evidence of preceding Iron Age or possibly earlier settlement occupation, and later Medieval and post-medieval activity within the same area.

2.2.2 The Roman Road (PRN 28130) which runs west from Carmarthen to Wiston in Pembrokeshire passes approximately 380m to the north of the proposed development area. Part of this Roman road is clearly visible as a substantial aggar in the fields to the north and this section has been designated as a Scheduled Monument (CM279).

2.2.3 Therefore, the potential for Iron Age and Roman activity to be present within the proposed development area was considered to be high because of its proximity to the known sites discussed above.

3. METHODOLOGY

3.1 Data Collection

3.1.1 The geophysical survey was conducted by an experienced surveyor using a fluxgate gradiometer with two sensors at 1m spacing and with a DL601 data logger. The gradiometers sensitivity was set to detect a magnetic variation in the order of 0.1 nanoTesla.

3.1.2 Data was collected within a controlled grid that the surveyors physically marked out on the ground to within 0.1m+/- accuracy. The survey grid was tied into the local Ordnance Survey (OS) grid using a Trimble R8s integrated GNSS system with a TSC3 controller.

3.2 Ground Coverage

3.2.1 Geophysical methods rely on a contrast in the physical properties between the buried archaeological remains and the surrounding soil. Therefore in order to best characterise archaeological features it is often necessary to survey a large enough area that not only captures any possible targets but also incorporates a sufficient area of natural background response. area has been surveyed. Aside from maintaining a suitable distance from field boundaries that could cause magnetic interference the entire proposed development area was surveyed.

3.3 Resolution

3.3.1 Data was collected in 30m x 30m grids using the zigzag traverse method with a sample interval (x-axis) of 0.25m (four readings per metre) and a line separation (y-axis) of 1.0m.

3.4 Data Processing

3.4.1 The data was processed using *Terrasurveyor 3.0.36.1* and is presented with a minimum of processing.

3.4.2 Typically, the data is "de-striped" to remove any striping effect caused by an imbalance between the two sensors. It is then "clipped" to remove high values caused by ferrous objects, which tend to hide fine details and obscure archaeological features, allowing finer details to show through.

3.4.3 Other processing functions may include "de-staggering" the data. This is to correct line displacement errors caused by variations in the traversal rate resulting in the sensors being in the incorrect position when taking a reading. Finally, the data may be "interpolated" followed by a "low pass filter". The gradiometer collects readings every 0.25m along the transect (x-axis) and 1.0m (or 0.25m in the higher resolution surveys), this results in an imbalanced grid, so by interpolating the data and choosing to match the x and y-axis by an increased factor the grid becomes more balanced. The "low pass filter" is used cautiously to smooth the data without removing any archaeology.

3.5 Data Presentation and Interpretation

3.5.1 Data is presented with a minimum of processing as a grey-scale plot overlaid on local topographical features. The main magnetic anomalies have been identified using a combination of the grey-scale plots at different stages of processing and XY traces which aid in interpretation by allowing for visualisation of the magnitude and form of a geophysical anomaly.

3.5.2 The results have been compared to available sources (satellite imagery, aerial photographs, historic maps etc.) to increase confidence levels, and an interpretation of the results has been formulated. In some instances it is possible to provide a very specific interpretation to geophysical anomalies, i.e. where its character or form is well

documented, its existence was known about before the survey, or corroborative evidence can be found. In other cases, a broader categorisation of interpretation is required (outlined in Table 2). Often, looking at the results as a whole and the environs within which they sit provides greater context and aids in interpreting individual features.

Table 2: Categories of interpretation for geophysical anomalies.

