1560

TRAFFWLL PARC SOLAR / PARC SOLAR TRAFFWLL

GWERTHUSIAD ARCHEOLEGOL (AROLWG GEOFFISEGOL) / ARCHAEOLOGICAL EVALUATION (GEOPHYSICAL SURVEY)

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

TRAFFWLL PARC SOLAR / PARC SOLAR TRAFFWLL

Gwerthusiad Archeolegol (Arolwg Geoffisegol) / Archaeological Evaluation (Geophysical Survey)

Yr Amgylchedd Hanesyddol yn Cofnodi Prif Gyfeirnod /
Historic Environment Record Event Primary Reference Number 45939

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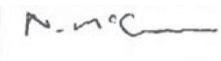
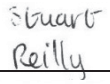
Originated by	Document Author	Neil McGuinness		20/08/20
Reviewed by	Document Reviewer	Stuart Reilly		20/08/20
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Revision History			
Rev No.	**Summary of Changes**	**Ref Section**	**Purpose of Issue**
0.1	Non-tech summary amended	Non-tech summary	SR request
0.2	Correct misspelling of *Traffwll* Correct commissioning organisation and scheme details	Non-tech summary, header, 1 Non-tech summary, 1	Client (TS) request Client (JC) request

CONTENTS

LIST OF FIGURES

CRYNODEB ANHECHNEGOL

Comisiynwyd Ymddiriedolaeth Archaeolegol Gwynedd gan Low Carbon i gynnal arolwg geoffisegol ar draws 65.24 ha o laswelltir fel rhan o raglen raddol o werthuso archaeolegol cyn prosiect arfaethedig Parc Solar Trafwll ar dir yng nghyffiniau pentref Llanfihangel yn Nhowyn, Ynys Môn. Cynhaliwyd yr arolwg dros 4 ardal ar wahân: Ardaloedd 3, 4, 5 a 6. Ni nodwyd unrhyw nodweddion archaeolegol pendant. Nodwyd nodweddion archaeolegol posibl yn Ardaloedd 3 a 4, a oedd yn cynnwys lloc mawr ac iddo argloddiau, twmpathau llosg cynhanesyddol, twmpathau, clastiroedd, odyn a nodwedd bosibl o anheddiad fach hirsgwar a ffos. Mae gweddillion ffiniau caeau tebygol wedi'u nodi yn Ardaloedd 3, 5, a 6 a chyn ffiniau caeau posibl yn Ardaloedd 3, 4, a 5. Yn Ardaloedd 4 a 5, gall y ffiniau caeau gael ei drefnu mewn i systemau caeau amlwg. Mae olion amaethyddiaeth wedi'u nodi yn Ardaloedd 3, 4, a 5. Mae anghysondebau a tharddiad ansicr yn amlwg ym mhob un o'r pedair ardal, allai'r rhain fod yn archaeolegol neu gallai wedi'i greu gan effeithiau neu gallai fod o darddiad modern.

NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust was instructed by Low Carbon to undertake a geophysical survey across 65.24 ha of grassland as part of a staged programme of archaeological evaluation in advance of the proposed Parc Solar Traffwll project on land in the vicinity of the village of Llanfihangel yn Nhowyn, Ynys Môn. The survey was conducted over 4 discrete areas: Areas 3, 4, 5 and 6. No definite archaeological features were identified. Possible archaeological features were identified in Areas 3 and 4, which included a possible large banked enclosure, prehistoric burnt mounds, raised mounds, enclosures, a kiln and a small rectangular possible ditched settlement feature. The remains of probable former field boundaries have been identified in Areas 3, 5 and 6 and possible former field boundaries in Areas 3, 4 and 5. In Areas 4 and 5, the possible field boundaries can be resolved into distinct field systems. The remains of ridge and furrow cultivation have been identified in Areas 3, 4 and 5. Anomalies with an uncertain origin, which may be archaeological but may be created by natural effects or have modern origins, are evident in all four areas.

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was instructed by *Low Carbon* to undertake a series of geophysical surveys in support of a planning application for the Parc Solar Traffwll project, a proposed solar farm on the western side of Ynys Môn. The proposed development will include photovoltaic panels; mounting frames; inverters; transformers and associated cabling; a 33kV distributor network operator substation; onsite substations; deer fencing; and internal service roads and access. The proposed development will take place within agricultural fields spread across four discrete land parcels in the vicinity of the village of Llanfihangel yn Nhowyn, Ynys Môn (Figure 01):

- Area 3 (13.48 ha; NGR SH3379375955; postcode LL65 3SL);
- Area 4 (27.46 ha; NGR SH3412276901; postcode LL65 3SG);
- Area 5 (7.58 ha; NGR SH3457176725; postcode LL65 3SH); and
- Area 6 (16.72 ha; NGR SH3157277674; postcode LL65 3NN).

The geophysical surveys began on Tuesday 14th July 2020 and were completed on Wednesday 5th August 2020. The surveys were undertaken by Karta Geo Ltd. on behalf of GAT and were carried out and reported on 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 geophysical surveys were monitored by the Gwynedd Archaeological Planning Service and was undertaken in accordance with an approved Written Scheme of Investigation (Appendix I). 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 GATHER1289 and the event primary reference number is 45939. 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 (CIfA) and a member of the Federation of Archaeological Managers and Employers (FAME).

1.1 Site Details

NGR / Postcode	Area 3	SH 33793 75955 / LL65 3SL
	Area 4	SH 34122 76901 / LL65 3SG
	Area 5	SH 34571 76725 / LL65 3SH
	Area 6	SH 31572 77674 / LL65 3NN

Location

The four survey areas are located on the western side of Ynys Môn (Figure 01). Area 3 is located 1.5km to the southwest of Bryngwyran, just to the north of the farm at Tai Croesion Newydd (Figure 02). A drainage ditch separates the northern edge of Area 3 from the Castellor AN088 Scheduled Monument and modern fields, and boggy ground and the Afon Crigyll lie to the west. Modern fields and the road from Bryngwran to Llanfaelog lie to the east.

Areas 4 and 5 are located just to the north, 0.5km to the southwest of Bryngwyran (Figure 03). Area 4 sits on the western side of the Bryngwran to Llanfaelog road, to the west of Plas Llechylched Farm. It is bounded on its western side by boggy, waterlogged ground and ponds and the Afon Crigyll, and to the north by the minor road from Llanfihangel yn Nhowyn to Engedi. The site of the former church of St Ulched abuts the southeast side of the area,

Area 5 is located on the opposite, eastern side of the Bryngwran to Llanfaelog Road to Area 4 (Figure 03). It is bounded on its north, south and eastern sides by pasture fields and the Llanfihangel yn Nhowyn to Engedi road forms the boundary at its northeastern corner.

Area 6 is located 100m to the west of Llanfihangel yn Nhowyn, to the north and east of the farm at Glan-y-gors (Figure 04). The minor road, Lon Bach, forms its northern boundary, while marshy ground, the Glan-y-gors farm and Llyn Dinam lie to the

	west. Pasture fields separate the area from Llanfihangel yn Nhowyn to the east and more pasture fields lie to the south.
HER	Gwynedd Archaeological Trust HER
District	Ynys Môn
Parish	Area 3 Llechylched Area 4 Llechylched Area5 Llechylched Area 6 Llanfihangel yn Nhowyn
Topography	All four areas are flat or gently undulating and located on low lying ground with a maximum elevation of 10m AOD. Area 3 contains 6 sub-rectangular fields separated by drystone walls, post and wire fences and drainage ditches. Area 4 consists of 7 subrectangular fields separated by drystone walls, post and wire fences and drainage ditches. Area 5 is a single subrectangular field, bounded by hedgerows, a grown out clawdd and drystone walls. Area 6 consists of 8 sub-rectangular fields, the larger 3 lie on the western side, the smaller and narrower 5 to the east. A trackway from Can-y-gors farm to Lon Bach separates the northwestern field from the main block. A gorse covered outcrop is located in the northwestern field. The fields are bounded by a mixture drystone walling, hedgerows and post and wire fences. The fields on the eastern side of the area are considerably wetter and divided and subdivided by drainage ditches
Current land use	Pasture fields.

Geology

Area 3: Solid: Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, interbedded. Superficial: Till, Devensian - Diamicton (BGS, 2020).

Area 4: Solid: Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, interbedded. Superficial: Till, Devensian - Diamicton (BGS, 2020).

Area 5: Solid: Ordovician Rocks (undifferentiated) - Sandstone and Conglomerate, interbedded to the west. Coedana Complex-Gneiss, Micaceous to the east. Superficial: Till, Devensian - Diamicton (BGS, 2020).

Area 6: Solid New Harbour Group - Mica Schist And Psammite, New Harbour Group – Jasper in northwestern corner. Superficial: Till, Devensian - Diamicton (BGS, 2020).

Soils

Area 3: Slowly permeable seasonally wet acid loamy and clayey soils (Soilscapes, 2020).

Area 4: Slowly permeable seasonally wet acid loamy and clayey soils to the north, freely draining slightly acid loamy soils to the south (Soilscapes, 2020)

Area 5: Freely draining slightly acid loamy soils to the south (Soilscapes, 2020).

Area 6: Slowly permeable seasonally wet acid loamy and clayey soils (Soilscapes, 2020).

Survey methods

Magnetometer survey (fluxgate gradiometer)

Study area

Area 3	13.48 ha
Area 4	27.46 ha
Area 5	7.58 ha
Area 6	16.72 ha
Total size	65.24 ha

1.2 Geophysical survey aims and objectives

The key aim and objective of the geophysical surveys was to:

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

If previously unknown potential archaeological features are identified through geophysical 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 BACKGROUND

The four proposed development areas are within areas of known and potential archaeological activity. An archaeological desk-based assessment and walkover survey report for the proposed development areas was commissioned by Sirius Planning Ltd. A draft version of the report was compiled by Archaeology Wales in 2019 (Garcia Rovira and Sinnot 2019). The report aimed to "highlight and assess the impact upon standing and buried remains of potential archaeological interest" within the proposed development areas (*Ibid.* 1.2). A summary of the draft version of the desk-based assessment's conclusions for each of the survey areas is presented below:

2.1 Area 3 (NGR SH3379375955; Figure 02; Garcia Rovira and Sinnot 2019, 2.9)

No previously recorded archaeological sites were identified within Area 3 however the prehistoric Castellor Hut Settlement (Scheduled Monument AN088) lies immediately adjacent to the area's northwestern boundary and the possibility of encountering archaeological remains associated with the prehistoric site within Area 3 cannot be discounted. The site walkover survey identified two raised mounds (CAG-003/004) that may be prehistoric cairns or may result from more recent field clearance. Analysis of aerial photographs and historic cartographic sources suggested to the authors that the area has been in agricultural use from at least the medieval period onwards and that the preservation of previously unidentified archaeological remains may be relatively good. The current field boundaries within the area have their origins in the mid-late 19th century but there is potential that agricultural remains dating from the Medieval to Post-medieval period may also be encountered within the area.

2.2 Area 4 (NGR SH3412276901; Figure 03; Garcia Rovira and Sinnot 2019, 3.9)

Two known archaeological sites recorded on the Gwynedd HER were identified within Area 4, a Post-medieval sheepfold (GAT HER PRN 28944) and a Post-medieval well (GAT HER PRN 28943). Neither site was identified during the site visit and it was suggested that they may survive as buried remains. Close analysis by this author however suggests that they lie just outside of the western boundary of Area 4. Another site, St Ulched's Church (Site of) (GAT HER PRN 2525) is located immediately adjacent to the southern boundary of Area 4. The church is thought to have been medieval in date, though no standing remains survive. The churchyard wall does survive and forms part of the southern boundary of Area 4. It is possible that the remains of early graves may be located within the part of the area in

proximity to the church site. The site walkover survey identified a circular mound (CAG-005) on the northwestern side of Area 4 which may be prehistoric in origin or may be as a result of more recent field clearance. Analysis of aerial photographs and historic mapping suggests that the area has been in continuous agricultural use since at least the Medieval period and that the current field boundaries largely date to the mid-late 19th century.

2.3 Area 5 (NGR SH3457176725; Figure 03; Garcia Rovira and Sinnot 2019, 4.9)

No known archaeological sites were identified within Area 5 or its immediate environs and no potential sites were identified during the walkover survey or the analysis of lidar data, aerial photographs or historic maps. The authors did state that given the archaeological potential of the wider landscape, as yet unidentified archaeological remains may survive in Area 5 and they may be relatively well preserved due to the historic lack of development within it. Historic maps suggest that the current field boundaries within Area 5 are likely to date to the mid-late 19th century.

2.4 Area 6 (NGR SH3157277674; Figure 04; Garcia Rovira and Sinnot 2019, 5.9)

No known archaeological sites were identified within Area 6 or its immediate environs but a number of known prehistoric sites identified to the north of the area suggest potential for prehistoric activity to be found within it. Two raised mounds were identified in the central part of the area during the walk-over survey (CAG-006). They may be prehistoric cairns or they may result from more recent field clearance. Cartographic sources also indicated the former presence of post-medieval buildings (CAG-010) to the north of the Glan-y-gors farmstead on the western side of the area. Analysis of aerial photographs and historic cartographic sources suggested to the authors that the area has been in agricultural use from at least the medieval period onwards and that the preservation of previously unidentified archaeological remains may be relatively good. The current field boundaries within the area have their origins in the mid-late 19th century.

3 METHODOLOGY

3.1 Introduction

The location and extent of the four survey areas are shown on Figures 02-04 and the details of each area are shown in the table below. The geophysical survey began on Tuesday 14th July 2020 beginning with Area 5, followed by Area 4, Area 3 and finally Area 6 which was completed on Wednesday 5th August 2020.

Area ID	NGR	Figure	Area (ha)
3	SH3379375955	02	14.33
4	SH3412276901	03	27.46
5	SH3457176725	03	7.58
6	SH3157277674	04	16.71

Table 3.1 Survey area details

The geophysical surveys were carried out by a GAT appointed sub-contractor, Karta Geo Ltd. and incorporated the accessible parts of the four areas listed in Table 3.1 and located on Figures 02 to 04.

The survey controls were predefined in AutoCAD by Karta Geo Ltd. prior to the commencement of the fieldwork. Baselines were plotted within each area to ensure comprehensive and even data coverage. The grid points associated with the baselines were exported from CAD then imported into a Leica GS16 RTK Global Positioning System (GPS). This instrument was then used to set out the grid points within the field using bamboo flags as non-magnetic markers.

