1542

# LAND AT CAE'R FELIN, ABERGWYNGREGYN

## Gwerthusiad Archeolegol / Archaeological Evaluation

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

# LAND AT CAE'R FELIN, ABERGWYNGREGYN

## Gwerthusiad Archeolegol / Archaeological Evaluation

Yr Amgylchedd Hanesyddol yn Cofnodi Prif Gyfeirnod /
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Mr H Roberts

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| 1 | Amended archaeological and historical background | 2 | GAPS/SNPA approval |
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## CRYNODEB ANHECHNEGOL

*Comisiynwyd Ymddiriedolaeth Archaeolegol Gwynedd gan Mr H Roberts i ymgymryd â gwerthusiad archaeolegol (arolwg geoffiseg ac arolwg canfod metelau) o flaen datblygiad preswyl arfaethedig ar dir yn Gae'r Felin, Abergwyngregyn, Gwynedd. Mae'r ardal ddatblygu yn mesur 0.081 hectar ac mae wedi'i lleoli o fewn cae ger Heneb Gofrestredig Pen-y-Mwd (cyf.CN007).*

*Roedd nifer o ymatebion uchel yn yr arolwg geoffisegol. Mae rhai yn amlwg yn ffensys ac adeiladau modern ac mae rhai yn ymatebion fferrus nodweddiadol achosir gan wrthrychau haearn yn y pridd. Mae anghysondeb 15 yn anghysondeb llinol negyddol sydd yn awgrymu y gallai fod yn nodwedd garreg. Gallai nodwedd linellol arall 16 fod yn arwydd o ffin flaenorol neu newid yn y pridd achoswyd gan ddympio. Arweiniodd yr arolwg darganfod metalau 38 o ymatebion, cafodd 6 o honynt ei ymchwilio yn bellach. Dim ond un y mateb ddaeth o ffynhonnell anhysbys.*

*Ar y cyfan, mae'r ardal yn rhoi'r argraff ei fod wedi cael ei tharfu'n helaeth o bosibl ar adeg adeiladu tai i'r gogledd ddwyrain. Argymhellir gwerthuso pellach trwy ffosio treialon neu gloddio wedi'i dargedu.*

## NON-TECHNICAL SUMMARY

*Gwynedd Archaeological Trust (GAT) was commissioned by Mr H Roberts to undertake a archaeological evaluation (geophysical and metal detector survey) in advance of a proposed residential development on l and at Cae'r Felin, Abergwyngregyn, Gwynedd. T he development area measures 0.081 ha and is located within a field of improved open pasture near Pen-y-Mwd Scheduled Monument (ref. CN007).*

*The geophysical survey was dominated by a series of high responses. Some are clearly modern fences and buildings and some are typical responses caused by iron objects in the soil. Anomaly 15 is a negative linear anomaly suggesting it might be a stone feature. Another linear feature 16 could be indicative of a former boundary or change in the soil caused by dumping. The metal detector survey resulted in 38 responses, 6 of which were investigated further. 5 of these produced modern material. Only one response was from an unknown source.*

*Overall the area gives the impression of having been extensively disturbed possibly at the time of the construction of the houses to the north east. Further evaluation is recommended through trial trenching or targeted excavation.*

# 1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by Mr H Roberts to undertake a archaeological evaluation (geophysical and metal detector survey) in advance of a proposed residential development on land at Cae'r Felin, Abergwyngregyn, Gwynedd (NGR SH65727262; postcode: LL33 0LW; Figure 01). The development area measures 0.081 ha and is located within a field of improved open pasture near Pen-y-Mwd Scheduled Monument (ref. CN007).

The geophysical and metal detector surveys were undertaken in April 2020, in accordance with the following guidelines:

- *Geophysical Survey in Archaeological Field Evaluation* (English Heritage, 2008);
- *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* Version 1.1 (The Welsh Archaeological Trusts, 2018);
- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015);
- *Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider* (European Archaeological Council, 2015);
- *Management of Archaeological Projects* (English Heritage, 1991);
- *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England, 2015); and
- *Standard and Guidance for Archaeological Geophysical Survey* (Chartered Institute for Archaeologists, 2014).

The surveys were monitored by the Gwynedd Archaeological Planning Service and were undertaken in accordance with an approved Written Scheme of Investigation (Appendix II). In line with the Gwynedd Historic Environment Record (HER) requirements, the HER was contacted at the onset of the project to ensure that any data arising was formatted in a manner suitable for accession to the HER under the guidelines set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (The Welsh Archaeological Trusts, 2018). The HER was informed of the project start date, location

including grid reference and estimated timescale for the work. The GAT HER enquiry number is GATHER1222 and the event primary reference number is 45789. A bilingual event summary has been prepared for submission to the HER in accordance with their guidance.

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

## 1.1 Site Details

| | |
|---|---|
| **NGR / Postcode** | SH65727262 / LL33 0LW |
| **Location** | The survey area is located approximately 100m to the southeast of the Pen-y-Mwd Scheduled Monument (ref. CN007). |
| **HER** | Gwynedd Archaeological Trust HER |
| **District** | Gwynedd |
| **Parish** | Abergwyngregyn |
| **Topography** | The area is part of a flat terrace above the most recent river terrace to the north-east at 31m AOD. |
| **Current land use** | Small pasture field situated between rows of housing. |
| **Geology** | Solid: Nant Ffrancon Subgroup – Siltstone<br><br>Superficial: Alluvial Fan Deposits – Sand and gravel (BGS, 2020). |
| **Soils** | Freely draining slightly acid loamy soil (Soilscapes, 2020). |
| **Survey methods** | Magnetometer survey (fluxgate gradiometer)<br><br>Metal Detector survey (deep search metal detector) |
| **Study area** | 0.081ha |

## 1.2 Aims and Objectives

The key aim and objective of the surveys was to:

- establish the extent to which potential archaeological remains survive at the location of the development.

If previously unknown potential archaeological features have been identified through geophysical and metal detector survey, they may need to be evaluated with trial trenches or targeted excavation to confirm their existence and to establish their date and function, and following on from this, to assess the implications of the findings on the current understanding of the historical development of the area. Any archaeological features encountered during the trial trenching or targeted excavation may require preservation by record, i.e. further investigation, or preservation in-situ that may require amending the layout of the proposed development.

# 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The evaluation area is located within a known area of medieval and later archaeological activity and is part of a wider historic landscape. The two key sites in proximity to the proposed development area are Pen y Mwd Motte (Primary Reference Number (PRN) 370; NGR SH65647266), c.100m to the northwest, and the site of a medieval Llys (Hall) (PRN 36302 NGR SH65707260), c.34m to the southwest.

Pen y Mwd Motte (Scheduled Monument CN007; PRN370) is an earthen motte (mound) situated on the southwestern bank of the Afon Aber, where the narrow valley joins the coastal plain. The motte has never been excavated; a topographic survey of the motte was undertaken by GAT in 2004, in advance of conservation work to stabilise tree root erosion (PRN 44346; Berks et al). The survey identified the motte as a roughly circular earthwork, 5.8m high, 35.5m diameter at the base and 14.5m diameter at the top, with the remains of a ditch visible on the south side (ibid.: 1). The survey report states that the date of the origin of the motte is unknown, but it is assumed to be one of the mottes established by the Norman Earl of Chester, Hugh of Avranches, during the late 11th century. By the 13th century, Abergwyngregyn is recorded as one of the main residences of the princes of Gwynedd; the wife of Llywelyn ap Iorwerth, Joan, died there in 1237, and Llywelyn's son Dafydd in 1246 and there are references to building repairs to court in 1289 and 1303 (ibid). Excavations in 1993 to the south of the motte by GAT, undertaken in in connection with a planning application, revealed the foundations of a hall house close to the motte (Scheduled Monument CN007; PRN 36302; PRN 40214). The building was identified as a rectangular stone structure, which appeared to have been divided internally into three sections with projecting wings at either end. The structures survived at foundation level and the northern limit of the building had been incorporated into a later field wall. Recovered artefacts included pottery of the 13th-14th and 15th century, a ring-brooch of 13th-14th century style and a coin of 1335-43 (Johnstone 1994, 1995, 1997 and 2000; Longley 1997). Further excavations at the site were undertaken by the Aber Heritage Valley Partnership, the Snowdonia National Park Authority and GAT in 2010/2011 (PRN 36302; Roberts 2012). The excavations identified more of the footprint of the hall house and a large rectangular stone-built building to the west. The latter measured around 16.5 x 14.5m internally with walls about 1.5m wide. The walls appeared to be robbed down to foundation level along most of their length but in places upper courses survived with neatly faced larger stones enclosing a rubble and earth core. Two hearths were identified within the building along with a large pit measuring 3.5 x 4.5m and up to 0.7m deep.

The hall house has been interpreted as part of the *llys* (court) - a centre of centre of royal power and administration used by the princes of Gwynedd – and it was likely situated within a curvilinear enclosure believed to be the bailey or castle yard defined by the roads to the west (Evans 2008). The site is likely to have gone out of use during the later Middle Ages. The village grew up around the west side of this bailey enclosure and in the late 13th century twenty-four families were recorded as living there (ibid.: 9). In 1339, the village was granted the right to hold a weekly market and a fair three times a year (ibid) and it appeared have propsered because of its position on the crossroads at the junction of the Aber valley and the coastal road and the route from the coastal road across the Lavan Sands for the ferry across to Anglesey, which was the chief route across the Straits until the opening of Telford's bridge in 1826. This route was also a droving route, which took the valley road over the hills and may have therefore been associated with the Aber fairs (ibid).