Archaeological features	
Archaeology	Where the character and form of response are clearly archaeological in origin or corroborative evidence exists (i.e. historical sources, excavation, etc.). These are typically made up of linear/curvilinear/rectilinear anomalies. This category also includes pits with a discernible arrangement, grouping or association with an archaeological feature to suggest an archaeological origin.
Industrial/area of burning	Where an anomaly has a strong magnetic response that could be evidence of kilns, heaths etc, their shape, form and context may aid interpretation. Caution should be observed as often a similar response can be produced from modern ferrous material.
Possible archaeological feature	
Possible archaeology	Where an archaeological response is favoured, but the response is weak or incomplete and lacks any distinguishing characteristics akin to an archaeological feature. This category also includes possible pits with no discernible pattern, grouping or association with an archaeological feature. They may be of archaeological origin, but they are also likely to represent natural features such as a tree throws (former root bole of a tree shrub).
Area of enhanced magnetic activity	An area that exhibits increased magnetic variations with no discernible pattern or cause. This may have an archaeological origin or a result of the geological variation.
Agricultural features	
Former field boundary	Typically a linear anomaly often seen as a positive response (bank) flanked either side by a negative (response) ditches. These can usually be attributed to former boundaries depicted on historical maps.

Ridge and furrow	A series of regular linear anomalies with consistent broad spacing. If they run parallel with existing field boundaries this might suggest a recent activity.
Plough lines	A series of regular linear anomalies with consistent narrow spacing. If they run parallel with existing field boundaries this might suggest a recent activity.
Field drains	A series of regularly spaced linear anomalies.
Non-archaeological features	
Magnetic interference	Typically an external source that affects the survey data. Usually occurs along the edges of surveys near fences containing ferrous material or around pylons and from subsurface utilities.
Ferrous	These may be associated with an artefact of archaeological interest but generally unless they form a pattern or a part of a larger feature they are regarded as not significant. They are usually the result of miscellaneous modern ferrous-rich debris, such as brick and tile fragments, and objects such as horseshoes or broken ploughshares, which lie within the topsoil and result in a dipole response.
Natural / Geology	These natural variations can cause significant variations in magnetic readings.

4. RESULTS AND DISCUSSION

4.1 The geophysical survey results are presented as a grey-scale plot overlaid on a topographical map in Figure 3. In total, an area of 0.83ha was surveyed.

4.2 In general, the quality of the survey data was good with little interference from external sources except around the southern edge of the survey area where the survey had encroached near boundaries containing metal wiring causing an amorphous shaped anomaly typically of a single polarity.

4.3 No magnetic responses have been recorded that could be interpreted as being archaeological in origin.

4.4 Throughout the survey area and particularly concentrated around the new-build home on the southern boundary of the site are various dipole anomalies (an anomaly consisting of a single positive response with an associated negative response forming a 'halo effect'). Such features are observed across a range of sites and generally, unless the dipoles form part of a larger pattern or feature they are not regarded as significant. They are usually the result of miscellaneous modern ferrous rich debris, such as brick and tile fragments as well as other objects such as horseshoes or broken ploughshares, which lie within the topsoil. In this instance they are likely to be associated with groundworks during construction of the residential dwelling.

5. SUMMARY OF RESULTS

5.1 The geophysical survey results did not show any evidence of potential archaeological features within the proposed development area, and the results suggest that the proposed development will have little impact on known buried archaeology.

5.2 However, the results of the geophysical survey are not definitive and given the proximity of known Iron Age and Roman activity in the surrounding area, there is still potential for subtle archaeological remains to have survived within the proposed development area that could lie undetected by this non-intrusive survey method.