3.2 Instrumentation

A Bartington cart mounted multi-sensor gradiometer array was used as the primary data collection instrument. The system consists of a two-wheeled cart that is pulled manually along the ground by an operator. The platform is GPS enabled using a mounted Leica GS16 antenna and will host two DL601 data loggers and an array of four Grad-01-1000L fluxgate gradiometer sensors spaced at 1m intervals.

Areas inaccessible to the cart were surveyed with a handheld non-GPS enabled Bartington Grad 601-2 dual fluxgate gradiometer which uses a pair of Grad-01-100L sensors with a 1m separation between the sensing elements and a single DL601 onboard data-logger.

The gradiometers detect variations in the earth's magnetic field 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 and anomalies down to a depth of approximately one meter.

The instruments detect 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.

The instruments were balanced in a magnetically stable area either within or external to the survey areas. The sensors were regularly checked for drift and rebalanced from this position if required.

3.3 Limitations

The success of the magnetometer survey detecting archaeological features is dependent upon a measurable contrast between the anomaly and the surrounding ground. 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 within the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. The presence of ferrous materials, made ground and modern burnt remains can all produce strong responses that can mask the presence of archaeological features.

To ensure data quality, the Bartington cart mounted multi-sensor platform operator is required to follow regular traverses pulling or pushing the survey cart at walking pace. Areas of waterlogged or rough uneven ground, deeply ploughed fields or dense vegetation or crops may restrict the movement of the operator and cart and limit the amount of data collected within these areas. When appropriate, the handheld Bartington Grad 601-2 gradiometer was used in areas inaccessible to the cart, however this survey method also requires the operator to walk along regular traverses at a constant pace and is therefore subject to similar limitations with respect to ground conditions but to a lesser degree.

3.4 Data collection

Data was collected by a field computer mounted on the Bartington cart mounted multi-sensor array using MLGrad-601 software that acquires and records the values provided by the gradiometer loggers as well as the NMEA stream from the GPS receiver. The operator pushes or pulls the cart platform in straight traverses using the baselines for heading references. The software records a GPS position every second with approximately 8 sensor readings between each timestamp. The cart is moved at approximately 1m per second and logs readings at intervals of 0.125m with a traverse interval of 1m. The instrument sensitivity was set at 0.1nT.

Data was collected from the handheld Bartington Grad 601-2 gradiometer's onboard data logger via an RS232 interface using the MLGrad-601 software on the field computer. The instrument takes un-georeferenced readings along parallel traverses on one axis of a 20m x 20m grid. The grids are tied into the Ordnance Survey grid using a Leica GS16 RTK GPS to enable geolocation of the grids post-processing. Marked guide ropes are used to ensure high positional accuracy during the survey. The traverse interval was 1.0m and readings were logged at intervals of 0.25m along each traverse. The instrument sensitivity was set at 0.1nT.

The collected data was downloaded during a mid-day interval and at the end of the shift to monitor quality and the progression of the survey. The client was updated with any issues encountered and notified of any significant anomalies that have been detected.

3.5 Data processing

The downloaded data was imported into MultiGrad601 to process the data files recorded by the MLGrad-601 software. The system geometry was revised, and the results exported as a suitable .XYZ file for importation into Terrasurveyor v.3.0.33.10 software and supplied to GAT by Karta Geo Ltd. for further processing, interpretation and presentation.

During processing, the numeric data are converted to a greyscale plot where data values are represented by modulation of the intensity of a greyscale within a geo-referenced rectangular area corresponding to the data collection point. 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.

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: 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.

3.6 Presentation of results and interpretation

The results of the survey are presented as a minimally processed greyscale plot (raw data clipped to 1 SD) 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 in 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*.

3.7 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).

4 RESULTS

In all of the survey areas, the presence of strongly magnetic anomalies caused by geology, modern structures such as pylons, or modern services has caused a magnetic 'spill' in the data collected by the Bartington cart mounted gradiometer when it was processed and de-striped. The 'spill' can usually be removed in gridded data but was not possible with the GPS composite data sets. As a result, the interpretation of each area is a synthesis of the results from both the minimally processed plot and the de-striped plot.

4.1 Area 3

The survey of Area 3 was conducted across 6 fields (A-F) (Figure 05). All of the fields were accessible for the Bartington cart mounted multi-sensor gradiometer array. The results are presented as a minimally processed greyscale plot (raw data clipped to 1SD; Figure 06), a processed greyscale plot (raw data de-striped and clipped to +/- 5nT; Figure 07) and an interpretative plan (Figure 08). Specific anomalies or groups of anomalies have been given numerical labels prefixed with the number 3 in the text below, as well as on the interpretative plan (Figure 12).

4.1.1 Area 3: Probable Archaeology

No definitive archaeological responses have been identified in the results

4.1.2 Area 3: Possible Archaeology

A poorly defined 'L' shaped weak-moderate linear negative trend with associated positive response has been identified in the northwestern corner of field 3B [3.1]. It appears to represent part of a large rectangular banked and ditched enclosure of unknown date. The feature is weakly defined however and It is also possible that the anomaly is a more recent agricultural feature.

Another possible archaeological anomaly has been identified in the northwestern corner of field 3B close to the stream that runs across its northern boundary. It is visible in the data as an irregular subcircular concentration of high amplitude dipolar responses [3.2]. The anomaly is approximately 10m in diameter and may represent the thermoremenant remains of a prehistoric burnt mound. Field 3B however contains high levels of background magnetic disturbance, presumably from modern debris in the topsoil and it is possible that the anomaly is a concentration of small pieces of modern ferrous or thermoremenant artefacts.

A weak positive curvilinear ditch type trend in the southwest corner of 3B [3.3] with short straight linear weak positive ditch type trends joining it on its eastern side may be the archaeological remains of a subcircular approximately 25m in diameter. Like the rectangular enclosure [3.1] to the north, the feature is very poorly defined however and It is also possible that the anomaly is geological or a more recent agricultural feature.

A low circular mound recorded as CAG-004 during the desk-based assessment is located in the central part of field 3D. It is described in the desk-based assessment as being 40m in diameter and 'composed of medium and large cobbles' (Garcia Rovira and Sinnot 2019, 2.9.1.3). In the field it appeared as a well grazed and relatively well-drained area compared to the more waterlogged edges of the field. It is just visible in the geophysical survey data as a subcircular area of very weak magnetic variability, probably as a result of the magnetically variable nature of the stones used in its construction [3.4]. It has been interpreted as potentially the remains of a prehistoric monument, though it could also be as a result of more recent field clearance. It is unlikely that the feature would have been flagged on the basis of the geophysical survey results alone as the anomaly does not stand out clearly from the background levels of variability in the data.

Another anomaly identified in field 3D may be archaeological in origin. The feature is not noted in the desk-based assessment but it is visible in the 1m lidar data as a small mound approximately 10m in diameter. The feature appears in the survey data as a circular area of dipolar responses [3.5]. Their magnitude suggests that they may well be thermoremenant responses and that the anomaly may represent a prehistoric burnt mound. It is also possible that the anomaly is as a result of more recent dumping of ferrous or thermoremenant material in the field.

A further low circular mound, desk-based assessment asset CAG-003, is located in the centre of field 3E. It is described as being a circa 56m in diameter 'outcrop composed of small cobbles and covered by vegetation' (Garcia Rovira and Sinnot 2019, 2.7.1.12; 2.8.4). Like CAG-004, it has also been interpreted as either a prehistoric cairn or modern field clearance. It was again identifiable during the survey as a well grazed, grassed raised circular area which overlooks the lower-lying more waterlogged surrounding ground. It is represented in the geophysical survey data as a relatively weakly magnetically variable 'noisy' area, probably as a result of its magnetically variable stone construction [3.6]. It also contains weakly magnetically enhanced irregular bands with no obvious trace of definite archaeological features, though there are traces of weak possible curvilinear ditch like trends and possible discreet pit-like features. A weakly enhanced band to the north may be geological in origin or possibly represent the remains of an enclosure ditch, as may ill-defined

traces of moderately magnetically enhanced patches to the east. To the south, part of an irregular band of moderately enhanced material sits parallel with a stronger positive linear ditch type anomaly on a different orientation to the definite geological variations in the field and together, they may represent a former ditched entrance. In addition to the interpretation in the desk-based assessment, the mound may represent a settlement platform of unknown date. However, all of the potential features here may be natural geological anomalies and it should be noted that if the desk-based assessment hadn't flagged this as a potential archaeological site this area would probably have been interpreted as belonging in the uncertain or even geological/natural categories.

4.1.3 Area 3: Former Field Boundaries (probable / possible)

The location of two probable (corroborated) former field boundaries depicted on the 1888 First Edition Ordnance Survey County Series map have been identified on the eastern and central parts of field 3A [3.7]. They are visible as moderate positive straight linear ditch type anomalies with accompanying low negative bank type responses over much of their lengths.

Another possible field boundary [3.8], a moderate positive linear ditch type anomaly that does not appear on any of the historic mapping runs broadly east-west on the eastern side of 3A.

4.1.4 Area 3: Agricultural – Ploughing, Land Drains, Trackway

An area of ridge and furrow, visible as northeast-southwest aligned widely spaced parallel linear anomalies, has been identified in field 3F. Their date is uncertain however they run broadly parallel with the present-day southwestern field boundary and may, therefore, be the result of recent agricultural activity.

Parallel narrow weak linear negative and occasionally positive trends running downslope in field 3B are probably best interpreted as modern land drains. A further network of land drains has been identified in field 3E. They are visible in the survey data as narrow straight linear bipolar anomalies with a typical 'herringbone' pattern. The magnitude of the bipolar response suggests that the drains contain ceramic pipes and represent a relatively modern agricultural improvement.

Two closely spaced weak-moderate negative parallel linear anomalies run across field 3F from the gateway in the southern corner towards the gateway in the centre of the northern boundary. These are most likely to be wheel ruts along the route of a modern farm trackway through the field.

4.1.5 Area 3: Geological

Several clearly defined wide bands and discreet areas of strong positive magnetic response, often with an associated negative halo, have been detected across all of the fields in Area 3. These are responses typical of magnetic variation in the underlying geology, primarily from igneous dykes. These strongly magnetic intrusive dykes may mask the presence of weaker anomalies that might be archaeologically significant.

4.1.6 Area 3: Uncertain Origin

A number of anomalies of uncertain origin, that is anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin, have been identified across Area 3.

A relatively large irregularly shaped area of moderate-strong dipolar magnetic response has been identified on the northeastern side of field 3B [3.9]. There may also be traces of weak negative curvilinear trends that may represent banks partially enclosing the disturbed area. The nature of the responses suggests that it has a modern origin, and may relate to an area of disturbed or made ground, possibly an infilled pond, however, there is no evidence for any such feature in this location on available historic mapping. It is also possible that the area is a concentration of modern ferrous or thermoremenant debris deposited against the field boundary, or possibly even the remains of a ploughed out prehistoric burnt mound.

Just to the south in 3B, two parallel sections of 'C' shaped weak linear trends [3.10] may be part of a small ditched archaeological feature, as may be the moderate linear 'C' shaped ditch type response just to the southeast. The group of anomalies do not represent a coherent archaeological pattern however and they may be pedological or modern agricultural features.

A feint broken linear band of weakly enhanced moderate response to the north of raised mound CAG-004 [3.4] in area 3D may be the remains of an enclosure ditch, however, it seems more likely that the response is geological in origin.

In field 3E, a similar linear band of weakly enhanced positive response to the north of CAG-003 [3.6] may be geological in origin or possibly represent the remains of an enclosure ditch, as may ill-defined traces of moderately magnetically enhanced areas to the east.

Two concentrations of magnetic disturbance [3.11] to the north of CAG-003 [3.6] are less well defined than and lack the surface indications of the possible burnt mound [3.5] to the

north in field 3D and so have been included in the uncertain category. It is still possible they represent disturbed prehistoric burnt mounds, it is also however possible that they are modern dumps of ferrous or thermoremenant material.

An approximately 18m long length of a possible ditch is indicated by a moderate positive polarity linear response in the northern part of field 3F [3.12]. The anomaly is aligned southwest-northeast and runs into an area of high natural response to the northeast which may mask more of it. It may be the remains of a ditched feature, however, it exists in isolation and no conclusive assessment of its exact origin and function is possible. it may also be a geological response or a modern agricultural feature.

Weak-moderate linear trends in field 3A, 3B, and 3F may be the remains of agricultural features such as plough marks the sporadic remains of ridge and furrow agriculture or land drains. Their lack of clear patterning makes it difficult to interpret their origins. Discrete but poorly defined areas of positive response in 3A, 3C and 3F may be cut features such as pits with an archaeological origin or may be tree throws or pedological or geological responses.

4.1.7 Area 3: Ferrous / Magnetic Disturbance

High magnitude ferrous responses close to field boundaries are due to adjacent modern post and wire metal fences and gates.

Smaller-scale ferrous anomalies consisting of a single high magnitude positive anomaly with an associated negative response ("iron spikes") are present throughout the Area 3 data and are characteristic of small pieces of ferrous debris (or brick/tile) in the topsoil; they are commonly assigned a modern origin. They are particularly numerous in field 3B and may be masking archaeological anomalies here. Only the most prominent of these are highlighted on the interpretative plot.

An area of magnetic disturbance is visible crossing the central part of the current field boundary between fields 3B and 3F. This corresponds with a heavily disturbed area either side of the gateway between the two fields. Similarly, an area of magnetic disturbance against the eastern boundary of 3C is probably due to the modern deposition of ferrous or thermoremenant material in a well-used approach to a gateway.

4.2 Area 4

The survey of Area 4 was conducted across 7 fields (A-G) (Figure 9). All of the fields were accessible for the Bartington cart mounted multi-sensor gradiometer array. The results are presented as a minimally processed greyscale plot (raw data clipped to 1SD; Figure 10), a processed greyscale plot (raw data de-striped and clipped to +/- 5nT; Figure 11) and an interpretative plan (Figure 12). Specific anomalies or groups of anomalies have been given numerical labels prefixed with the number 4 in the text below, as well as on the interpretative plan (Figure 12).

4.2.1 Area 4: Probable Archaeology

No definitive archaeological responses have been identified in the results

4.2.2 Area 4: Possible Archaeology

A series of parallel 'L' shaped moderate positive ditch type anomalies have been identified close to the existing field boundary in the northern corner of area 4B [4.1]. Another moderate positive ditch type 'C' shaped anomaly runs parallel with the three northernmost ditches before turning to the south. They may represent the remains of a ditched enclosure of unknown date. A building and enclosure are depicted immediately to the north of the current field boundary on the 1840 Bodedern Tithe Award Map, and these may be later features associated with that activity in the field to the north.