Most of the present dwellings in Abergwyngregyn are no earlier than the nineteenth century, and were constructed either by the Bulkeley estate or the Penrhyn estate, which acquired the Bulkeley land holdings in 1863. In terms of post-medieval land use and development, an examination of the Ordnance Survey First to Third Edition Ordnance Survey 1-inch to 25-mile County Series Map Sheet of the area (Sheet VII.8,; 1889, 1900 and 1914 respectively) show the development area within an enclosed field of open pasture that generally matches the current boundaries. The plot is located at the centre of the town of Abergwyngregyn which is located on the southern side of the A55 dual carriageway and next to the Afon Aber. This layout has not fundamentally changed, beyond additional settlement along the local road network, including two plots along the northeast and southwest boundary of the plot and one on the adjacent side of the road to the southeast.

In 2010, a geophysical survey (magnetometer) was completed across a c. 0.64ha area to the east and south of the motte that included the current proposed development (Hopewell 2010; GAT Project G2137). The aim of the survey was to investigate the location of the *llys* and the surrounding area, further to the results of the 1993-4 excavations and ahead of the subsequent targeted excavations (see above). The survey was carried out using a Bartington Grad 601-2 dual Fluxgate Gradiometer. The results suggested the soil conditions were generally unsuitable for gradiometer survey due to background noise possibly being higher than the magnetic responses from archaeological features (ibid.). The geophysical survey did not detect known archaeological features but faint anomalies were thought to indicate buried archaeology. Two anomalies were identified to the north of the development area: a discrete area of randomly aligned high readings (6), thought typical of either a dump or an accumulation of burnt material, with a bonfire most likely; a narrow negative anomaly (7) that

appeared to originate from an iron covered man hole and interpreted as a modern pipe.

# 3 METHODOLOGY

## 3.1 Geophysical Survey

### *3.1.1 Technical Detail*

The survey was carried out in a series of traverses within a series of 20x20m grids covering the footprint of the evaluation area. The grids were tied into the Ordnance Survey National Grid using a Trimble R8S high precision GPS system. The survey was conducted using a Barrington Grad 601-2 dual fluxgate gradiometer and carried out at standard resolution with a 1.0m traverse interval and 0.25m sample interval.

### *3.1.2 Instrumentation*

The Bartington Grad 601-2 dual fluxgate gradiometer uses a pair of Grad-01-100 sensors. These are high stability fluxgate gradient sensors with a 1.0m separation between the sensing elements, giving a strong response to deeper anomalies. The instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetized iron oxides which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil, therefore contain greater amounts of iron and can therefore be detected with the gradiometer. This is a simplified description as there are other processes and materials which can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Strong readings are also produced by archaeological features such as hearths or kilns as fired clay acquires a permanent thermo-remnant magnetic field upon cooling. This material can also get spread into the soil leading to a more generalized magnetic enhancement around settlement sites. Not all surveys can produce good results as results can be masked by large magnetic variations in the bedrock or soil or high levels of natural background "noise" (interference consisting of random signals produced by material with in the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. The Bartington Grad 601 is a hand held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 500mm apart. Their cores are driven in and out of magnetic saturation by a 1,000Hz alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse

proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output. The gradiometer can detect anomalies down to a depth of approximately one meter. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT; typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The machine is capable of detecting changes as low as 0.1nT.

### *3.1.3 Data Collection*

The gradiometer includes an on-board data-logger. Readings are taken along parallel traverses of one axis of a 20m x 20m grid. The traverse interval is 1.0m and readings are logged at intervals of 0.25m along each traverse. Marked guide ropes are used to ensure high positional accuracy during the high resolution survey. The data is transferred from the data-logger to a computer where it is compiled and processed using ArchaeoSurveyor2 software. The data is presented as a grey scale plot where data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed. This is supplemented by an interpretation diagram showing the main feature of the survey with reference numbers linking the anomalies to descriptions in the written report. It should be noted that the interpretation is based on the examination of the shape, scale and intensity of the anomaly and comparison to features found in previous surveys and excavations etc. In some cases the shape of an anomaly is sufficient to allow a definite interpretation e.g. a Roman fort. In other cases all that can be provided is the most likely interpretation. The survey will often detect several overlying phases of archaeological remains and it is not usually possible to distinguish between them. Weak and poorly defined anomalies are most susceptible to misinterpretation due to the propensity of the human brain to define shapes and patterns in random background "noise".

### *3.1.4 Data Processing*

The data collected in each 20m x 20m grid is transferred from the data-logger to a personal computer where it is compiled and processed using TerraSurveyor v.3.0.33.10 software. Additional analysis of the data is carried out using MagPick v3.25.

The numeric data are converted to a greyscale plot where data values are represented by modulation of the intensity of a greyscale within a rectangular area corresponding to the data

collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed. X-Y trace plots of the collected data are also used to aid interpretation.

The Bartington Grad 601-2 captures raw data in the range of +/- 3000 nT. When raw data is presented in greyscale format all but the extreme high or low readings are rendered in the central range of the greyscale and therefore not visible against the background. The data is minimally processed by clipping as archaeological features tend to produce readings within the +/-15nt range.

Corrections may also be made to the data to compensate for instrument drift and other data collection inconsistencies. These corrections may include:

- de-striping using zero mean traverse which sets the background mean of each traverse within each grid to zero, removing striping effects and edge discontinuities;
- de-staggering in order to correct for slight differences in the speed of walking on forward and reverse traverses;
- de-spiking to remove high or low readings caused by stray pieces of iron, fences, etc. in order to reduce background magnetic noise;
- the application of a high pass filter to remove low frequency, large scale spatial detail for example a slowly changing geological background;
- the application of a low pass filter to remove high frequency, small scale spatial detail in order to smooth data or to enhance larger weak anomalies; and
- interpolation to produce a smoothed grayscale plot with more but smaller pixels in order to aid clarity.

### *3.1.5 Presentation of results and interpretation*

The results of the survey are presented as a minimally processed greyscale plot (raw data clipped to +/- 15nT) and a processed greyscale plot if further processing or enhancement has been performed. X-Y trace plots of the collected data may also be included if they are necessary to support the interpretation of specific anomalies visible on the greyscale plots.
Magnetic anomalies are identified, interpreted and plotted onto an interpretative plot with reference numbers linking the anomalies to descriptions within the written report. When interpreting the results, several factors are taken into consideration, including the shape, scale and intensity of the anomaly and the local conditions at the site (geology, pedology, topography, etc.). Anomalies are categorised by their potential origin. Where responses can be related to other existing evidence, the anomalies will be given specific categories, such as Abbey Wall or Roman Road. Where the interpretation is based largely on the geophysical data, levels of confidence are implied, for example: Probable, or Possible Archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification *Possible.*

### *3.1.6 Interpretation categories*

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, Roman Fort, Wall, etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

| **Interpretation Category** | **Description** |
|---|---|
| *Archaeology / Probable Archaeology* | *This term is used when the form, nature and pattern of* the responses are clearly or very probably archaeological and/or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age. |
| *Possible Archaeology* | These anomalies exhibit either weak signal strength and/or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation. |
| *Industrial / Burnt-Fired* | Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metalworking areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies. |
| *Former Field Boundary (probable and possible)* | Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. *Possible* denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary. |
| *Ridge and Furrow* | Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity |
| *Agriculture (ploughing)* | Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes. |

| Interpretation Category | Description |
|---|---|
| *Land Drain* | Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains. |
| *Natural* | These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions. |
| *Magnetic Disturbance* | Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. |
| *Service* | Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. PVC) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity. |
| *Ferrous* | This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above-ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material. |
| *Uncertain Origin* | Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology / Natural* or (in the case of linear responses) *Possible Archaeology / Agriculture*; occasionally they are simply of an unusual form. |

Where appropriate some anomalies are further classified according to their form (positive or negative) and relative strength and coherence (trend: low and poorly defined).

## 3.2 Metal Detector Survey

### *3.2.1 Summary*

A metal detector survey was undertaken and incorporated the area defined as the red highlighted plot in Figure 01. It was carried out in a series of 20m grids, which were tied into the Ordnance Survey grid using a Trimble R8 high precision GPS system. The survey was conducted using a Fisher 1266-X Deep Search Metal Detector using 2m traverses of the grid.

### *3.2.2 Instrumentation*

The Fisher 1266-X Deep Search Metal Detector uses a VLF-search frequency of 4.8KHz and and audio target response of 370Hz. It has duel discrimination operating modes to allow the user to better define good targets and eliminate probable metal debris (e.g. nails, rings pulls). It also has a pinpoint mode to precisely target responses. The search coil is a concentric, co-planar spider coil with a diameter of 8 inches that is 100% electrostatically insulated and is automatically tuned.

### *3.2.3 Data Collection*

All good targets were investigated but any object potentially buried at a lower depth than the topsoil was not recovered. In order to investigate a reading the sod was removed and left to one side. The required amount of topsoil was then be removed to establish the source of the reading. Once the reading was investigated and recorded the excavated topsoil was replaced, compacted and the sod restored.