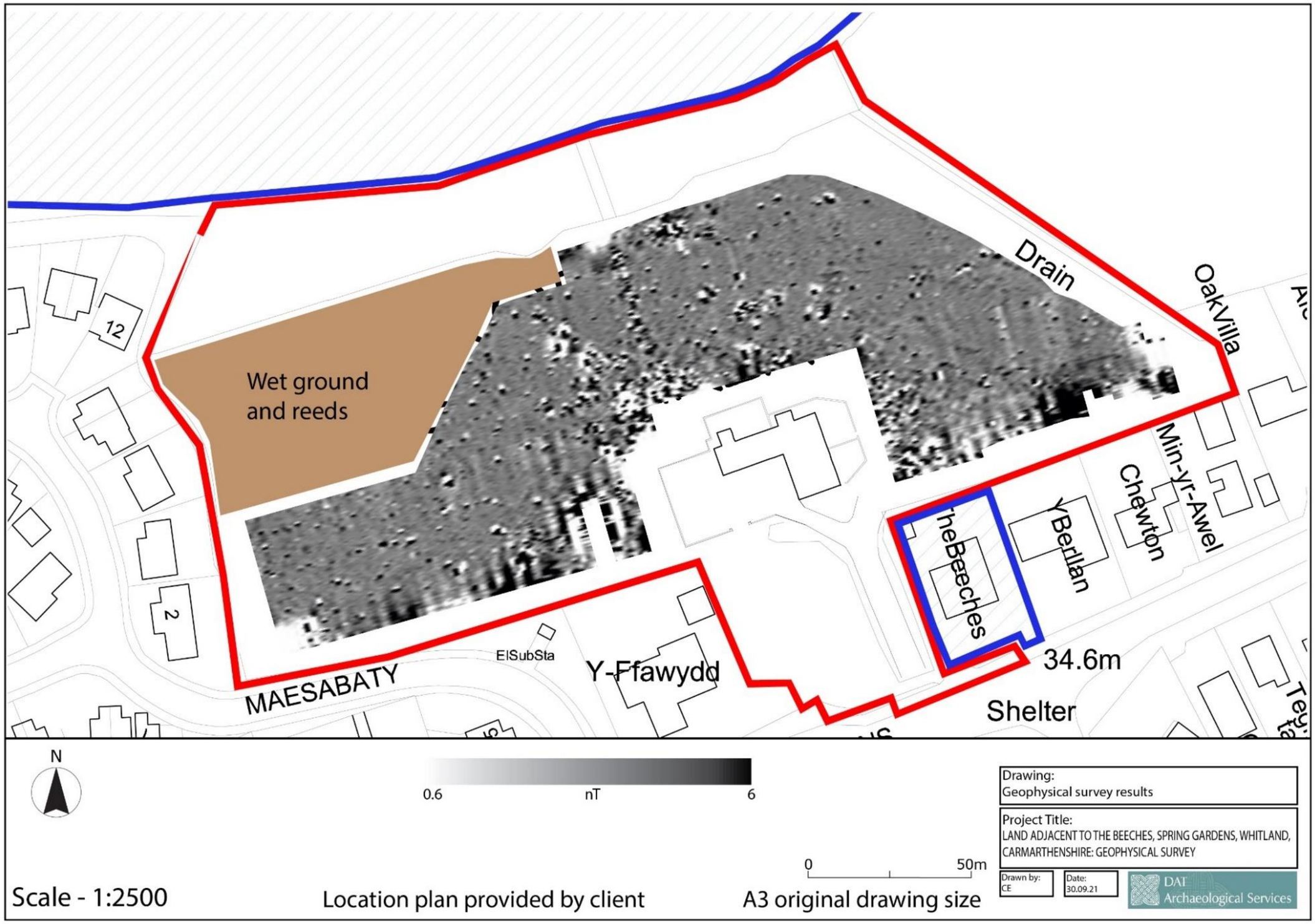

Figure 3: Grey-scale plot of geophysical survey results.

6. SOURCES

CIfA, 2014 *Chartered Institute of Field Archaeologists Standards and Guidance for Archaeological Geophysical Survey*

Enright, C., Murphy, F., & Poucher, P., 2019. *Land Adjacent to Spring Gardens, Whitland, Carmarthenshire: Archaeological Excavation.* DAT Report No. 2019-48.

National Standard and Guidance for Collecting and Depositing Archaeological Archives in Wales 2017. http://www.welshmuseumsfederation.org/en/news-archive/resources-landing/Collections/national-standard-and-guidance-for-collecting-and-depositing-archaeological-archives-in-wales-2017.html

Online resources

British Geological Survey [online] Date Accessed 1st October, 2021.http://mapapps.bgs.ac.uk/geologyofbritain/home.html**.**

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