A subcircular area of high amplitude dipolar responses [4.2] has been identified just to the south of [4.1] in area 4B. The anomaly corresponds with the grassed over mound CAG-005 identified in the desk-based assessment described as approximately 26m in diameter and formed by 'cobbles' and thought to be a possible prehistoric cairn (Garcia Rovira and Sinnot 2019, 3.8.3). The responses are possibly thermoremanent (typically +-50nT) produced by a dense area of heat-affected stones. The feature may, therefore, be the remains of a prehistoric burnt mound. It is also possible that the mound results from more recent agricultural clearance and the dipolar responses are due to small ferrous items buried in between the stone 'cobbles'.

Two narrow linear moderate positive ditch type anomalies have been identified on the western side of area 4C [4.3]. The northeast-southwest aligned elements of the ditches are more clearly seen in the unprocessed plot (Figure 10) as the de-striping process has removed them as they lie parallel with the axis of the survey traverses. The northernmost ditch also has an accompanying weak negative response on its eastern side which may

represent the remains of a bank. The southern ditch turns through 90˚ to run southeast before terminating at a field boundary ditch. Together they appear to form two sides of an enclosure of unknown date with an opening or entrance approximately halfway along its northeast-southwest aligned side. The feature is poorly defined however and may be an artefact of survey orientation or be a more recent agricultural feature.

A sub-rectangular ditched feature of weak – moderate positive polarity [4.4] has been identified in the southwest part of 4D. It measures approximately 9m x 8m and may be the remains of a ditched settlement feature of unknown date, it may, however, be a result of natural geological or pedological variation.

A well-defined subcircular area of concentric strong positive polarity (up to 75nT at its centre) with complementary concentric negative responses (-30nT max) and a spur at its eastern side in the western part of 4D may represent a kiln, oven or other burnt themoremenant industrial anomaly of unknown date [4.5]. The anomaly itself measures approximately 16m across, which does seem to be large for a kiln feature. It also appears to be located on a spur on the edge of slightly raised ground in the Lidar data with more low lying ground to the west, and it is possible that the anomaly represents a prehistoric burnt mound on the edge of what might have been a wetter, waterlogged area to the west. It is also possible that it represents an area where more recent repeated burning episodes have taken place. A curvilinear moderative negative bank type anomaly curves northeastwards from the eastern side of the feature, whilst a poorly defined weak to moderate ditch type anomaly runs southwards, together they may form some kind of entrance to the feature. They may also be geological phenomena marking the interface between the higher ground to the east and the lower to the west.

4.2.3 .Area 4: Former Field Boundaries (possible)

A number of features that appear to be field boundaries, none of which appear on the 1888 First Edition Ordnance Survey County Series or the 1843 Llechylched tithe award maps, have been identified in Area 4. A recognisable field system of unknown date has been identified on the western side of field 4A. The field system, arranged broadly on north-south / east-west axes, consists of 7 linear moderate positive linear ditch type anomalies [4.6] defining at least 5 individual subrectangular fields. A weak negative linear response running parallel along the western side of the westernmost ditch may represent an associated bank. A single length of east-west aligned weak positive trend on the western side of the field system may be the remains of a further banked field boundary.

Further evidence for field systems have been identified in field 4B where at least two separate examples may be present. A series of four moderate positive ditch type anomalies [4.7] arranged on similar axes to those in 4A may represent part of the same field system as that seen in the field to the north. Other examples of weak – moderate negative linear responses [4.8] in the central part of 4B appear to represent the remains of a banked field system.

Four moderate positive curvilinear ditch type anomalies and a weak negative probable bank like anomaly [4.9] are located on the western side of field 4C, and again appear to represent the remains of a field system in this area. In the northern part of 4C a moderate negative bank type anomaly [4.10] continues southeastwards on the projected line of the road to its northwest and probably represents the original field boundary which was removed when the section of road to the north was straightened to its run on its current east-southeast alignment.

A number of possible field boundary type anomalies are located in the southern part of Area 4. Ten sections of either straight linear or curvilinear weak to moderate positive ditch type or moderate negative bank type anomalies have been identified in the eastern part of field 4D and fields 4E, 4F, and 4G [4.11]. The field system that they represent is of unknown date.

4.2.4 Area 4: Agricultural – Ploughing, Land Drains

Two areas of ridge and furrow, visible as north-west-southeast aligned widely spaced parallel linear anomalies, have been identified in field 4A, on its western side and in a smaller area in its eastern corner. Their date is uncertain, however, they do not respect the probable field system [4.6] and therefore are not contemporary with them. They are however broadly parallel with the present-day northeastern field boundary and may, therefore, be the result of recent agricultural activity.

The results of modern ploughing (not marked on the interpretative plan), represented by closely spaced parallel linear anomalies, are evident in feilds 4B, 4C, 4D, 4E, 4F, and 4G.

A network of land drains has been identified in field 4A. They appear as narrow straight linear bipolar anomalies in a typical ‘herringbone’ pattern. The magnitude of the bipolar response suggests that they contain ceramic pipes and represent a relatively modern agricultural improvement. Further ceramic land drains have also been identified in the central and western part of field 4D. Narrow weak linear trends in the central and southern part of field 4C are also probably best interpreted as modern land drains.

4.2.5 Area 4: Geological

Several clearly defined wide bands and discreet areas of strong positive magnetic response, often with an associated negative halo, have been detected across all of the fields in Area 4. These are responses typical of magnetic variation in the underlying geology, primarily from igneous dykes. These strongly magnetic intrusive dykes may mask the presence of weaker anomalies that might be archaeologically significant.

4.2.6 Area 4: Uncertain Origin

A number of anomalies of uncertain origin, that is anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin, have been identified across Area 4.

A short north-south aligned weak-moderate positive trend on the western side of the westernmost ditch that is part of anomaly [4.6] in field 4A may be the remains of a ditch or may result from more recent agricultural activity in the field.

In field 4B to the south, two short moderate negative straight linear trends in the northern corner of the field against the field boundary may be two possible banks or buried walls [4.12], their location against the field boundary and proximity to the magnetic disturbance from ferrous boundary features makes any conclusive interpretation difficult. The southernmost anomaly cuts through a sinuous band of weak increased positive response that may be a poorly defined ditch feature or may be a geological or pedological response, as may be the linear band of enhanced positive response emerging from the northeastern side of possible burnt mound [4.2].

Two poorly defined weak trends [4.13], one circular and weakly negative and one ‘C’ shaped and weakly positive, have been identified to the south of anomaly [4.1]. Their shape could indicate features of possible interest; however, the responses are too poorly defined and confused by the effects of modern ploughing to permit even a tentative archaeological classification and non-archaeological causes (agriculture, natural) should also be considered.

Two discreet small areas of moderate-high positive polarity in the southwestern part of 4B [4.14] lack an associated strong negative dipolar response and may represent areas of burning such as hearths, although they could be of modern origin. They could also however still result from ferrous metal debris. A very poorly defined ‘L’ shaped weak negative linear trend [4.15] on the eastern side of 4B may be the remains of a banked or walled enclosure or structure, or may result from more recent agricultural activity. Other poorly defined weak

linear trends on the southern and eastern eastern side of field 4B may be poorly defined field boundary ditches, modern land drains or be due to another modern agricultural cause.

A semi-circular band of very weakly enhanced positive response [4.16] up to 5m wide with a spur at its southern end has been identified on the north side of field 4C. The eastern side of it appears to be visible as a slope in the Lidar data. It may be part of an enclosure, perhaps related to the field system [4.9] or, perhaps more likely given its width and poor definition, represents an anomaly of geological origin. Two parallel weak linear trends inside its boundary, also faintly visible on the Lidar as a slight linear hollow, may be a modern agricultural artefact, or perhaps the fragmentary remains of a trackway of unknown date.

Weak linear trends in the northern part of 4C do not form any coherent pattern and a combination of agricultural, natural and modern origins seems likely.

Very poorly defined 'weak negative linear trends in the southern part of 4C just to the north of Plas-Llechylched [4.17] may possibly represent the remains of two superimposed banked or walled rectangular enclosures or structures, but an agricultural or modern origin cannot be discounted. The high levels of disturbance in the background data here, probably as a result of ground disturbance by stock from the nearby farm, also adds to the difficulties of forming a firm conclusion, likewise with the nearby straight linear weak trends and the weak curvilinear trend recorded to the east which may be archaeological but may be a stock worn trackway around a raised area of ground visible in the lidar data.

Two poorly defined weak straight linear trends close to the southern boundary of 4C may represent more of the remains of the field system [4.19], but may equally be modern land drains or other agricultural anomalies.

A poorly defined band of enhanced positive response has been identified to the south of rectangular ditched feature [4.4] in field 4D. This may represent the remains of a ditch, or may have a geological origin. A discrete circular area of weak-moderate positive response approximately 6m in diameter, just to the south of the southern ditch associated with the burnt feature [4.5], may represent a large pit of archaeological interest, but could equally be a geological or pedological anomaly, a tree throw, or have a more modern origin.

A number of long, narrow straight linear or curvilinear weak to moderate negative anomalies of uncertain origin have been identified in 4D, 4E, and 4F. It is possible that they represent the remains of field boundary ditches, however their form suggests that they are most likely land drains or, in the case of the curvilinear examples, modern agricultural phenomena such as stock worn trackways.

4.2.7 Area 4: Ferrous / Services / Magnetic Disturbance

High magnitude ferrous responses close to field boundaries are due to adjacent modern post and wire metal fences and gates. Ferrous responses in the southeast corners of fields 4A and 4C are due to adjacent agricultural buildings. Four ferrous metal electricity pylons carrying overhead lines from southeast to northwest in Area 4 have also caused significant circular areas of high magnitude responses in fields 4B and 4C. Smaller but still substantial areas of ferrous disturbance in the fields are caused by ferrous metal stock feeders.

Smaller-scale ferrous anomalies consisting of a single high magnitude positive anomaly with an associated negative response ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick/tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretative plot.

Strong bipolar linear anomalies running into field 4C from its southern boundary are representative of buried services, either ferrous metal pipes or cables.

Areas of weak scattered magnetic debris are visible close to the field boundaries on the eastern side of field 4A and the southern side of field 4C. These are most likely of modern origin, and represent small pieces of ferrous/magnetic debris or rubbish within the topsoil dumped from the other side of the field boundary. A spread of magnetic debris to the northeast of the possible burnt mound [4.2] may represent a spread of burnt stone from the mound itself (if that's what it is) or be more modern debris.

4.3 Area 5

Area 5 comprises a single field (Figure 9) which was accessible for the Bartington cart mounted multi-sensor gradiometer array. The results are presented along with those for Area 4 as a minimally processed greyscale plot (raw data clipped to 1SD; Figure 10), a processed greyscale plot (raw data de-striped and clipped to +/- 5nT; Figure 11) and an interpretative plan (Figure 12). Specific anomalies or groups of anomalies have been given numerical labels prefixed with the number 5 in the text below, as well as on the interpretative plan (Figure 12).

4.3.1 Area 5: Probable Archaeology

No definitive archaeological responses have been identified in the results.

4.3.2 Area 5: Possible Archaeology

No responses thought to be possibly archaeological in nature have been identified in the results.

4.3.3 Area 5: Former Field Boundaries (probable / possible)

The location of a probable (corroborated) former field boundary depicted on the 1888 First Edition Ordnance Survey County Series map has been identified running north-south across the centre of Area 5 [5.1]. It is marked by a wide linear band of magnetic disturbance, probably resulting from strongly magnetic material being used to infill the former ditch and subsequently being spread by ploughing. Two parallel linear weak-moderate negative bank type anomalies running east-northeast from the southeast corner of the area probably represent an access trackway between former fields, the western end of which is depicted on the 1843 Llechylched Tithe Award map. A third probable field boundary [5.3] has been identified in the central-southern part of Area 5. Though partly obscured by natural geological variation on its southern side, it can just be made out as a linear weak positive ditch like trend with an associated negative response. It is aligned on the same northwest-southeast orientation as the existing field boundary to the southeast and appears to be an extension of it.

Two groups of possible field boundaries that appear to form two distinct field systems have been identified on the western side of Area 5. The first, [5.4], consists of straight linear moderately positive ditch type anomalies that appear to define a group of 5 sub-rectangular fields. The second group, [5.5], are weaker positive linear ditch type trends with an

associated weak negative, bank-like, response that form a field system whose main axes are approximately 15 degrees different to those of [5.4]. Neither group appears to respect the probable field boundary/ trackway [5.2] and they do not appear on the 1888 Ordnance Survey map so they most likely predate the earliest available historic mapping for the area.

Two more possible field boundaries have also been identified that cannot be conclusively included as part of either of the field systems [5.4] or [5.5] discussed above. A weak negative ditch like response runs parallel with the field boundaries/trackway [5.2] for a short distance at its western end. A further a weak negative trend to the east of the trackway and the area of geological disturbance seems to continue the line of its northern bank. It is therefore possible that both of these features are broadly contemporary with the field boundaries / trackway [5.2] depicted on the 1843 Tithe Award map.

4.3.4 Area 5: Agricultural – Ploughing

An area of ridge and furrow, visible as broadly east-west aligned widely spaced parallel linear anomalies, has been identified in Area 5 in its northeastern corner.

The results of modern ploughing (not marked on the interpretative plan) are visible as a series of west-southwest-east-northeast aligned closely spaced parallel linear anomalies on the western side of Area 5.

4.3.5 Area 5: Geological

A wide band of strong positive magnetic response, often with an associated negative halo, has been detected across running broadly north-south across Area 5. These are responses typical of magnetic variation in the underlying geology, primarily from igneous dykes. The strongly magnetic intrusive dyke may mask the presence of weaker anomalies that might be archaeologically significant.

4.3.6 Area 5: Uncertain Origin

Several anomalies of uncertain origin, that is anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin, have been identified in Area 5.

In the southeast corner of the field, a group of weak subcircular and linear positive anomalies [5.6] may represent the remains of a cluster of banked or walled structures up to 10m in diameter that may be of archaeological interest. Their poor definition suggests however that

a geological or modern agricultural origin may be more likely. Similarly, a smaller group of sub-circular ‘c’ shaped weak negative ditch like anomalies on the eastern edge of Area 5 [5.7] are most likely pedological, geological or result from modern agricultural practices.