The location of each metal detector reading where an object has been recorded and/or where the object remains buried beneath the topsoil was recorded using a Trimble R8 high precision GPS system. Each reading or object recorded has been allocated a unique identification number. Items that were deemed to be modern and not therefore significant will be left in situ after recording.

# 4 RESULTS

## 4.1 Geophysical Survey

This was a small area of survey and experience has shown that the most understandable results are produced if such an area is carried out at high resolution (0.5 traverse interval x 0.25 sample interval) as opposed to a standard 1.0m traverse interval where the lack of detail makes interpretation less certain. It was carried out as a series of 4 x 20m square grids. Only parts of these grids could be surveyed and the spread of grids extended slightly beyond the development area.

Anomalies were detected across the whole of the survey area and these are transcribed on the interpretation plan (Figure 02). The results were dominated by a series of very high responses across the majority of the area. Anomalies 1-3 produced peak responses of over +-3000nT. Typical archaeological anomalies are in the range of +-15nT. The grey-scale plots have been clipped to +- 15nT (Figure 03) and +-50nT (Figure 04), the latter reduces the dominant halos around the strong anomalies. Very high magnitude anomalies are typically associated with magnetic bedrock, large ferrous objects or thermoremnant magnetism caused by industrial activity or large fires. The three anomalies could be the result of any of these causes although they seem to be discrete features. This suggests that a mass of underlying bedrock is a less likely origin. The other strong anomalies are typical ferric dipoles and are almost certainly buried iron objects. Ferrous anomalies intrude into three sides of the survey area and are associated with a house and fence on the south west side, a steel fence services and a footpath along the north-east side and a fence and parked cars on the south-east. The high magnitude features dominate the results and may mask lower magnitude archaeological anomalies. Two linear anomalies and several anomalies of uncertain origin could be seen between the stronger responses. These could be interpreted as either buried archaeology or modern services/drains. Although these linear anomalies fall outside of the development area they could be indicative of remains currently obscured by the high responses within the development footprint. The anomalies are described and assessed separately in the table below.

| Number | Category | Description |
|---|---|---|
| 1 | Fe or Thermoremnant | A very magnetic discrete anomaly (+-3000nT). Either a large iron object a strong thermoremnant feature or possibly geology |
| 2 | Fe or Thermoremnant | A very magnetic discrete anomaly (+-3000nT). Either a large iron object a strong thermoremnant feature or possibly geology |
| 3 | Fe or Thermoremnant | A very magnetic discrete anomaly (+-3000nT). Either a large iron object a strong thermoremnant feature or possibly geology |
| 4 | Fe or Thermoremnant | A thermoremnant anomaly or iron object |
| 5 | Fe | Strong magnetic dipole, large iron object |
| 6 | Fe | Strong magnetic dipole, large iron object |
| 7 | Fe | Magnetic dipole, small iron object |
| 8 | Fe | Magnetic dipole, small iron object |
| **9** | Fe | Magnetic dipole, small iron object |
| 10 | Fe | 2 magnetic dipoles, small iron objects |
| 11 | Fe | Steel fence |
| 12 | Fe | Fence and house |
| 13 | Fe | Fence and parked cars |
| 14 | Fe | Strong magnetic dipole, large iron object |
| 15 | Archaeology or services | Linear negative anomaly (typically caused by stone feature), turns through 90 degrees at south-east end |
| 16 | Archaeology or services | Poss. linear anomaly or change in the nature of the soil. Much more noisy to the east. Best viewed on +-15nT plot. Poss. former boundary or dump of material |
| 17 | Archaeology | An area of multiple small anomalies. Typical of a spread or pile of stones. Could be interpreted as a cairn or pile of rubble |
| 18 | Uncertain | Moderate magnitude anomaly 20-30nT. Some enhancement possibly thermoremnant. Possibly a bonfire or a magnetic boulder |

| Number | Category | Description |
|---|---|---|
| 19 | Uncertain | Moderate magnitude anomaly 20-30nT. Some enhancement possibly thermoremnant. Possibly a bonfire or a magnetic boulder |
| 20 | Uncertain | Moderate magnitude anomaly 30-50nT. Some enhancement possibly thermoremnant. Possibly a bonfire or a magnetic boulder |
| 21 | Uncertain | Moderate magnitude anomaly 30-50nT. Some enhancement possibly thermoremnant. Possibly a bonfire or a magnetic boulder |
| 22 | Uncertain | Three short linear anomalies. Possibly indicating general ground disturbance |

## 4.2 Metal Detector Survey

The metal detector survey was undertaken using duel discrimination equipment set to levels 4 and 8. These levels had proved in testing to pick up all targets at the lower level (4), but excluded aluminium cans and ring pulls at the higher level (8). In total 38 responses were encountered across the study area. 32 of these were not investigated due to the duel discrimination system discussed above as these were unlikely to be good targets.

6 targets elicited a response on both discrimination levels and these were investigated further and located using GPS. These are detailed in the table below and on Figure 05.

| Number | Material | Description |
|---|---|---|
| 1 | Unknown | No material found in the topsoil |
| 2 | Copper | Ring - circumference 3.6cm on one side, has a flat (tool cut) edge 3mm in diameter. The ring tapers to a circumference of 3cm over a 1cm distance and has a rough slightly sharp edge on this side. Possibly plumbing related. |
| 3 | Steel | Can lid with pull tab hole. This old style opening dates the lid to the 80's or early 90's. |
| 4 | ZAMAC (Zinc and aluminium) | Realtoy diecast model – BMW New Mini (Red and White) 1/56 scale. Made in China. Must post-date 2001 release of the new style mini. |
| 5 | ZAMAC (Zinc and aluminium) | SSECA (Kingstar toys) diecast model (rear door only) – from a White Asia Towner 1/32 from their City Life series. Made in Korea. |
| 6 | ZAMAC (Zinc and aluminium) | Yellow construction truck (Flatbed) unknown brand. |

# 5 CONCLUSIONS AND RECOMMENDATIONS

The geophysical survey was dominated by a series of high magnitude anomalies. Some are clearly modern fences and buildings and some are typical ferrous responses caused by iron objects in the soil. Ferrous rubbish in the soil is commonly found in the vicinity of dwellings. The stronger anomalies could be large ferrous objects but seem to be diffuse and less obvious dipoles so could be interpreted as strong thermoremnant anomalies or perhaps geology. Moderate magnitude anomalies could be the result of bonfires or magnetic boulders in the soil. Several low magnitude anomalies in the typical range of archaeology were detected. Anomaly 15 is a negative linear anomaly suggesting it might be a stone feature. This could be a drain, a service trench or a wall. Another linear feature 16 is the border between an area of low magnetic noise and an area of higher magnetic noise. This could indicate a former boundary or change in the soil caused by differential deposition or dumping. Although these linear anomalies lie outside the development area they could be indicative of features currently obscured by the high responses within the development footprint. The survey identified additional anomalies not highlighted in the survey completed in 2010 by GAT; these were primarily iron object anomalies of various that were identified across the proposed development area.

The metal detector survey resulted in 38 responses, 6 of which were investigated further; 5 of these produced modern material. Only response (number 1) was from an unknown source.

Overall the area gives the impression of having been extensively disturbed possibly at the time of the construction of the houses to the north east. It should also be noted that the area is part of a terrace above the most recent river terrace to the north-east. The edge of the upper terrace along the boundary that is contiguous with the back of the gardens of the houses is revetted with stone and it is therefore possible that part of the area is made ground. Further evaluation is necessary through either trial trenching or targeted excavation.

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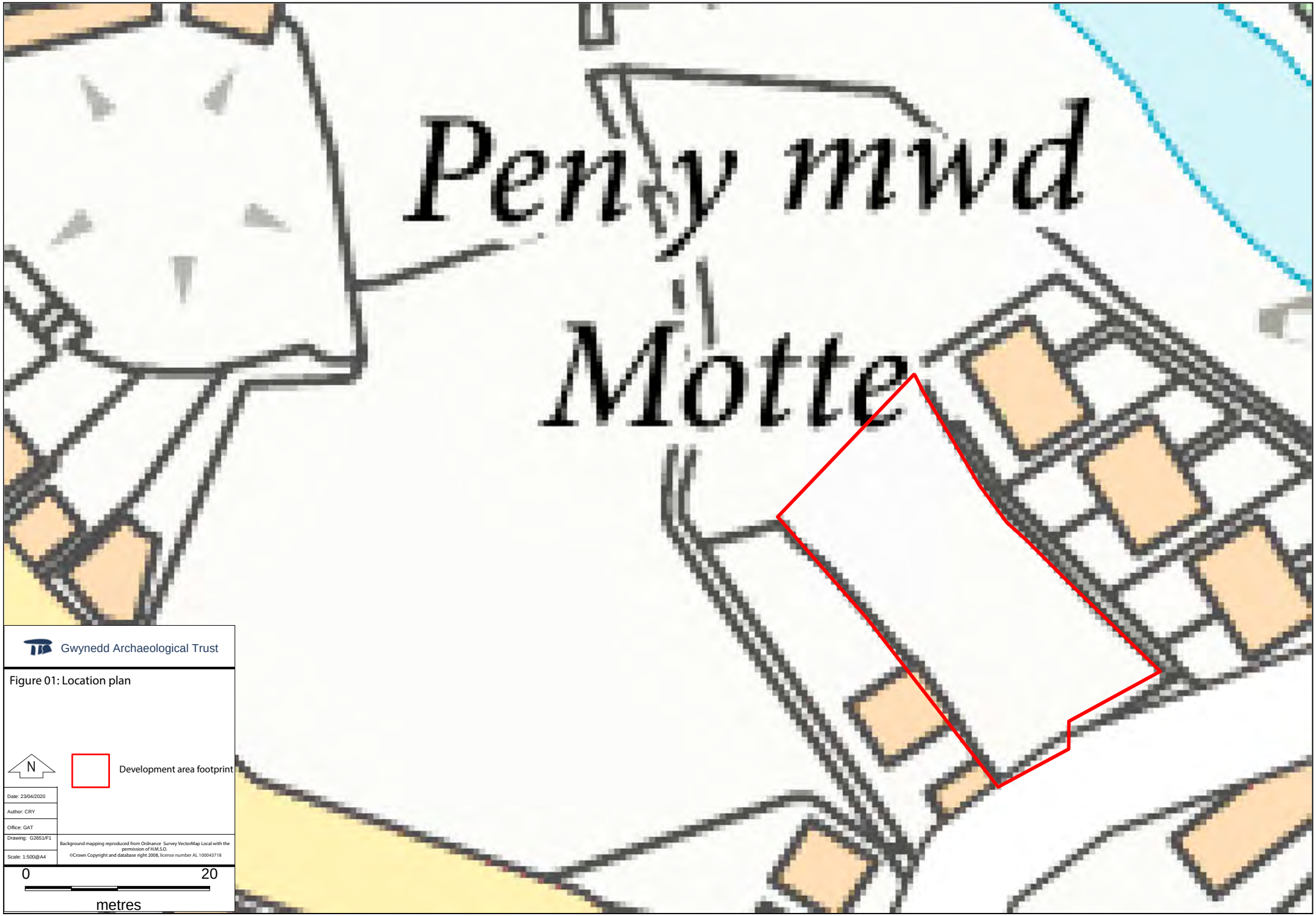
## APPENDIX I