A number of other weak linear and curvilinear trends of uncertain origin have been identified across Area 5. None are part of any recognisable pattern and may be archaeological or result from agricultural or natural processes.

4.3.7 Area 5: Ferrous / Magnetic Disturbance

High magnitude ferrous responses close to field boundaries are due to adjacent modern post and wire metal fences and gates. A ferrous metal electricity pylon carrying overhead lines from southeast to northwest across Area 5 and into Area 4 has also caused a significant circular area of high magnitude response close to the field boundary in the central part of Area 5. Smaller but still substantial areas of ferrous response in the field are caused by metal stock feeders.

Smaller-scale ferrous anomalies consisting of a single high magnitude positive anomaly with an associated negative response ("iron spikes") are present throughout the Area 5 data and are characteristic of small pieces of ferrous debris (or brick/tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretative plot.

As was discussed in sec 4.3.3 above, a north-south aligned wide linear band of magnetic disturbance identified at the centre of Area 5 probably results from strongly magnetic material being used to infill the former field boundary [5.1] and subsequently being spread by ploughing.

4.4 Area 6

Area 6 comprises 8 fields. The larger 2 fields on the west side of the area, 6A and 6B, were largely accessible to the Bartington cart mounted multi-sensor gradiometer array. Parts of the western side of 6A could not be surveyed as the ground here consists of a gorse covered rock outcrop and and wet ground the density of reeds on the eastern side of 6B prevented full coverage in this field. Ground conditions on the eastern side of the survey area presented problems and the survey of two fields there was abandoned due to the density of reeds and the nature of the wet boggy ground. Four fields, 6C, 6D, 6E and 6F were partially surveyed using the handheld Bartington Grad 601-2 dual fluxgate gradiometer but vegetation and ground conditions prevented full coverage within them. In total 6.82 ha (40.81%) of the 16.72 ha of Area 6 was surveyed (Figure 13).

The results of the survey are presented as a minimally processed greyscale plot (raw data clipped to 1SD; Figure 14), a processed greyscale plot (raw data de-striped and clipped to +/- 5nT; Figure 15) and an interpretative plan (Figure 16). Specific anomalies or groups of anomalies have been given numerical labels prefixed with the number 6 in the text below, as well as on the interpretative plan (Figure 16).

4.4.1 Area 6: Probable archaeology

No definitive archaeological responses have been identified in the results.

4.4.2 Area 6: Possible Archaeology

No responses thought to be possibly archaeological in nature have been identified in the results.

4.4.3 Area 6: Former Field Boundaries (probable)

The location of a probable (corroborated) former field boundary depicted on the 1840 Llanfihangelynnhowyn Tithe Award map and the 1888 First Edition Ordnance Survey County Series map has been identified running from west-northwest to east-southeast across the eastern side of field 6A [6.1]. It should be noted that the location of the boundary is indicated by a very weak positive linear trend and a slight concentration of dipolar responses from small pieces of ferrous debris or brick/tile that appear to have accumulated within or against the ploughed out / infilled feature; without the lidar and mapping evidence it is unlikely that any significance would have been assigned to them.

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4.4.4 Area 6: Agricultural – Land Drains

A narrow moderate negative straight linear anomaly has been identified running across the northern half of area 6B. Its form and appearance suggest it is most likely a modern land drain.

4.4.5 Area 6: Geological

A wide band of variable response in field 6B and an irregular shaped area in field 6C are suggestive of natural magnetic variation in the underlying geology or soils.

4.4.6 Area 6: Uncertain Origin

A number of anomalies of uncertain origin, that is anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning give little clue as to their origin, have been identified in Area 6.

In the northeastern corner of field 6A, an area of variable response may represent disturbed ground or may be due to underlying geological variation.

Poorly defined weak positive curvilinear ditch like trends [6.2] in the southern part of 6A may be features of archaeological interest, however they are more likely be localised pedological variations or modern agricultural features.

In field 6B an area of variable response [6.3] appears to be bounded on its western side by a straight linear weak-moderate negative bank like anomaly that runs southeast-northwest before turning to run southwest-northeast. The possible bank may have two spurs that run off for a short distance to the southwest. The anomalies may be archaeological in nature however they are confused and difficult to interpret in any meaningful archaeological sense. They may also be as a result of more recent ground disturbance or the underlying geology.

Two other narrow straight linear anomalies, one moderately negative and bank like and one moderately positive and ditch like, to the south and west of [6.3] in field 6B may be of archaeological interest as they may form two sides of the corner of a rectangular enclosure. It is equally possible however that they represent more recent agricultural features such as land drains. A poorly defined negative linear trend to the south of [6.3] crosses the possible bank like element of [6.4] and again, may be archaeological or equally may be a modern agricultural feature.

A cluster of moderate positive discreet anomalies [6.5] in the northeastern corner of the field may represent cut archaeological features such as small pits, they do not however form any coherent pattern and may be modern or caused by naturally magnetic igneous erratics in the soil.

A variety of different anomalies of uncertain origin are visible in field 6D. Five discreet high magnitude subcircular anomalies with an associated negative halo [6.6] may represent the remains of hearths, however they are perhaps more likely to be large modern ferrous objects in the topsoil. Nearby irregular areas of low magnitude enhanced response may be cut archaeological features such as pits however they may also result from natural variation in the local soil.

A poorly defined linear 'L' shaped weak positive ditch like anomaly to the southeast in field 6D may be the remains of the corner of a ditched feature, it may also be natural variation in an area with high levels of background variability.

A stronger moderate negative polarity linear ditch like anomaly in the central-eastern part of field 6D may represent a short section of ditch of archaeological origin. Only a short length is visible however and little can be said about its origin (it may be a modern agricultural feature) or it's function due to the fragmentary nature of the remains.

Similarly, a short length of a weak negative curvilinear trend in the northeastern corner of 6D may be the remains of a bank, however little can be said of its original purpose or whether it is an archaeological, modern agricultural or natural anomaly.

A moderative negative curvilinear trend on the eastern side of field 6F [6.7] is partly masked by an area of magnetic disturbance at its western end. It may also continue to the north of the magnetic disturbance. It is possible that it represents the remains of a subcircular enclosure ditch, however too little of it remains to draw any firm conclusions on its origin ore function. It seems to be associated and possibly even enclose an area of enhanced magnetic variability however this may extend beyond the northern and southern limit of the survey in 6F and may be natural in origin and result from variability in the drift geological deposits here or modern agricultural (stock) disturbance.

4.4.7 Area 6: Ferrous / Services / Magnetic Disturbance

High magnitude ferrous responses close to field boundaries are due to adjacent modern metal post and wire fences and gates.

Smaller-scale ferrous anomalies consisting of a single high magnitude positive anomaly with an associated negative response ("iron spikes") are present throughout the Area 5 data and are characteristic of small pieces of ferrous debris (or brick/tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretative plot.

A very high magnitude positive linear anomaly with an associated strong negative response producing a band of magnetic disturbance up to 30m wide runs through fields 6A and 6C. This has been caused by a substantial buried ferrous metal service pipe or cable. Vey high amplitude straight linear bipolar responses in fields 6A , 6B and 6C also mark the location of buried services, either ferrous metal pipes or cables

A substantial area of magnetic disturbance is evident in the northeastern corner of Area 6 in field 6E, and to a lesser extent in field 6F. There are no obvious surface causes for the responses. They most likely result from strongly magnetic material being dumped in the field, perhaps to create an informal trackway into the marshy ground.

5 DATA APPRAISAL AND CONFIDENCE ASSESSMENT

English Heritage guidelines (English Heritage, 2008, Table 4) states that the results of magnetometer survey can be average to poor over sandstone and conglomerate solid geology (Areas 3, 4 and 5) and can be effective over metamorphic solid geology (Area 6). Magnetic response is generally poor on glacial till drift geologies (all areas). Despite this, this the magnetometer survey has yielded evidence of possible archaeological features in Areas 3 and 4, anomalies of uncertain origin across all areas and former field boundaries in Areas 3, 4, 5 and 6. The former boundary in Area 6 was, however, difficult to discern and other now removed boundaries recorded on historic mapping could not be identified in this area. Significant strong geological anomalies were detected in Areas 3, 4 and 5 in the form of igneous dykes which would mask any archaeological features present within their footprint as would the strong response from the pylons in Areas 4 and 5 and the modern service in fields 6A and 6C. Consequently, the technique is likely to have detected any substantial archaeological features away from areas of geological or modern magnetic disturbance in Areas 3, 4 and 5, but the lack of possible archaeological features and known historic field boundaries in the data for Area 6 means that less confidence can be assigned to the conclusivity of the results there. It is also possible that archaeological features remain undetected in all areas due to the broader nature of the local geology.

6 CONCLUSIONS AND RECOMMENDATIONS

The magnetometer survey of Areas 3, 4, 5 and 6 did not reveal any probable archaeological anomalies.

Anomalies of possible archaeological provenance have been identified in Areas 3 and 4. In Area 3 a possible large banked enclosure [3.1], two possible prehistoric burnt mounds [3.2; 3.5] a possible subcircular enclosure [3.3] and the two raised mounds that may be prehistoric monuments recorded in the desk-based assessment (CAG-003; [3.6]) and CAG-004; [3.4]) have been identified. In Area 4, the corner of a possible ditched enclosure [4.1], a possible prehistoric burnt mound recorded in the desk-based assessment as a possible prehistoric cairn (CAG-005; [4.2]), an enclosure [4.3], a small rectangular possible ditched settlement feature [4.4] and a possible kiln site [4.5] have been recorded.

Former field boundaries recorded on 19th century historic maps have been identified in Areas 3, 5 and 6. Anomalies which appear to represent field boundaries not recorded on historic maps have been identified in areas 3, 4 and 5. In Areas 4 and 5 these possible field boundaries can be resolved into distinct field systems. The remains of ridge and furrow cultivation have been identified in Areas 3, 4 and 5 and modern ploughing is evident in Areas 4 and 5. Land drains and other modern agricultural features have been identified in Areas 3, 4 and 6. The locations of modern services have been mapped in Areas 4 and 6. Anomalies of uncertain origin which may be of archaeological interest but may have a modern or natural origin have been identified in all four areas.

It is possible that archaeological anomalies have not been detected in some parts of the survey areas. Strong linear geological responses from igneous dykes may mask the presence of potential archaeological anomalies in Areas 3, 4 and 5 and the ground conditions in Area 6 meant that only 40% of the area was accessible for survey.

Given the identification of possible archaeological remains in Areas 3 and 4, it is recommended that a further programme of archaeological evaluation (trial trenching or targeted excavation) is implemented for them to verify their existence and determine their character, function and date. Targetting elements of the field systems in Areas 4 and 5 would allow their character and level of survival to be recorded and could produce dating evidence and allow some assessment of phasing. A selection of the anomalies of uncertain origin in all four areas might also be considered as candidates for further evaluation and trial trenching in apparently archaeologically sterile or unsurveyed areas might also be useful

given the possibility of undetected archaeological features. Any further archaeological evaluation should take place prior to the commencement of any proposed construction related groundwork.

7 SOURCES CONSULTED

Chartered Institute for Field Archaeologists, 2014, *Standard and Guidance for Archaeological Geophysical Survey*

English Heritage, 1991, *Management of Archaeological Projects*

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*

English Heritage, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*

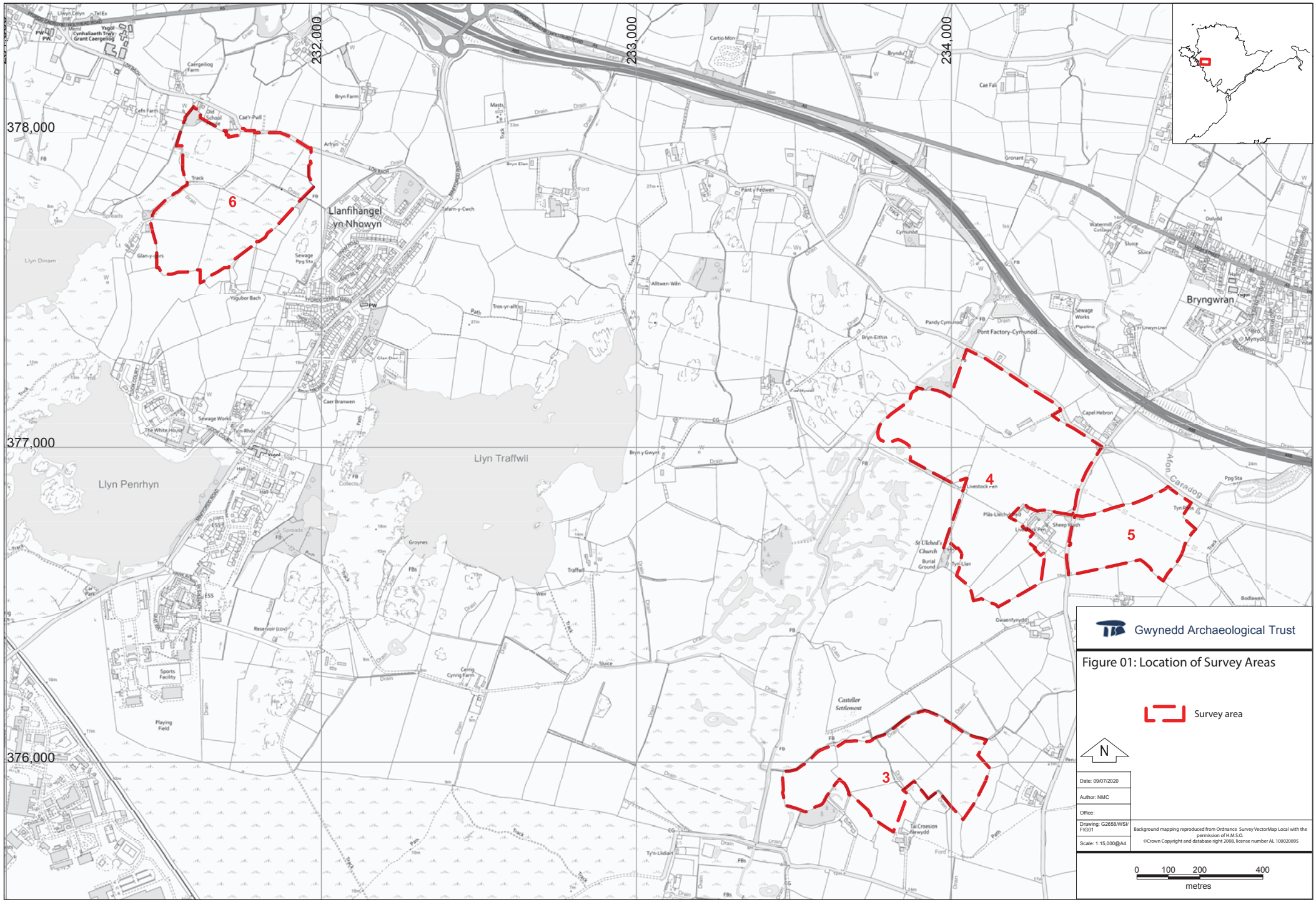
European Archaeological Council, 2015, *Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*

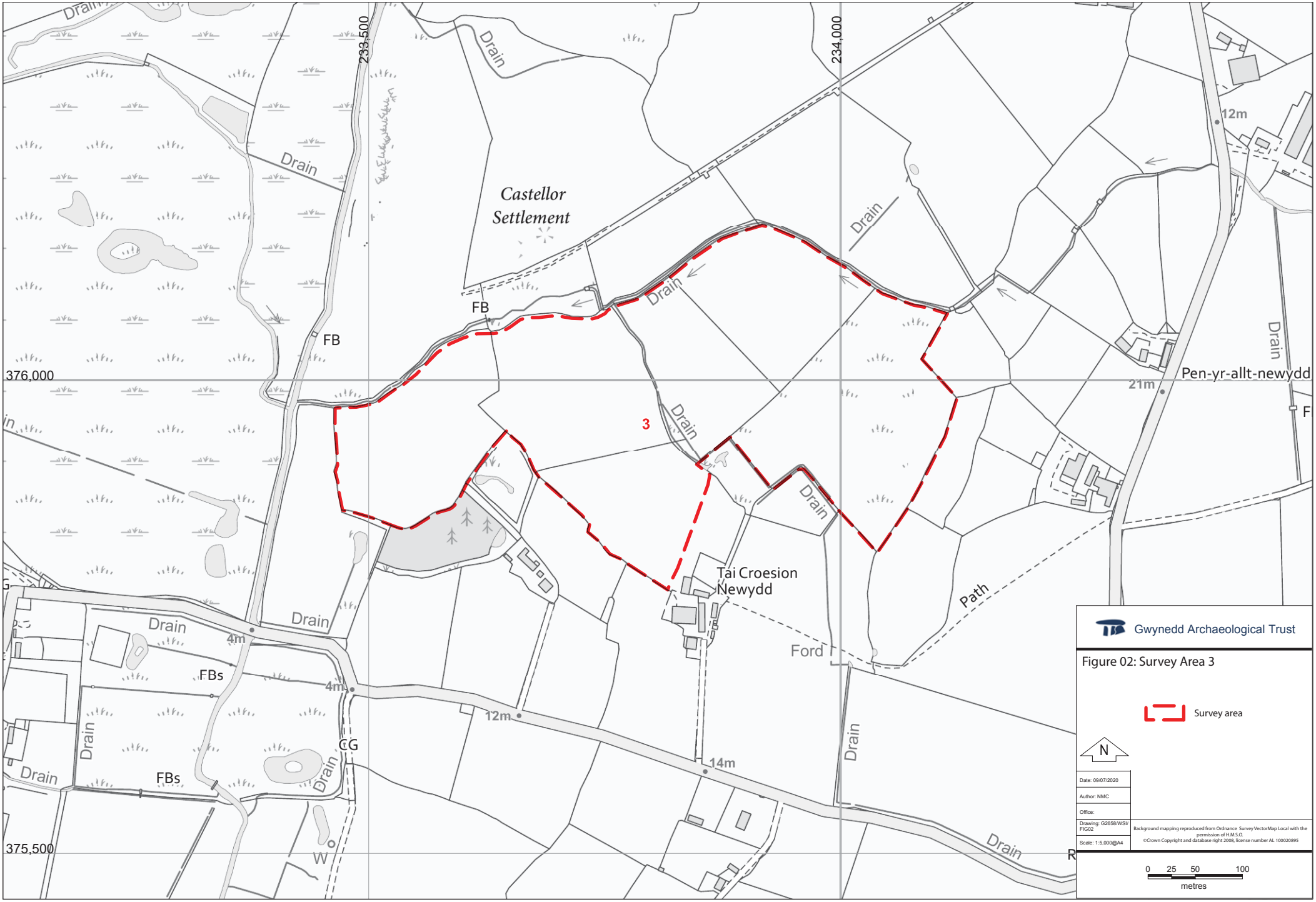
Garcia Rovira, I, and Sinnot, S, 2019, *Caergeiliog, Anglesey: Desk Based Assessment and Site Visit*, Archaeology Wales Report 1758 (draft version)

Royal Commission on Ancient and Historic Monuments of Wales, 2015, *Guidelines for digital archives*

The Welsh Archaeological Trusts, 2018, *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1)

FIGURES


232,000
233,000
234,000
378,000
377,000
376,000
6
4
5
3
Llanfihangel yn Nhowyn
Llyn Dinam
Llyn Penrhyn
Llyn Traffwll
Bryngwran
Alon Caradog
Castellor Settlement
St Ulched's Church
Gwynedd Archaeological Trust
Figure 01: Location of Survey Areas
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG01
Scale: 1:15,000@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 100020895
0 100 200 400
metres


Drain
233,500
234,000
Castellor
Settlement
FB
376,000
3
Pen-yr-allt-newydd
12m
21m
Tai Croesion
Newydd
Path
Ford
4m
FBs
14m
375,500
Gwynedd Archaeological Trust
Figure 02: Survey Area 3
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG02
Scale: 1:5,000@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 100020895
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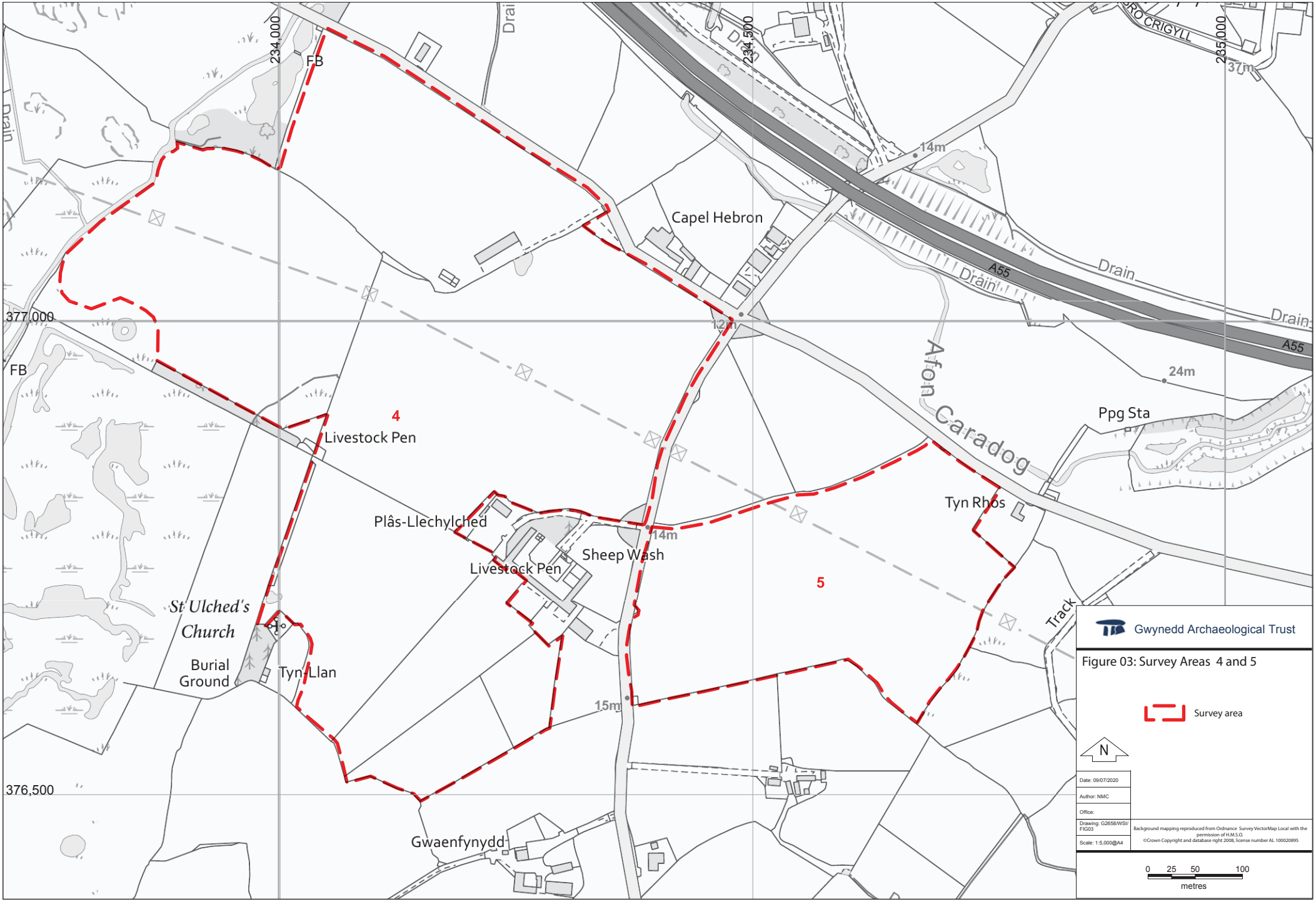
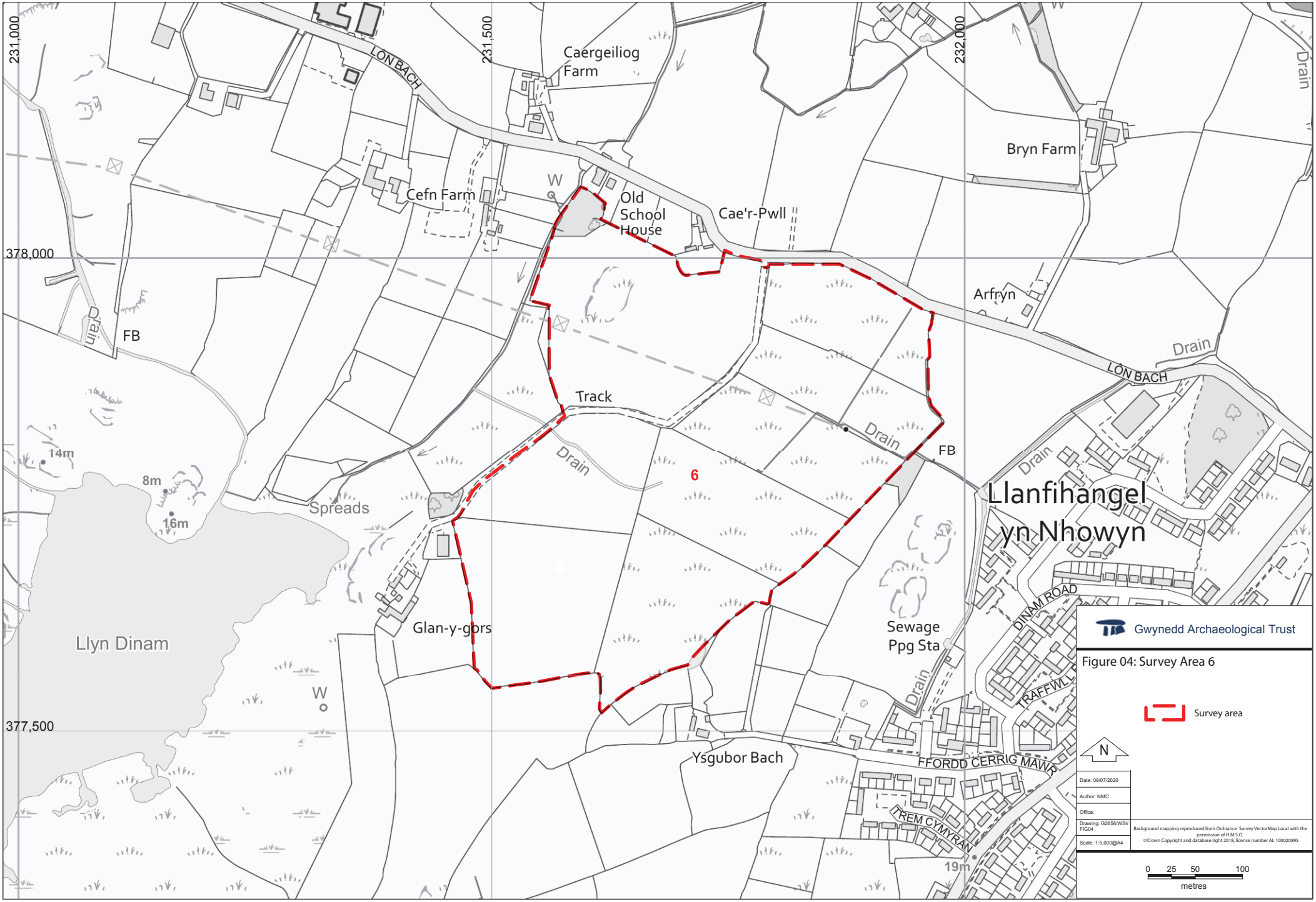
metres


234,000
234,500
235,000
377,000
376,500
FB
Drain
Capel Hebron
A55
Afon Caradog
Ppg Sta
Tyn Rhos
Plâs-Llechylched
Sheep Wash
Livestock Pen
Livestock Pen
4
5
St Ulched's Church
Burial Ground
Tyn-Llan
Track
Gwaenfynydd
14m
12m
24m
15m
37m
Gwynedd Archaeological Trust
Figure 03: Survey Areas 4 and 5
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG03
Scale: 1:5,000@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 100020895
0 25 50 100
metres