## Gwynedd Archaeological Trust approved WSI




Gwynedd Archaeological Trust

Figure 01: Location plan

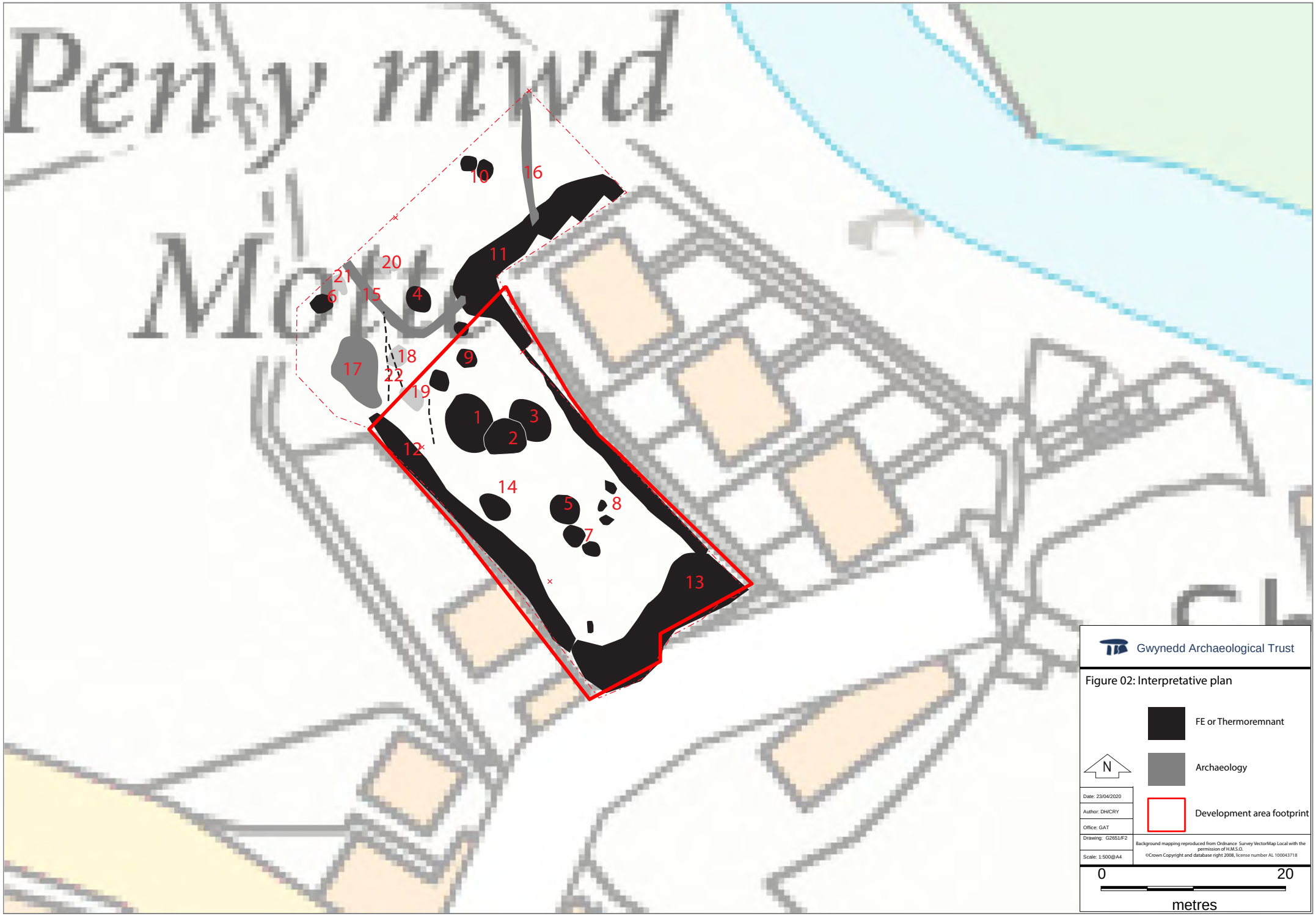
N

Development area footprint

| | |
|---|---|
| Date: 23/04/2020 | |
| Author: CRY | |
| Office: GAT | |
| Drawing: G2651/F1 | Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O. |
| Scale: 1:500@A4 | ©Crown Copyright and database right 2008, license number AL 100043718 |