Gwynedd Archaeological Trust

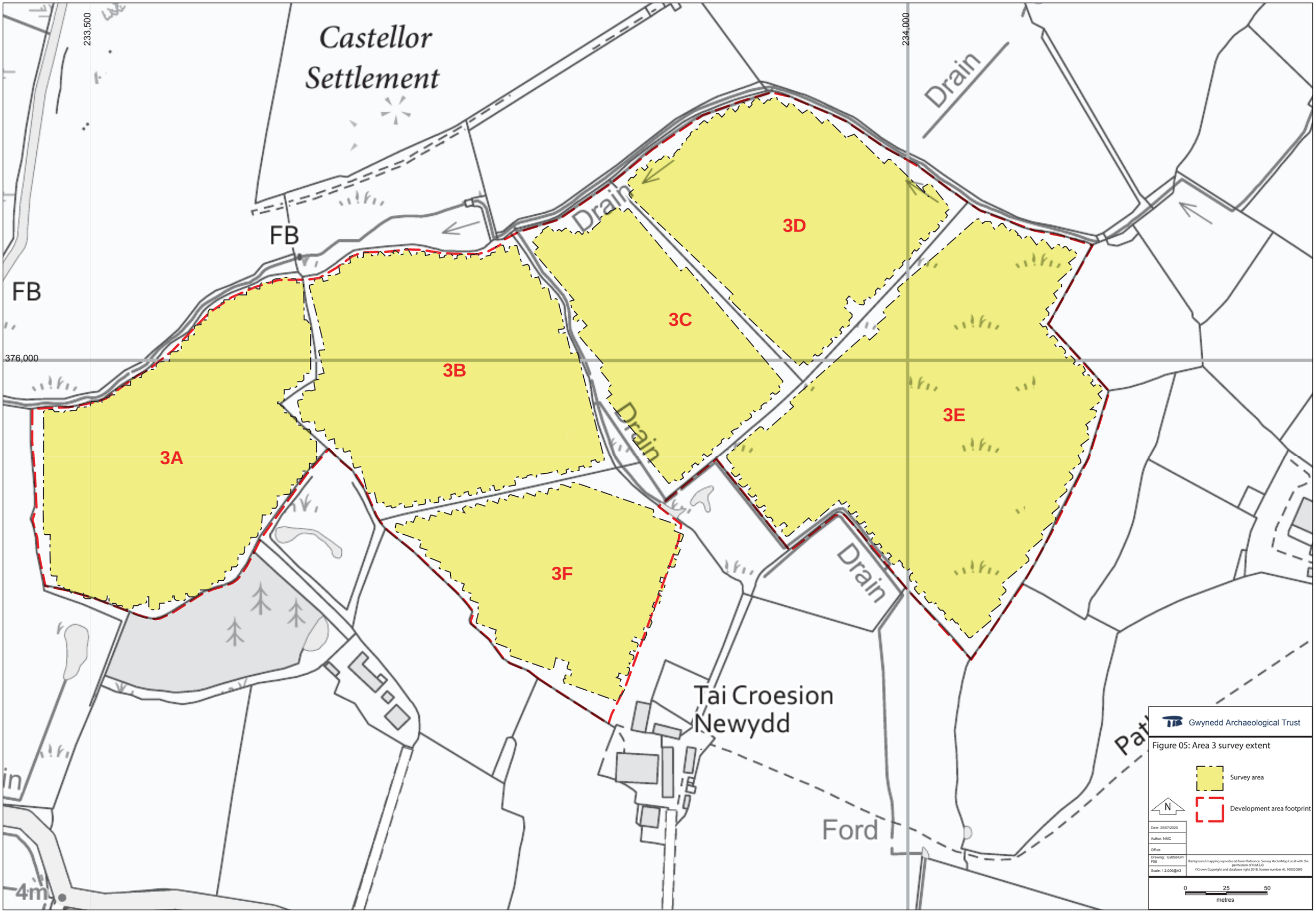
Figure 04: Survey Area 6

Survey area

N

Date: 09/07/2020	
Author: NMC	
Office:	
Drawing: G2658/WSI/FIG04	Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
Scale: 1:5,000@A4	©Crown Copyright and database right 2018, license number AL 100020895

0 25 50 100
metres


Castellor
Settlement
233,500
234,000
376,000
FB
FB
Drain
Drain
Drain
Drain
3A
3B
3C
3D
3E
3F
Tai Croesion
Newydd
Ford
4m
Gwynedd Archaeological Trust
Figure 05: Area 3 survey extent
Survey area
Development area footprint
N
Date: 25/07/2020
Author: NMC
Office:
Drawing: G2658/GP/F05
Scale: 1:2,000@A3
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
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0
25
50
metres

Castellor Settlement

233,500

234,000

376,000

Drain

FB

FB

3A

3B

3C

3D

3E

3F

Drain

Drain

Tai Croesion Newydd

Ford

-4m

Gwynedd Archaeological Trust

Figure 06: Area 3 minimally processed plot (raw data clipped to 1SD)

13.75 nT

-3.62 nT

-20.98 nT

N

Date: 04/08/2020	
Author: NMC	
Office:	
Drawing: G2658/GP/F06	Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
Scale: 1:2,000@A3	©Crown Copyright and database right 2018, license number AL 100020895

0 25 50

metres


Castellor
Settlement
233,500
234,000
376,000
FB
FB
Drain
Drain
Drain
Drain
3A
3B
3C
3D
3E
3F
Tai Croesion
Newydd
Ford
4m
Gwynedd Archaeological Trust
Figure 07: Area 3 processed plot
(destriped, clipped +/-5 nT)
5.53 nT
-0.01 nT
-5.50 nT
N
Date: 04/08/2020
Author: NMC
Office:
Drawing: G2658/GP/F07
Scale: 1:2,000@A3
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2018, license number AL 100020895
0
25
50
metres

233,500

234,000

376,000

3A

3B

3C

3D

3E

3F

3.1

3.2

3.3

3.4

3.5

3.6

3.7

3.8

3.9

3.10

3.11

3.12

Gwynedd Archaeological Trust

Figure 08: Area 3 geophysical survey interpretative plan

- Possible archaeology (discrete/enhanced response/trend)
- Uncertain (discrete/enhanced response/trend)
- Former field boundary (probable/possible)
- Ridge and furrow
- Land drain
- Modern trackway
- Natural
- Ferrous/magnetic disturbance

N

Date: 25/07/2020	
Author: NMC	
Office:	
Drawing: G2658/GP/F08	
Scale: 1:2,000@A3	

0 25 50

metres

234,000

234,500

377,000

376,500

FB

4A

4B

4C

4D

4E

4F

4G

5

Capel Hebron

Livestock Pen

Plâs-Llechylched

Livestock Pen

Sheep Wash

St Ulched's Church

Burial Ground

Tyn-Llan

Tyn Rhos

Track

A55

Drain

Drain

Drain

Afon Caradog

Ppg Sta

14m

12m

14m

15m

24m

Gwynedd Archaeological Trust

Figure 09: Areas 4 and 5 survey extent

Survey area

Development area footprint

N

Date: 25/07/2020

Author: NMC

Office:

Drawing: G2658/GP/F09

Scale: 1:3,000@A3

0 20 40 80

metres

4A
4B
4C
4D
4E
4F
4G
5
Capel Hebron
A55
Drain
Drain
Drain
Afon Caradog
14m
12m
15m
24m
Ppg Sta
Track
Sheep W
Livestock Pen
St Ulched's Church
Burial Ground
Tyn
234,000
234,500
377,000
376,500

Gwynedd Archaeological Trust

Figure 10: Areas 4 and 5 minimally processed plot (raw data clipped to 1SD)

13.75 nT
-3.62 nT
-20.98 nT

N

Date: 25/07/2020
Author: NMC
Office:
Drawing: G2658/GPI F10
Scale: 1:3,000@A3

0 20 40 80
metres


234,000
234,500
377,000
376,500
4A
4B
4C
4D
4E
4F
4G
5
Capel Hebron
A55
Drain
Drain
Drain
14m
12m
15m
24m
Afon Caradog
Ppg Sta
Sheep W
Track
St Ulched's Church
Burial Ground
Tyn
Gwynedd Archaeological Trust
Figure 11: Areas 4 and 5 processed plot (destriped, clipped +/-5 nT)
5.53 nT
-0.01 nT
-5.50 nT
N
Date: 25/07/2020
Author: NMC
Office:
Drawing: G2658/GP/F11
Scale: 1:3,000@A3
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
©Crown Copyright and database right 2018, license number AL 100020895
0 20 40 80
metres

234,000

234,500

377,000

376,500

4A

4B

4C

4D

4E

4F

4G

5

4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10 4.11 4.12 4.13 4.14 4.15 4.16 4.17

5.1 5.2 5.3 5.4 5.5 5.6 5.7

Gwynedd Archaeological Trust

Figure 11: Areas 4 and 5 geophysical survey interpretative plan

- Possible archaeology (discrete/enhanced response)
- Uncertain (discrete/enhanced response/trend)
- Former field boundary (probable/possible)
- Ridge and furrow
- Land drain
- Service
- Natural
- Ferrous / magnetic disturbance

N

Date: 25/07/2020

Author: NMC

Office:

Drawing: G2658/GP/F11

Scale: 1:3,000@A3

0 20 40 80

metres

Cefn Farm

Old School House

Cae'r-Pwll

Arfryn

231.500

232.000

378.000

6A

6E

6F

Track

Drain

6C

FB

ads

6B

6D

Glan-y-gors

Sewage Ppg Sta

Llanfihar

yn Nhow

Gwynedd Archaeological Trust

Figure 13: Area 6 survey extent

Survey area

Development area footprint

N

Date: 25/07/2020

Author: NMC

Office:

Drawing: G2658/GP/F13

Scale: 1:2,000@A3

0 25 50

metres

Cefn Farm

Old School House

Cae'r-Pwll

Arfryn

FB

Drain

Llanfihar yn Nhow

Glan-y-go

ads

Sewage Ppg Sta

6A

6B

6C

6D

6E

6F

231.000

232.000

378.000

Gwynedd Archaeological Trust

Figure 14: Area 6 minimally processed plot (raw data clipped to 1SD)

13.75 nT

-3.62 nT

-20.98 nT

N

Date: 04/08/2020

Author: NMC

Office:

Drawing: G2658/GP/F14

Scale: 1:2,000@A3

0 25 50

metres

Cefn Farm

Old School House

Cae'r-Pwll

Arfryn

Drain

FB

Llanfihan yn Nhow

Glan-y-go

ads

Sewage Ppg Sta

6A

6B

6C

6D

6E

6F

231.500

232.000

378.000

Gwynedd Archaeological Trust

Figure 15: Area 6 processed plot (destriped, clipped +/-5 nT)

5.53 nT

-0.01 nT

-5.50 nT

N

Date: 04/08/2020

Author: NMC

Office:

Drawing: G2658/GP/F15

Scale: 1:2,000@A3

0 25 50

metres

231,500

232,000

378,000

6A

6E

6F

6C

6B

6D

6.1

6.2

6.3

6.4

6.5

6.6

6.7

Gwynedd Archaeological Trust

Figure 16: Area 6 geophysical survey interpretative plan

Uncertain (discrete/enhanced response/trend)

Former field boundary (probable)

Land drain

Natural

Ferrous/magnetic disturbance

N

Date: 20/08/2020	
Author: NMC	
Office:	
Drawing: G2658/GPI/F16	
Scale: 1:2,000@A3	

0 25 50

metres

APPENDIX I

Gwynedd Archaeological Trust Approved Written Scheme of Investigation

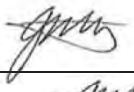
Parc Solar Trafwll, Llanfihangel yn Nhowyn, Ynys Môn (G2658)

WRITTEN SCHEME OF INVESTIGATION FOR GEOPHYSICAL SURVEY

Prepared for Sirius Planning Ltd

July 2020

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Approvals Table				
	Role	**Printed Name**	**Signature**	**Date**
Originated by	Document Author	Neil McGuinness		10/07/20
Reviewed by	Document Reviewer	John Roberts		10/07/20
Approved by	Principal Archaeologist	John Roberts		10/07/20

Revision History			
Rev No.	**Summary of Changes**	**Ref Section**	**Purpose of Issue**
0.1	State draft version of AW DBA report	2,7	GAPS request
	Landowner contact details redacted	3.1	GAPS request
	Replaced reference to 'approved' subcontractor and also inserted estimated time for survey completion.	1, 3.1	GAPS request
	Inserted details of backup survey instrumentation and methods and clarification of survey resolution.	3.2.2, 3.2.3, 3.2.4	GAPS Request
	Inserted draft report delivery date estimate	3.3	GAPS request
	Inserted details of sub-contractors experience	4	GAPS request

All GAT staff members and sub-contractors should sign their own personal copy of this document to confirm that the project specification is read and understood. Personal copies of the specification are to be retained for the duration of a GAT staff member's or sub-contractor's involvement with the project. On completion, the specification will be included as part of the project archive.

Name	Signature	Date

PARC SOLAR TRAFWLL, LLANFIHANGEL YN NHOWYN, YNYS MÔN (G2658)

WRITTEN SCHEME OF INVESTIGATION FOR GEOPHYSICAL SURVEY

Prepared for *Sirius Planning Ltd*, July 2020

CONTENTS

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by Sirius Planning Ltd to prepare a written scheme of investigation (WSI) for a geophysical survey in support of a pre-application consultation for the Parc Solar Trafwll project, a proposed solar farm on the western side of Ynys Môn. The proposed development will include photovoltaic panels; power storage units; mounting frames; inverters; transformers and associated cabling; a 33kV distributor network operator substation; onsite substations; deer fencing; and internal service road and access. The proposed development will take place within agricultural fields spread across four discrete land parcels in the vicinity of the village of Llanfihangel yn Nhowyn, Ynys Môn (Figure 01):

- Area 3 (14.33ha; NGR SH3379375955; postcode LL65 3SL);
- Area 4 (27.46ha; NGR SH3412276901; postcode LL65 3SG);
- Area 5 (7.58ha; NGR SH3457176725; postcode LL65 3SH); and
- Area 6 (16.71ha; NGR SH3157277674; postcode LL65 3NN)

Following the completion of the geophysical survey of the four proposed development areas, further archaeological works may be recommended, which could include trial trenching or targeted excavation of any identified archaeological anomalies. Any such works will be defined in separate written schemes of investigation.

The geophysical survey will begin on Tuesday 14th July 2020 and is estimated to be completed by Friday 7th August. The survey will be undertaken by Karta Geo Ltd. on behalf of GAT. The survey and subsequent reporting and archiving will conform to 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).

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 (CIfA) and a member of the Federation of Archaeological Managers and Employers (FAME).

1.1 Geophysical survey aims and objectives

The key aims and objectives of the geophysical survey are to:

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

Magnetometry will be used as a rapid reconnaissance technique to locate any buried archaeological features within the survey areas. A detailed magnetometer survey can identify targets with enhanced magnetic susceptibility, such as ditches, pits, field systems and paleochannels. Fired structures such as hearths, kilns and ovens can also be identified using this technique as well as accumulations of ferrous metal within the sub-surface.

If previously unknown potential archaeological features are identified through geophysical 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.

1.2 Monitoring Arrangements

The geophysical survey 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 before final issue. GAPS contact details are:

Jenny Emmett	07824481052
Tom Fildes	07920264232

1.3 Historic Environment Record

In line with the Gwynedd Historic 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). The HER will be informed of the project start date, location including grid reference, estimated timescale for the work, and further relevant information associated with the project.

The GAT HER Enquiry Number for this project is GATHER1289 and the Event PRN is 45939. If relevant, the HER will also be responsible for supplying Primary Reference Numbers (PRN) for any new historic assets identified and recorded.

2 ARCHAEOLOGICAL BACKGROUND

The four proposed development areas are within areas of known and potential archaeological activity. An archaeological desk-based assessment and walkover survey report for the proposed development areas has been commissioned by Sirius Planning Ltd. A draft version of the report was compiled by Archaeology Wales in 2019 (Garcia Rovira and Sinnot 2019). The report aimed to "highlight and assess the impact upon standing and buried remains of potential archaeological interest" within the proposed development areas (*Ibid.* 1.2). A summary of the draft version of the desk-based assessment's conclusions for each of the survey areas is presented below:

2.1 Area 3 (NGR SH3379375955; Figure 02; Garcia Rovira and Sinnot 2019, 2.9)

No previously recorded archaeological sites were identified within Area 3 however the prehistoric Castellor Hut Settlement (Scheduled Monument AN088) lies immediately adjacent to the area's northwestern boundary and the possibility of encountering archaeological remains associated with the prehistoric site within Area 3 cannot be discounted. The site walkover survey identified two raised mounds (CAG-003/004) that may be prehistoric cairns or may result from more recent field clearance. Analysis of aerial photographs and historic cartographic sources suggested to the authors that the area has been in agricultural use from at least the medieval period onwards and that the preservation of previously unidentified archaeological remains may be relatively good. The current field boundaries within the area have their origins in the mid-late 19th century but there is potential that agricultural remains dating from the Medieval to Post-medieval period may also be encountered within the area.

2.2 Area 4 (NGR SH3412276901; Figure 03; Garcia Rovira and Sinnot 2019, 3.9)

Two known archaeological sites recorded on the Gwynedd HER were identified within Area 4, a Post-medieval sheepfold (GAT HER PRN 28944) and a Post-medieval well (GAT HER PRN 28943). Neither site was identified during the site visit and it was suggested that they may survive as buried remains. Close analysis by this author however suggests that they lie just outside of the western boundary of Area 4. Another site, St Ulched's Church (Site of) (GAT HER PRN 2525) is located immediately adjacent to the southern boundary of Area 4. The church is thought to have been medieval in date, though no standing remains survive. The churchyard wall does survive and forms part of the southern boundary of Area 4. It is possible that the remains of early graves may be located within the part of the area in

proximity to the church site. The site walkover survey identified a circular mound (CAG-005) on the northwestern side of Area 4 which may be prehistoric in origin or may be as a result of more recent field clearance. Analysis of aerial photographs and historic mapping suggests that the area has been in continuous agricultural use since at least the Medieval period and that the current field boundaries largely date to the mid-late 19th century.

2.3 Area 5 (NGR SH3457176725; Figure 03; Garcia Rovira and Sinnot 2019, 4.9)

No known archaeological sites were identified within Area 5 or its immediate environs and no potential sites were identified during the walkover survey or the analysis of lidar data, aerial photographs or historic maps. The authors did state that given the archaeological potential of the wider landscape, as yet unidentified archaeological remains may survive in Area 5 and they may be relatively well preserved due to the historic lack of development within it. Historic maps suggest that the current field boundaries within Area 5 are likely to date to the mid-late 19th century.

2.4 Area 6 (NGR SH3157277674; Figure 04; Garcia Rovira and Sinnot 2019, 5.9)

No known archaeological sites were identified within Area 6 or its immediate environs but a number of known prehistoric sites identified to the north of the area suggest potential for prehistoric activity to be found within it. Two raised mounds were identified in the central part of the area during the walk-over survey (CAG-006). They may be prehistoric cairns or they may result from more recent field clearance. Cartographic sources also indicated the former presence of post-medieval buildings (CAG-010) to the north of the Glan-y-gors farmstead on the western side of the area. Analysis of aerial photographs and historic cartographic sources suggested to the authors that the area has been in agricultural use from at least the medieval period onwards and that the preservation of previously unidentified archaeological remains may be relatively good. The current field boundaries within the area have their origins in the mid-late 19th century.

3 METHODOLOGY

3.1 Introduction

The location and extent of the four survey areas are shown on Figures 02-04 and the details of each area are shown in the table below. The geophysical survey will begin on Tuesday 14th July 2020 beginning with Area 5, followed by Area 3, Area 4 and finally Area 6. It is estimated that approximately 20ha per 6-day week can be surveyed so the current estimated completion date for the project is Friday 7th August 2020. Landowners will be contacted before the surveys begin to agree suitable access arrangements.

Area ID	NGR	Figure	Area (ha)
3	SH3379375955	02	14.33
4	SH3412276901	03	27.46
5	SH3457176725	03	7.58
6	SH3157277674	04	16.71

3.2 Geophysical Survey

3.2.1 Summary

The geophysical survey will be carried out by a GAT appointed sub-contractor, Karta Geo Ltd. and will incorporate the accessible parts of the four areas listed in sec 3.1 and located on Figures 02 to 04.

The survey control will be predefined in AutoCAD by Karta Geo Ltd. prior to the commencement of the fieldwork. Baselines will be plotted within each area to ensure comprehensive and even data coverage. The grid points associated with the baselines will be exported from CAD then imported into a Leica GS16 RTK Global Positioning System (GPS). This instrument will be used to set out the grid points within the field using bamboo flags as non-magnetic markers.

3.2.2 Instrumentation

A Bartington multi-sensor platform, a two-wheeled cart that is pulled manually along the ground by an operator, will be used as the primary data collection instrument. The platform is GPS enabled using a mounted Leica GS16 antenna and will host two DL601 data loggers with four associated Grad-01-1000L fluxgate gradiometer sensors spaced at 1m intervals.

Areas inaccessible to the cart will be surveyed with a handheld non-GPS enabled Bartington Grad 601-2 dual fluxgate gradiometer which uses a pair of Grad-01-100L sensors with a 1m separation between the sensing elements and a single DL601 onboard data-logger.

The gradiometers detect variations in the earth' s magnetic field 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 and anomalies down to a depth of approximately one meter.

The instruments detect 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.

The instruments will be balanced in a magnetically stable area either within or external to the survey area. The sensors will be regularly checked for drift and rebalanced from this position if required.

3.2.3 Limitations

The success of the magnetometer survey detecting archaeological features is dependent upon a measurable contrast between the anomaly and the surrounding ground. 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 within the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. The presence of ferrous materials, made ground and modern burnt remains can all produce strong responses that can mask the presence of archaeological features.

To ensure data quality, the Bartington multi-sensor platform operator is required to follow regular traverses pulling or pushing the survey cart at walking pace. Areas of waterlogged or rough uneven ground, deeply ploughed fields or dense vegetation or crops may restrict the movement of the operator and cart and limit the amount of data collected within these areas. If appropriate, the handheld Bartington Grad 601-2 gradiometer will be used in areas inaccessible to the cart, however this survey method also requires the operator to walk along regular traverses at a constant pace and is therefore subject to similar limitations with respect to ground conditions but to a lesser degree.

3.2.4 Data Collection

Data will be collected by a field computer mounted on the multi-sensor cart platform using MLGrad-601 software that will acquire and record the values provided by the gradiometer loggers as well as the NMEA stream from the GPS receiver. The operator will push or pull the cart platform in straight traverses using the baselines for heading references. The software will record a GPS position every second with approximately 12 sensor readings between each timestamp. The cart is moved at approximately 1m per second and logs readings at intervals of 0.08m with a traverse interval of 1m. The instrument sensitivity will be set at 0.1nT.

Data is collected from the handheld Bartington Grad 601-2 gradiometer's onboard data logger via an RS232 interface using the MLGrad-601 software on the field computer. The instrument takes un-georeferenced readings along parallel traverses on one axis of a 20m x 20m grid. The grids are tied into the Ordnance Survey grid using a Leica GS16 RTK GPS to enable geolocation of the grids post-processing. Marked guide ropes are used to ensure high positional accuracy during the survey. The traverse interval is 1.0m and readings are logged at intervals of 0.25m along each traverse. The instrument sensitivity will be set at 0.1nT.

The collected data will be downloaded during a mid-day interval and at the end of the shift to monitor quality and the progression of the survey. The client will be updated with any issues encountered and notified of any significant anomalies that have been detected.

3.2.5 Data Processing

The downloaded data will be imported into MultiGrad601 to process the data files recorded by the MLGrad-601 software. The system geometry will be revised, and the results will be exported as a suitable .XYZ file for importation into Terrasurveyor v.3.0.33.10 software and supplied to GAT by Karta Geo Ltd. for further processing, interpretation and presentation.

During processing, the numeric data are converted to a greyscale plot where data values are represented by modulation of the intensity of a greyscale within a geo-referenced rectangular area corresponding to the data collection point. 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.

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.

3.2.6 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 in 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.

3.2.7 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)

3.3 Report compilation

Following the completion of the stages outlined in sec 3.2, a report will be produced by GAT incorporating the following:

1. Front cover;
2. Inner cover;
3. Figures and Plates List;
4. Non-technical summary (Welsh/English);
5. Introduction;
6. Methodology;
    i. Geophysical survey;
7. Results;
8. Conclusions and recommendations;
    a. Conclusion and recommendations;
9. Acknowledgements;
10. Bibliography;
    a. Primary sources;
    b. Secondary sources;
11. Figures; inc.:
    - location plan;
    - greyscale 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);
15. Back cover.

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

A full archive including plans, written material and any other material resulting from the project will be prepared.

The results of the geophysical survey outlined in this written scheme of investigation will be disseminated according to the following schedule:

- A digital report(s) will be provided to the client/consultant and GAPS (draft report then final report, draft to be submitted within one month of fieldwork completion, current fieldwork completion estimate Friday 7th August 2020);
- 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. 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 digital archive 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*.

4 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The geophysical survey will be completed by Nigel Barker, Karta Geo Ltd, an archaeological geophysicist with over 16 years of professional experience. A GAT Project Archaeologist will have responsibility for interpreting the results and preparing the subsequent report and archive. The project manager will be responsible for reviewing and approving the report prior to submission.

5 HEALTH AND SAFETY

Any hazards, risks and recommended risk mitigation will be identified by Karta Geo Ltd. prior to the start of work in a site-specific risk assessment, copies of which will be supplied to the client prior to the beginning of fieldwork. Any issues of safety will be discussed with the client. It is important that large animals such as horses and cattle are removed from the required areas for the duration of the survey. Liaison with farmers and landowners will ensure that a suitable programme of works is devised to cause the minimum of disruption. Karta Geo Ltd. is CHAS accredited and a copy of the company's Health and Safety Document can be provided upon request.

6 INSURANCE

The geophysical survey will continue beyond the expiration date of the current Professional Indemnity insurance policy. The client will be sent updated details once the policy has been renewed.

6.1 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 21/06/2021

6.2 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 21/06/2021

6.3 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

7 SOURCES CONSULTED

Chartered Institute for Field Archaeologists, 2014, *Standard and Guidance for Archaeological Geophysical Survey*

English Heritage, 1991, *Management of Archaeological Projects*

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*

English Heritage, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*

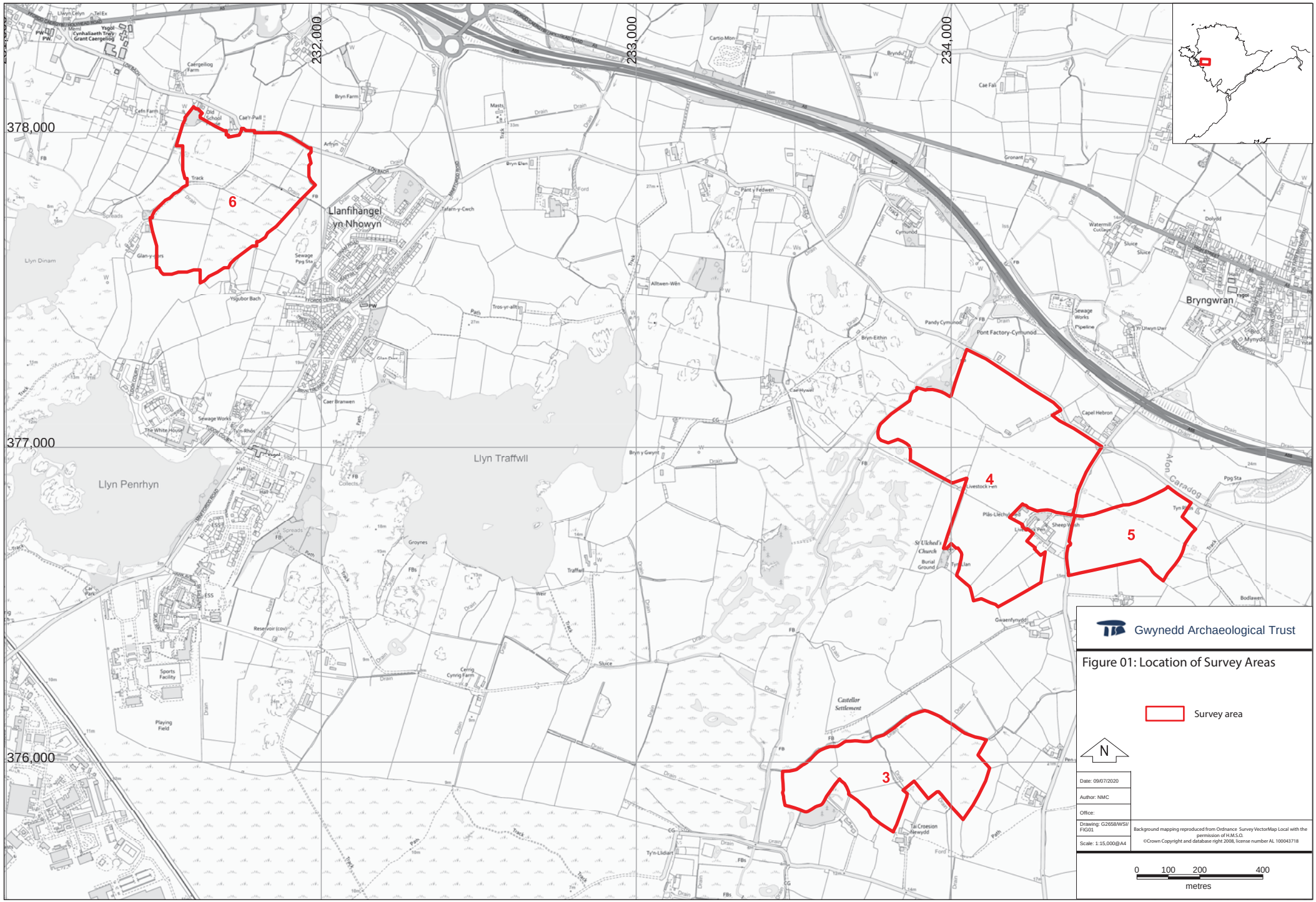
European Archaeological Council, 2015, *Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*