0 20

metres


Penty mwd
Mott
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16
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20
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6
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4
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17
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19
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1
3
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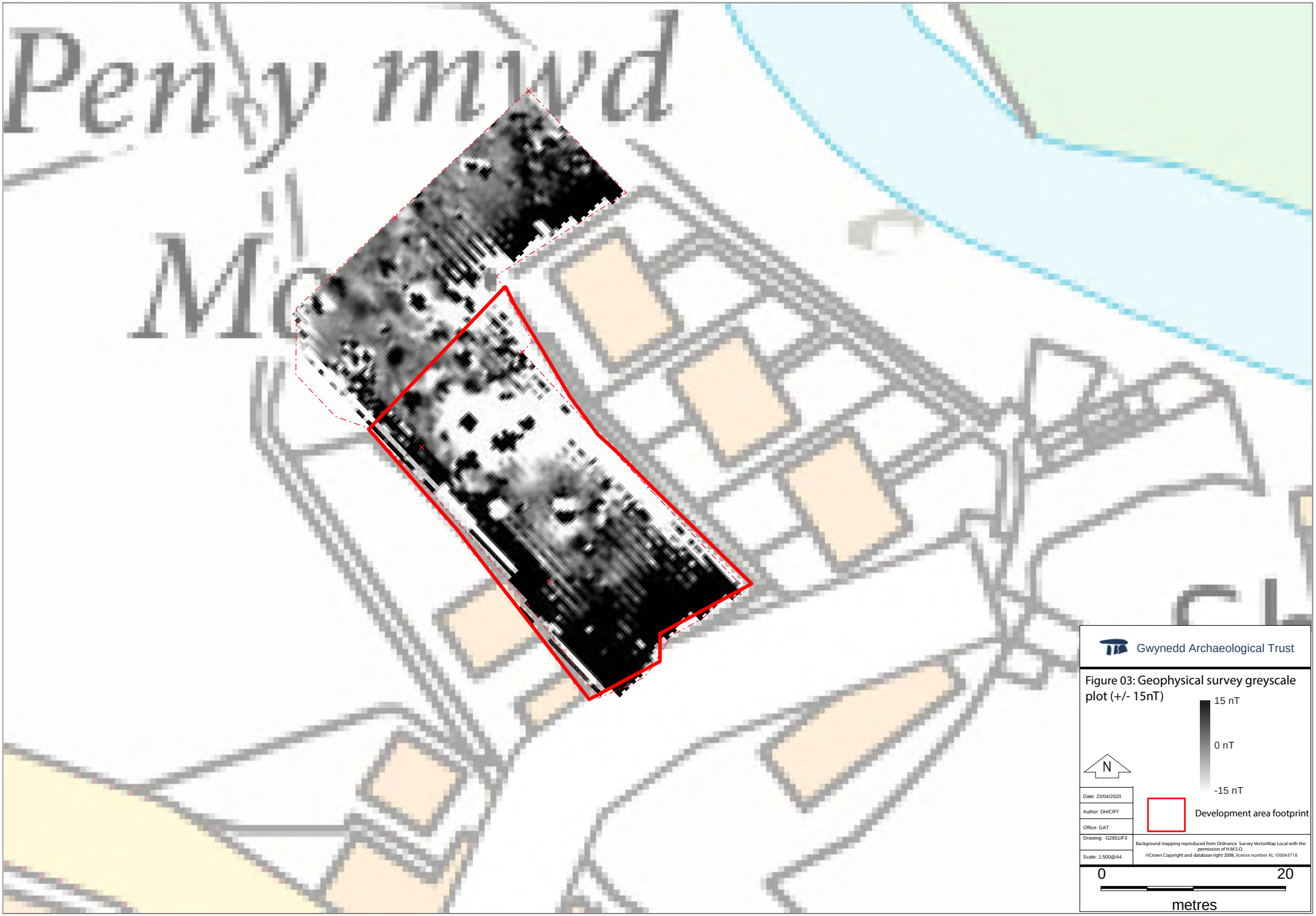
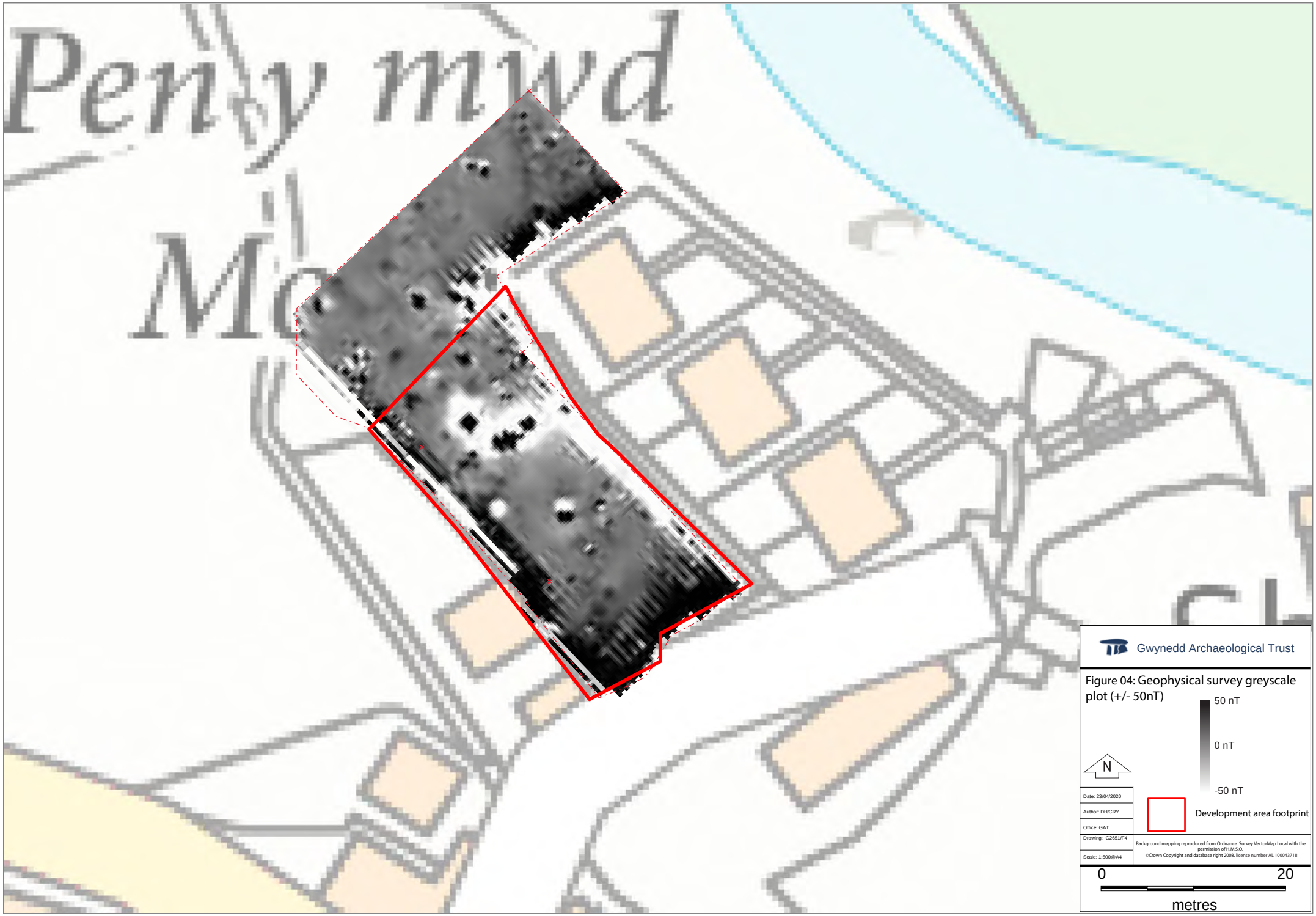
12
14
5
8
7
13
Gwynedd Archaeological Trust
Figure 02: Interpretative plan
FE or Thermoremnant
Archaeology
Development area footprint
N
Date: 23/04/2020
Author: DH/CRY
Office: GAT
Drawing: G2651/F2
Scale: 1:500@A4
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2008, license number AL 100043718
0
20
metres


Penty mwd
Gwynedd Archaeological Trust
Figure 03: Geophysical survey greyscale plot (+/- 15nT)
15 nT
0 nT
-15 nT
N
Development area footprint
Date: 23/04/2020
Author: DH/CRY
Office: GAT
Drawing: G2651/F3
Scale: 1:500@A4
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2008, license number AL 100043718
0
20
metres


Gwynedd Archaeological Trust
Figure 04: Geophysical survey greyscale plot (+/- 50nT)
50 nT
0 nT
-50 nT
N
Development area footprint
Date: 23/04/2020
Author: DH/CRY
Office: GAT
Drawing: G2651/F4
Scale: 1:500@A4
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2008, license number AL 100043718
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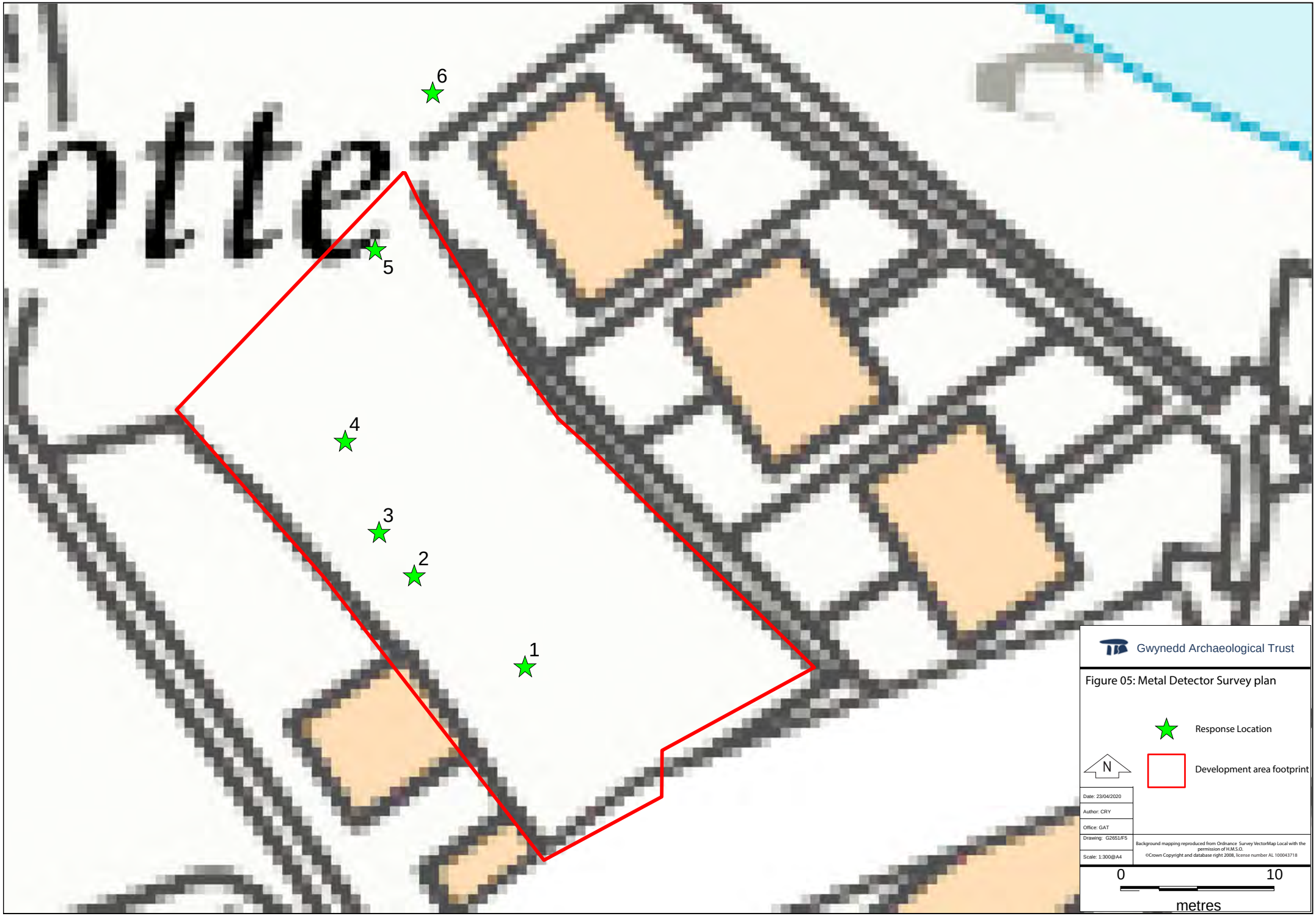
20
metres


6
5
4
3
2
1
Gwynedd Archaeological Trust
Figure 05: Metal Detector Survey plan
Response Location
N
Development area footprint
Date: 23/04/2020
Author: CRY
Office: GAT
Drawing: G2651/F5
Scale: 1:300@A4
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2008, license number AL 100043718
0
10
metres

## APPENDIX I

## Gwynedd Archaeological Trust approved WSI

# LAND AT CAE FELIN, ABERGWYNGREGYN (G2651)

# WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL EVALUATION (GEOPHYSICAL SURVEY)

*Prepared for Mr H Roberts*

***April 2020***

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

| Approvals Table | | | | |
|---|---|---|---|---|
| | **Role** | **Printed Name** | **Signature** | **Date** |
| Originated by | Document Author | John Roberts |  | 07/04/2020 |
| Reviewed by | Document Reviewer | Carol Ryan Young |  | 16/04/2020 |
| Approved by | Principal Archaeologist | John Roberts |  | 07/04/2020 |

| Revision History | | | |
|---|---|---|---|
| **Rev No.** | **Summary of Changes** | **Ref Section** | **Purpose of Issue** |
| | | | |
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| | | | |

All GAT staff should sign their copy to confirm the project specification is read and understood and retain a copy of the specification for the duration of their involvement with the project. On completion, the specification should be retained with the project archive:

Name Signature Date

**LAND AT CAE FELIN, ABERGWYNGREGYN (G2651)**

**WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL EVALUATION (GEOPHYSICAL SURVEY)**

Prepared for *Mr H Roberts*, April 2020

**CONTENTS**

# 1 INTRODUCTION

Gwynedd Archaeological Trust has been commissioned by Mr H Roberts to undertake an archaeological evaluation (geophysical and metal detecting survey) in advance of a proposed residential development on land at Cae Felin, Abergwyngregyn, Gwynedd (NGR SH65727262; postcode: LL33 0LW; Figure 01). The development area measures 0.081 ha and is located within a field of improved open pasture near Pen-y-Mwd Scheduled Monument (ref. CN007). The planning application reference is NP3/10/121 and the evaluation will be undertaken from April 2020 in accordance with the following guidelines:

- *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* Version 1.1 (The Welsh Archaeological Trusts, 2018);
- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015);
- *Management of Archaeological Projects* (English Heritage, 1991);
- *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England, 2015);
- *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014); and
- *Standard and Guidance for Archaeological Geophysical Survey* (Chartered Institute for Archaeologists, 2014.

Based on the results of the geophysical survey, further pre-determination archaeological works may be recommended, which could include targeted trial trenching. Any such works will be defined in future written schemes of investigation.

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

## 1.1 Monitoring Arrangements

The archaeological evaluation will be monitored by the Gwynedd Archaeological Planning Service (GAPS); the content of this WSI and all subsequent reporting by GAT must be approved by GAPS prior to final issue. GAPS have stated the geophysical survey should be supported by sufficient desk-based research to aid interpretation of any archaeological evidence encountered. GAPS have also requested that in addition to the geophysics a metal-detecting survey should be undertaken in order to assess the surface and shallow-depth potential for ferrous and non-ferrous material in the area

The GAPS Archaeologist will need to be informed of the project timetable and of the subsequent progress and findings. The curator contact details are:

The curator contact details are:

**Jenny Emmett: jenny.emmett@heneb.co.uk – 07824481052;** and

**Tom Fildes: tom.fildes@heneb.co.uk – 07920264232.**

## 1.2 Historic Environment Record

In line with the GAT Environment Record (HER) requirements, the HER will be contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER and follows the guidance set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (The Welsh Archaeological Trusts, 2018). In line with this guidance, all submitted reporting will need to include the equivalent of a non-technical summary in Welsh and English at the front of the report combined with short bilingual summaries of the principal Historic Assets recorded during the event. These requirements are mandatory. The GAT HER enquiry number is 1254 and the event primary reference number is 45903.

The GAT HER will also be responsible for supplying Primary Reference Numbers (PRN) for new assets identified and recorded.

# 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

A brief examination of the regional Historic Environment Record demonstrates that the evaluation area is part of a wider historic landscape associated with Abergwyngregyn as well as within a general area of known archaeological activity, with two sites located within close proximity:

- The site of a Medieval motte earthwork (Primary Reference Number (PRN) 370) is located at NGR SH6564272665, c.88m to the southwest; and
- Medieval Llys (Hall) (PRN 36302) is located at NGR SH657726, c.34m to the southwest.

In terms of post-medieval land use and development, an examination of the Ordnance Survey First to Third Edition Ordnance Survey 1-inch to 25-mile County Series Map Sheet of the area (Sheet VII.8,; 1889, 1900 and 1914 respectively; cf. Figures 02 to 04) show the development area within an enclosed field of open pasture that generally matches the current boundaries. The plot is located at the centre of the town of Abergwyngregyn which is located on the southern side of the A55 dual carriageway and next to the Afon Aber. This layout has not fundamentally changed, beyond additional settlement along the local road network, including two plots along the northeast and southwest boundary of the plot and one on the adjacent side of the road to the southeast.

Monuments and areas of archaeological interest located in close vicinity include the scheduled Pen y Mwd Motte (SH6564272665) located c.88m to the northwest of the plot. Pen y Mwd Motte (PRN370) is an earthen motte at Abergwyngregyn which is situated on the south-western bank of the Afon Aber, where the narrow valley joins the coastal plain. The mound is nearly circular and roughly 6.7m high. The diameter at the base is 36.5m, and 16m at the top. There are no visible signs of masonry or of a bailey surrounding the earthwork, although there is some indication of a ditch on the south side. The motte has never been excavated.

While there is no documentary evidence for the construction of the motte, it has been attributed to Hugh of Avranches, and Robert of Rhuddlan in the late 11th century. In the 13th century, however, Abergwyngregyn is recorded as one of the main residences of the princes of Gwynedd which could mean that either the existing mound was re-used, or that the Welsh princes copied the Norman motte-building tradition themselves. There is no written evidence

describing the princes' site, and it has been suggested that the remains of the llys (court or regional centre) are located near the motte: excavations in 1993 adjacent to the motte uncovered buildings which were associated with 13th century pottery (Johnstone, 1994). Leland, writing in the 16th century, claimed that part of the building was still standing in his time, and gave the alternative name Llan Boduan for the motte. The court is located to the southwest of the evaluation area at c.34m, while at c.90m SSE of the motte.

Given the close proximity of both sites to the evaluation area, the chance of discovering features of archaeological interest is quite high. This is especially relevant to the motte, as any archaeology identified would add to the greater understanding of the motte within a wider context.

# 3 METHODOLOGY

## 3.1 Geophysical Survey

### *3.1.1 Summary*

The geophysical survey will be undertaken by GAT staff and will incorporate the area defined as the red highlighted plot in Figure 01 and 02, and will be carried out in a series of 20m grids, which will be tied into the Ordnance Survey grid using a Trimble R8 high precision GPS system. The survey will be conducted using a Bartington Grad 601-2 dual fluxgate gradiometer with a 1.0m traverse interval and a 0.25m sample interval. In addition, a full metal detecting survey will be conducted on the area to assess the surface and shallow-depth potential for ferrous and non-ferrous material in the area.

### *3.1.2 Instrumentation*

The Bartington Grad 601-2 dual fluxgate gradiometer uses a pair of Grad-01-100 sensors. These are high stability fluxgate gradient sensors with a 1.0m separation between the sensing elements, giving a strong response to deeper anomalies. The instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetized iron oxides which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil, therefore contain greater amounts of iron and can therefore be detected with the gradiometer. This is a simplified description as there are other processes and materials which can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Strong readings are also produced by archaeological features such as hearths or kilns as fired clay acquires a permanent thermo-remnant magnetic field upon cooling. This material can also get spread into the soil leading to a more generalized magnetic enhancement around settlement sites. Not all surveys can produce good results as results can be masked by large magnetic variations in the bedrock or soil or high levels of natural background "noise" (interference consisting of random signals produced by material with in the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. The Bartington Grad 601 is a hand held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 500mm apart. Their cores are driven in and out of magnetic saturation by a

1,000Hz alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output. The gradiometer can detect anomalies down to a depth of approximately one meter. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT; typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The machine is capable of detecting changes as low as 0.1nT.

### *3.1.3 Data Collection*

The gradiometer includes an on-board data-logger. Readings are taken along parallel traverses of one axis of a 20m x 20m grid. The traverse interval is 1.0m and readings are logged at intervals of 0.25m along each traverse. Marked guide ropes are used to ensure high positional accuracy during the high resolution survey. The data is transferred from the data-logger to a computer where it is compiled and processed using ArchaeoSurveyor2 software. The data is presented as a grey scale plot where data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed. This is supplemented by an interpretation diagram showing the main feature of the survey with reference numbers linking the anomalies to descriptions in the written report. It should be noted that the interpretation is based on the examination of the shape, scale and intensity of the anomaly and comparison to features found in previous surveys and excavations etc. In some cases the shape of an anomaly is sufficient to allow a definite interpretation e.g. a Roman fort. In other cases all that can be provided is the most likely interpretation. The survey will often detect several overlying phases of archaeological remains and it is not usually possible to distinguish between them. Weak and poorly defined anomalies are most 4 susceptible to misinterpretation due to the propensity of the human brain to define shapes and patterns in random background "noise".