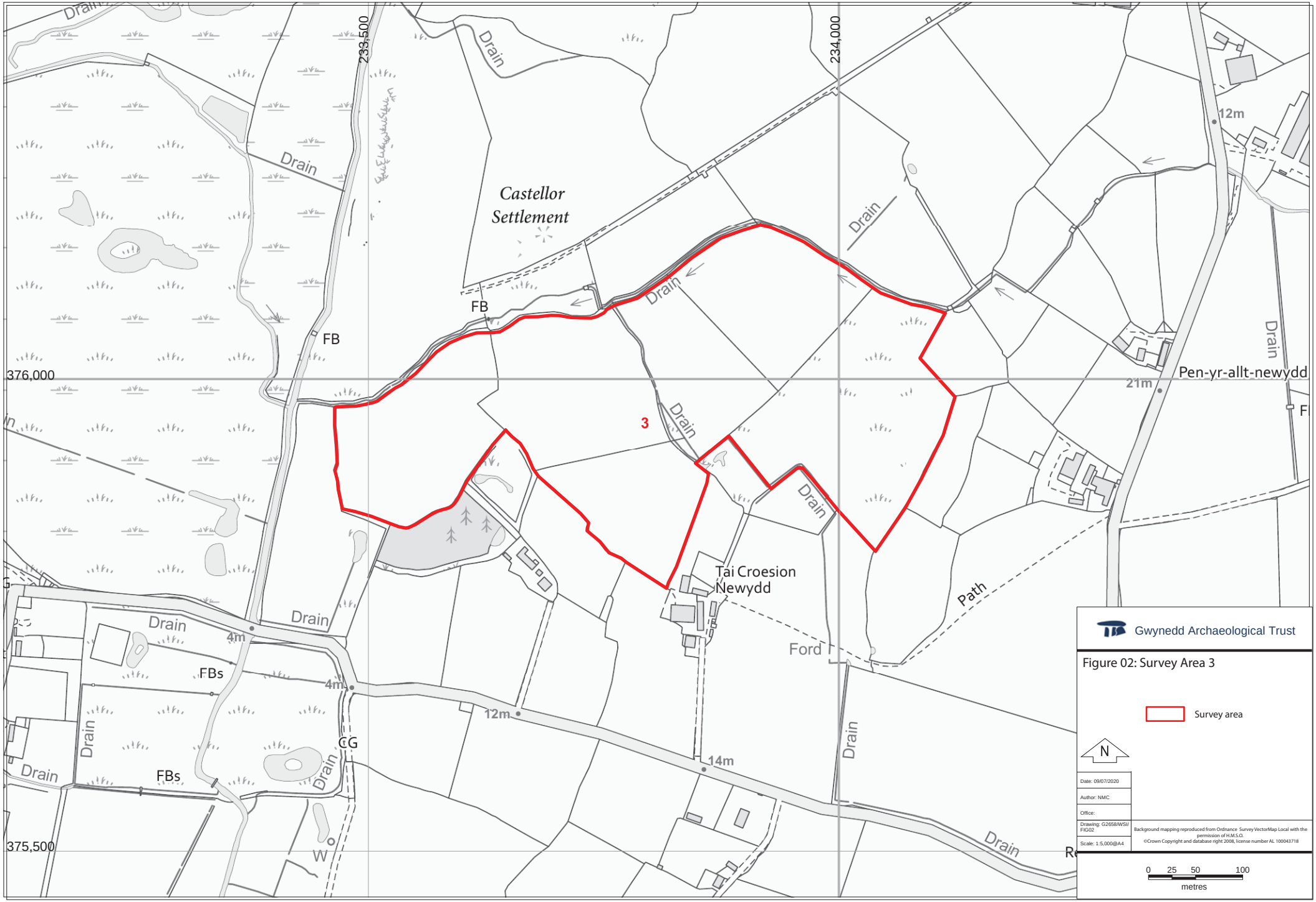
Garcia Rovira, I, and Sinnot, S, 2019, *Caergeiliog, Anglesey: Desk Based Assessment and Site Visit*, Archaeology Wales Report 1758 (draft version)

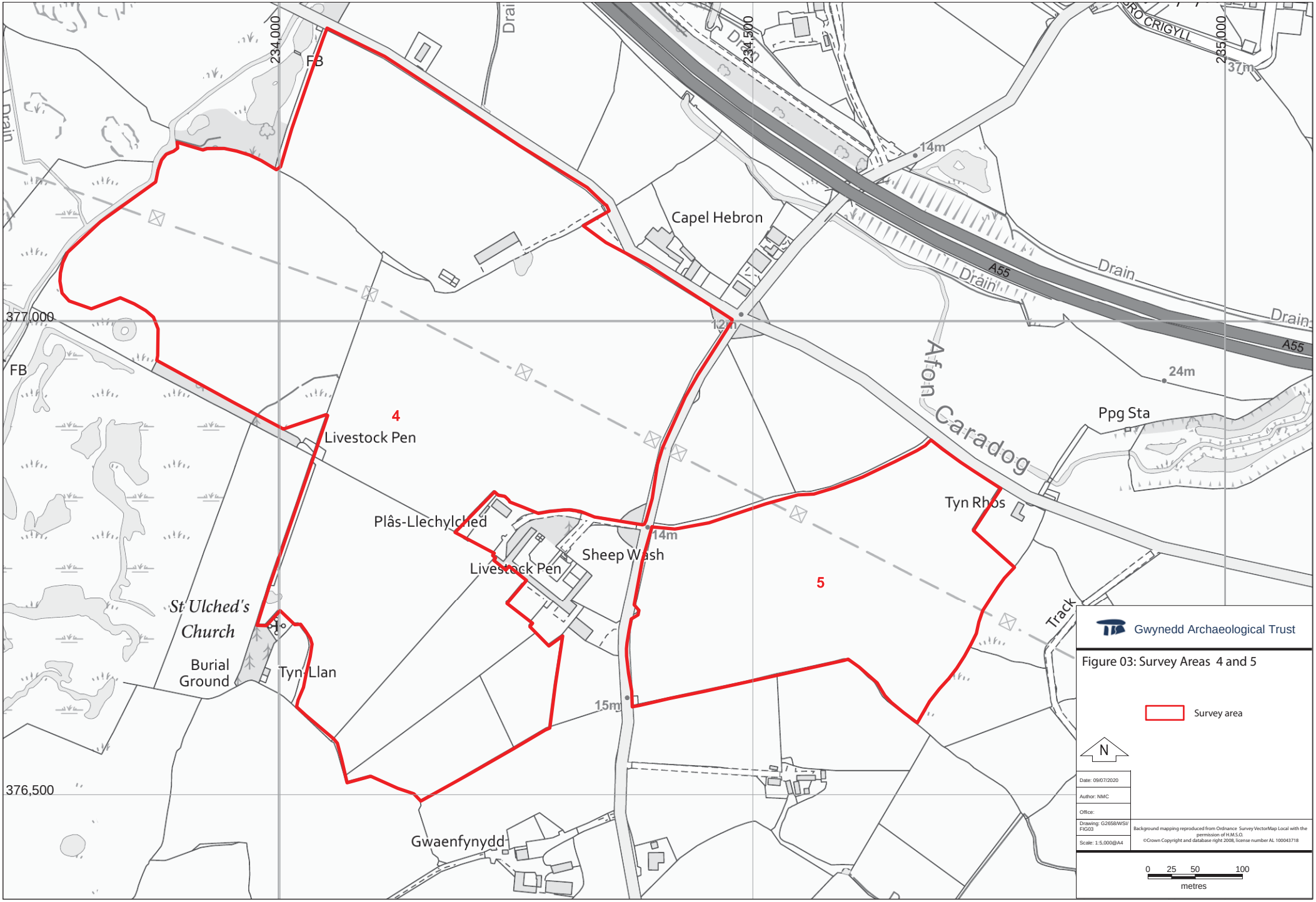
Royal Commission on Ancient and Historic Monuments of Wales, 2015, *Guidelines for digital archives*

The Welsh Archaeological Trusts, 2018, *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1)

FIGURES


232,000
233,000
234,000
378,000
377,000
376,000
6
4
5
3
Llanfihangel yn Nhowyn
Llyn Traffwll
Llyn Penrhyn
Llyn Dinam
Bryngwran
Gwynedd Archaeological Trust
Figure 01: Location of Survey Areas
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG01
Scale: 1:15,000@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
0 100 200 400
metres


Castellor Settlement
3
Tai Croesion Newydd
Pen-yr-allt-newydd
Path
Ford
FB
FBs
CG
W
Drain
233,500
234,000
376,000
375,500
12m
21m
14m
4m
Gwynedd Archaeological Trust
Figure 02: Survey Area 3
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG02
Scale: 1:5,000@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 25 50 100
metres


234,000
234,500
285,000
377,000
376,500
FB
Drain
A55
Capel Hebron
Afon Caradog
Ppg Sta
Tyn Rhos
Plâs-Llechylched
Livestock Pen
Sheep Wash
St Ulched's Church
Burial Ground
Tyn Llan
Track
Gwaenfynydd
4
5
14m
12m
24m
37m
15m
Gwynedd Archaeological Trust
Figure 03: Survey Areas 4 and 5
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG03
Scale: 1:5,000@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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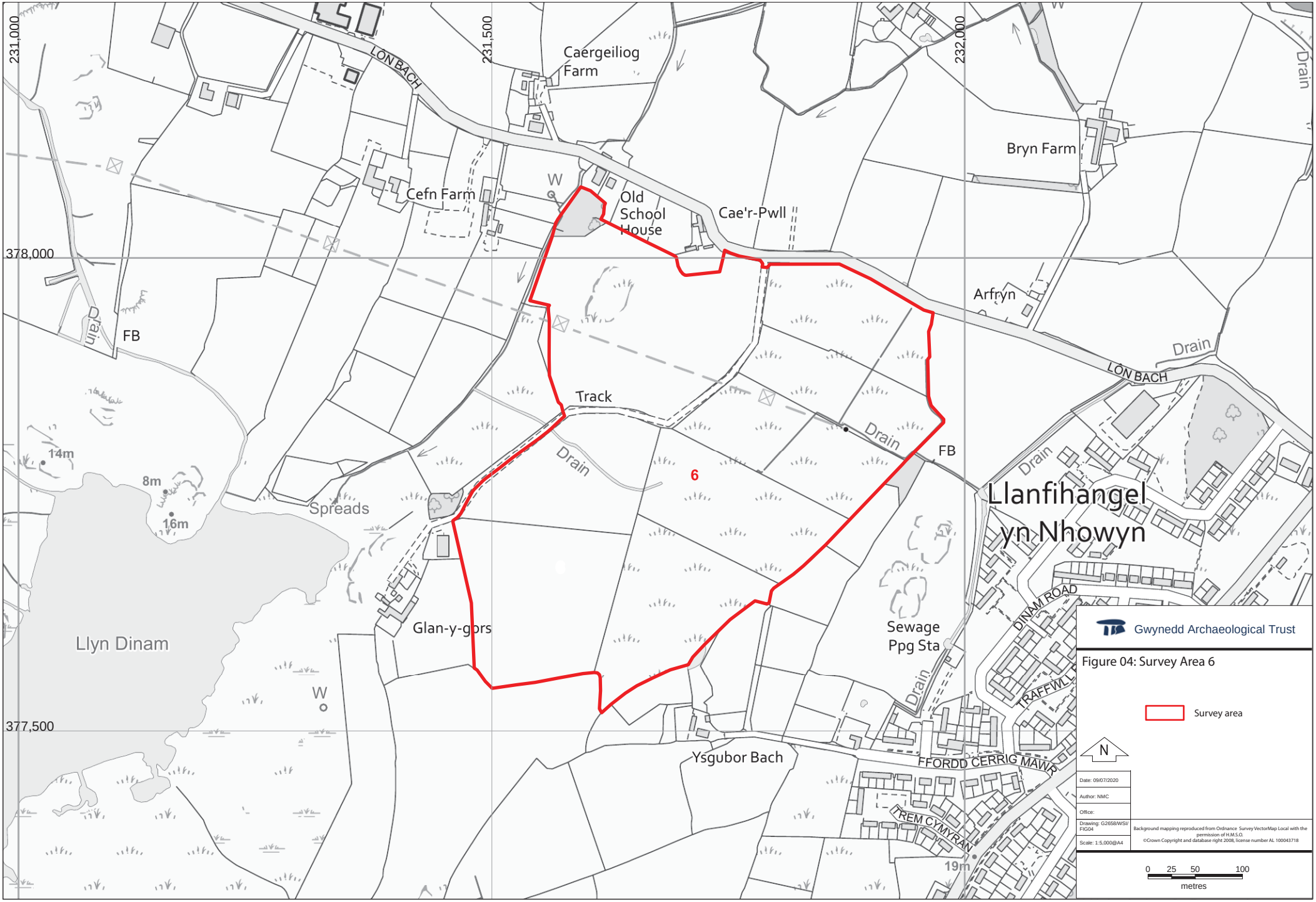
231,000
231,500
232,000
378,000
377,500
LON BACH
Caergeiliog Farm
Cefn Farm
Old School House
Cae'r-Pwll
Bryn Farm
Arfryn
Drain
FB
Track
6
Spreads
14m
8m
16m
Llyn Dinam
Glan-y-gors
Sewage Ppg Sta
Llanfihangel yn Nhowyn
DINAM ROAD
TRAFFWLL
FFORDD CERRIG MAWR
TREM CYMYRAN
Ysgubor Bach
19m
W
Gwynedd Archaeological Trust
Figure 04: Survey Area 6
Survey area
N
Date: 09/07/2020
Author: NMC
Office:
Drawing: G2658/WSI/FIG04
Scale: 1:5,000@A4
Background mapping reproduced from Ordnance Survey VectorMap Local with the permission of H.M.S.O.
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0 25 50 100
metres

Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

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