### *3.1.4 Data Processing*

The data collected in each 20m x 20m grid is transferred from the data-logger to a personal computer where it is compiled and processed using TerraSurveyor v.3.0.33.10 software. Additional analysis of the data is carried out using MagPick v3.25.

The numeric data are converted to a greyscale plot where data values are represented by modulation of the intensity of a greyscale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed. X-Y trace plots of the collected data are also used to aid interpretation.

The Bartington Grad 601-2 captures raw data in the range of +/- 3000 nT. When raw data is presented in greyscale format all but the extreme high or low readings are rendered in the central range of the greyscale and therefore not visible against the background. The data is minimally processed by clipping as archaeological features tend to produce readings within the +/-15nt range.

Corrections may also be made to the data to compensate for instrument drift and other data collection inconsistencies. These corrections may include:

- de-striping using zero mean traverse which sets the background mean of each traverse within each grid to zero, removing striping effects and edge discontinuities;

- de-staggering in order to correct for slight differences in the speed of walking on forward and reverse traverses;

- de-spiking to remove high or low readings caused by stray pieces of iron, fences, etc. in order to reduce background magnetic noise;

- the application of a high pass filter to remove low frequency, large scale spatial detail for example a slowly changing geological background;

- the application of a low pass filter to remove high frequency, small scale spatial detail in order to smooth data or to enhance larger weak anomalies; and

- interpolation to produce a smoothed grayscale plot with more but smaller pixels in order to aid clarity.

### *3.1.5 Presentation of results and interpretation*

The results of the survey will be presented as a minimally processed greyscale plot (raw data clipped to +/- 15nT) and a processed greyscale plot if further processing or enhancement has been performed. X-Y trace plots of the collected data may also be included if they are necessary to support the interpretation of specific anomalies visible on the greyscale plots.
Magnetic anomalies are identified, interpreted and plotted onto an interpretative plot with reference numbers linking the anomalies to descriptions within the written report. When interpreting the results, several factors are taken into consideration, including the shape, scale and intensity of the anomaly and the local conditions at the site (geology, pedology, topography, etc.). Anomalies are categorised by their potential origin. Where responses can be related to other existing evidence, the anomalies will be given specific categories, such as Abbey Wall or Roman Road. Where the interpretation is based largely on the geophysical data, levels of confidence are implied, for example: Probable, or Possible Archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification *Possible.*

### *3.1.6 Interpretation categories*

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, Roman Fort, Wall, etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

| | |
|---|---|
| *Archaeology / Probable Archaeology* | *This term is used when the form, nature and pattern of* the responses are clearly or very probably archaeological and/or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age. |
| *Possible Archaeology* | These anomalies exhibit either weak signal strength and/or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation. |
| *Industrial / Burnt-Fired* | Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metalworking areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies. |

| | |
|---|---|
| *Former Field Boundary (probable and possible)* | Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. *Possible* denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary. |
| *Ridge and Furrow* | Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity |
| *Agriculture (ploughing)* | Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes. |
| *Land Drain* | Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains. |
| *Natural* | These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions. |
| *Magnetic Disturbance* | Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. |
| *Service* | Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. PVC) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity. |

| | |
|---|---|
| *Ferrous* | This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above-ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material. |
| *Uncertain Origin* | Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology / Natural* or (in the case of linear responses) *Possible Archaeology / Agriculture*; occasionally they are simply of an unusual form. |

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: low and poorly defined).

## 3.2 Metal Detector Survey

### *3.2.1 Summary*

A metal detector survey will be undertaken and will incorporate the area defined as the red highlighted plot in Figure 01 and will be carried out in a series of 20m grids, which will be tied into the Ordnance Survey grid using a Trimble R8 high precision GPS system. The survey will be conducted using a Fisher 1266-X Deep Search Metal Detector using 2m traverses of the grid.

### *3.2.2 Instrumentation*

The Fisher 1266-X Deep Search Metal Detector uses a VLF-search frequency of 4.8KHz and and audio target response of 370Hz. It has duel discrimination operating modes to allow the user to better define good targets and eliminate probable metal debris (e.g. nails, rings pulls). It also has a pinpoint mode to precisely target responses. The search coil is a concentric, co-planar spider coil with a diameter of 8 inches that is 100% electrostatically insulated and is automatically tuned.

### *3.2.3 Data Collection*

All readings will be investigated but any object potentially buried at a lower depth than the topsoil will not recovered. In order to investigate a reading the sod will be removed and left to one side. The required amount of topsoil will then be removed to establish the source of the reading. Once the reading is investigated and recorded the excavated topsoil will be replaced, compacted and the sod restored.

The location of each metal detector reading where an object has been recorded and/or where the object remains buried beneath the topsoil will be recorded using a Trimble R8 high precision GPS system. Each reading or object recorded will be allocated a unique identification number, which incorporates the grid identification number and the traverse identification number. Items that were deemed to be modern and not therefore significant will be left in situ after recording.

All artefacts recovered will be retained and removed from site by GAT for assessment by an appropriately experienced finds specialist. GAT will seek advice from a suitably qualified conservator with regard to the appropriate storage of materials of recovered metalwork. All recording, cleaning, storage and conservation of finds will be in accordance with advice of the Conservator and the Chartered Institute for Archaeologist's Standard and Guidance for

the collection, documentation, conservation and research of archaeological materials (CIfA 2014b).

## 3.3 Assessment (Desktop Study)

The geophysical survey will be supported by sufficient desk-based research to aid interpretation of any archaeological evidence encountered. A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage….Significance is to be judged in a local, regional, national or international context as appropriate” (CIfA 2014, 4).

The desk-based assessment will involve a study of the following resources:

1. The regional Historic Environment Register ((HER) Gwynedd Archaeological Trust, Craig Beuno, Ffordd y Garth, Bangor, Gwynedd LL57 2RT) will be examined for information concerning the study area, defined as the red highlighted plot in Figure 01 and the immediate environs. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. All identified features will be mapped, described and added to a gazetteer of sites and the relative importance of any sites defined;
2. The National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for sites additional to the HER;
3. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential features;
4. On-line catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU);
5. Archive data, including primary and secondary sources, historic maps and estate maps will be examined at the regional archives (Archifau Ynys Môn / Anglesey Archives, Bryn Cefni Industrial Estate Road, Llangefni LL77 7JA). The examination of the archive data will include the local tithe map and schedule;

6. If available, Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at http://lle.gov.wales/home for information on potential surface features using digital terrain modelling and digital surface modelling;

## 3.4 Data processing and report compilation

Following completion of the stages outlined above, a report will be produced incorporating the following:

1. Front cover;
2. Inner cover;
3. Figures and Plates List;
4. Non-technical summary (Welsh/English);
5. Introduction;
6. Methodology;
7. Results;
8. Conclusions and recommendations;
9. Acknowledgements;
10. Bibliography;
    a. Primary sources;
    b. Secondary sources;
11. Figures; inc.:
    - location plan;
    - historic mapping;
    - location plan with identified features;
    - grey scale plot;
    - anomaly identification and interpretation;
12. Appendix I (approved written scheme of investigation);
13. Appendix II (Sites listed on GAT Historic Environment Record);
14. Appendix III (Definition of mitigation terms);

    Back cover.

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included.

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. The archaeological evaluation outlined in this written scheme of investigation will be submitted in draft format in March 2020; a final report will be submitted to the Historic Environment within six months of submitting the draft report .

The following dissemination will apply:

- A digital report(s) will be provided to the client/consultant and GAPS (draft report then final report);
- A paper report plus a digital report will be provided to the regional Historic Environment Record, Gwynedd Archaeological Trust; this will be submitted within six months of project completion (final report only), along with any relevant, digital

information such as the project database and photographs. All digital datasets submitted will conform to the required standards set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1); and

- A digital report and archive (including photographic and drawn) data will be provided to Royal Commission on Ancient and Historic Monuments, Wales (final report only), in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata.

# 4 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The evaluation will be completed by a team of Project Archaeologists who will have responsibility for completing and compiling the survey data, interpreting the results, preparing the subsequent report and archive. The project manager will be responsible for reviewing and approving the report prior to submission.

# 5 INSURANCE

## 5.1 Public/Products Liability

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability
INSURER Aviva Insurance Limited
POLICY TYPE Public Liability
POLICY NUMBER 24765101CHC/UN/000375
EXPIRY DATE 21/06/2020

## 5.2 Employers Liability

Limit of Indemnity- £10,000,000 any one occurrence.
The cover has been issued on the insurers standard policy form and is subject to their usual terms and conditions. A copy of the policy wording is available on request.
INSURER Aviva Insurance Limited
POLICY TYPE Employers Liability
POLICY NUMBER 24765101 CHC / UN/000375
EXPIRY DATE 21/06/2020

## 5.3 Professional Indemnity

Limit of Indemnity- £5,000,000 in respect of each and every claim
INSURER Hiscox Insurance Company Limited
POLICY TYPE Professional Indemnity
POLICY NUMBER 9446015
EXPIRY DATE 22/07/2020

# 6 SOURCES CONSULTED

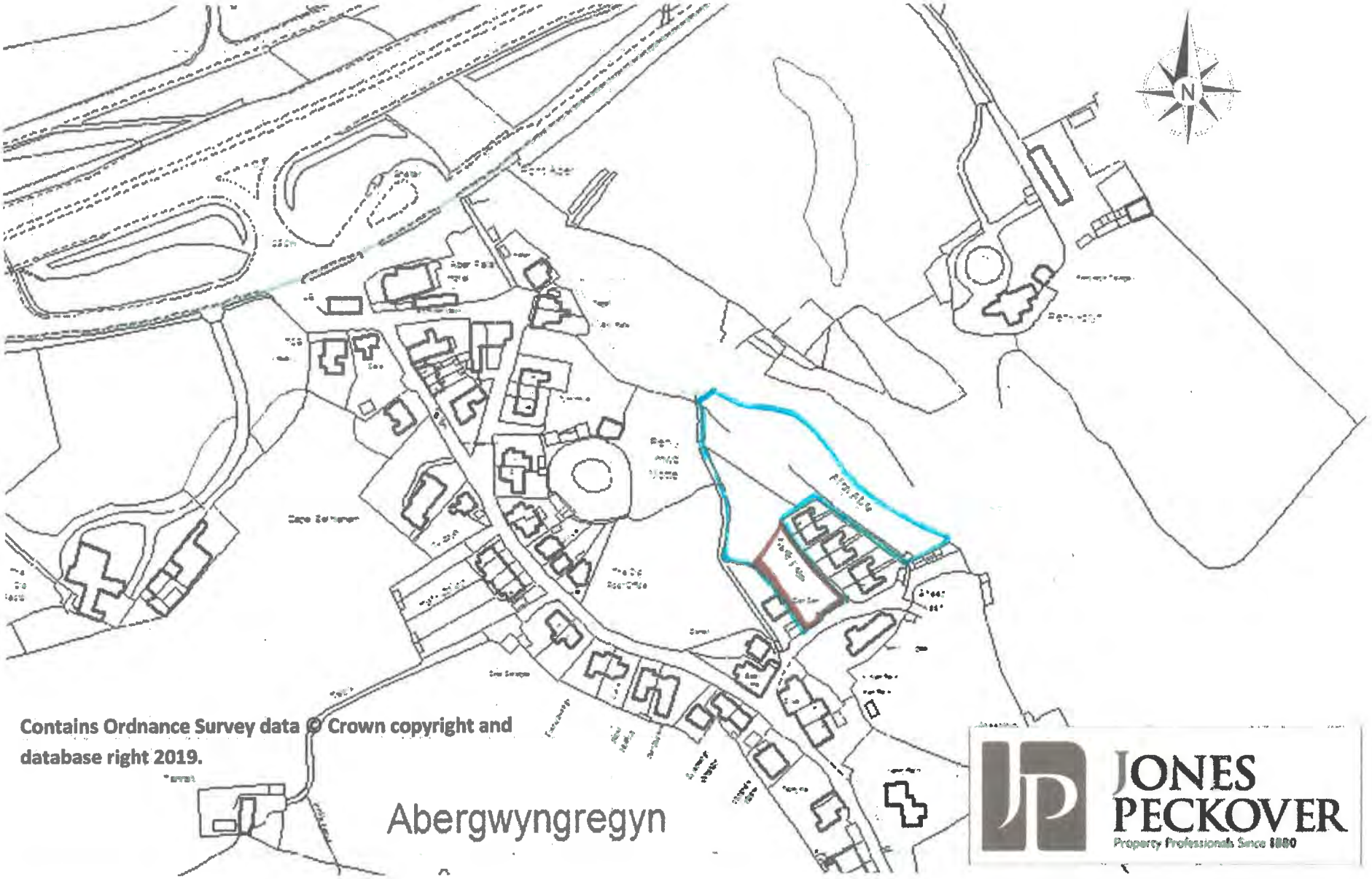

1. English Heritage, 1991, Management of Archaeological Projects
2. English Heritage, 2015, Management of Research Projects in the Historic Environment (MoRPHE).
3. *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1)
4. Johnstone, N. 1994. *Ty'n y Mwd, Aber, excavation*, GAT Report 86.
5. Ordnance Survey First Edition Ordnance Survey 1-inch to 25-mile County Series Map Sheets VII.9, VII.10, VII.13 & VII.14; 1889.
6. Ordnance Survey Second Edition Ordnance Survey 1-inch to 25-mile County Series Map Sheets VII.9, VII.10, VII.13 & VII.14; 1900.
7. Ordnance Survey Third Edition Ordnance Survey 1-inch to 25-mile County Series Map Sheets VII.9, VII.10, VII.13 & VII.14; 1920/21.
8. Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*
9. Standard and Guidance for Archaeological Geophysical Survey (Chartered Institute for Archaeologists, 2014).
10. Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014).
11. Standard and Guidance for the collection, documentation, conservation and research of archaeological materials (Chartered Institute for Archaeologists, 2014).

## FIGURE 01

**Reproduction of Jones Peckover Location Plan, denoting development area (outlined red) targeted for evaluation.**

**LOCATION PLAN – LAND AT CAE'R FELIN, ABERGWYNGREGYN**

**SCALE 1:2500**



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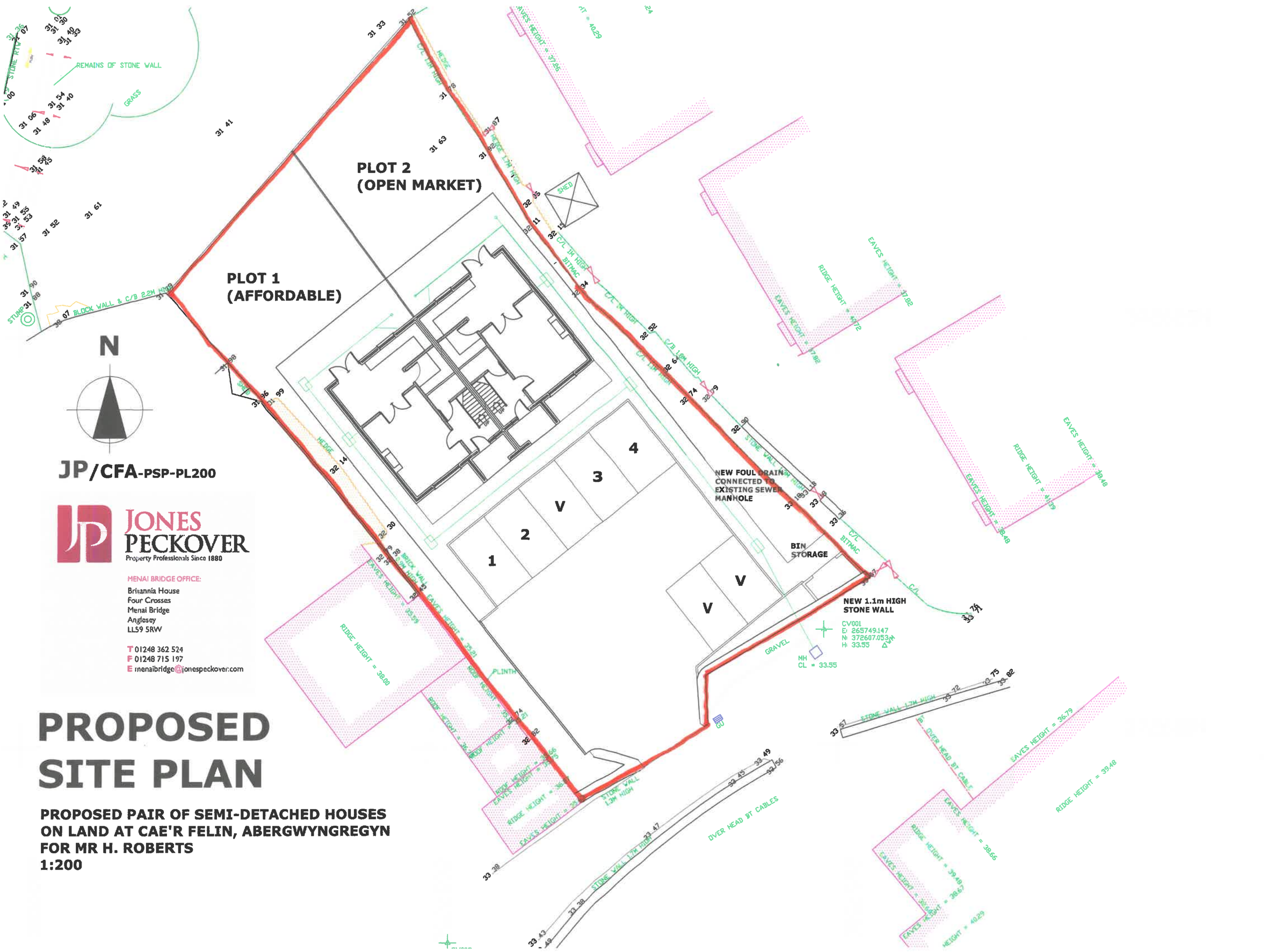
## FIGURE 02

**Reproduction of Jones Peckover Proposed Site Plan, denoting development area (outlined red) targeted for evaluation.**

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# PROPOSED SITE PLAN

**PROPOSED PAIR OF SEMI-DETACHED HOUSES ON LAND AT CAE'R FELIN, ABERGWYNGREGYN FOR MR H. ROBERTS**
**1:200**

Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

Craig Beuno, Ffordd y Garth, Bangor, Gwynedd. LL57 2RT
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