Archaeology Wales

Land adjacent to Laugharne Primary School, Laugharne, Carmarthenshire

Geophysical Survey Report

Jennifer Muller MA

Report No. 1974

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Geophysical Survey Report

Prepared For: Sancler 3 Ltd

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By
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Report No. 1974

May 2021

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Summary

This report results from work carried out by Archaeology Wales Ltd (AW) for Sancler 3 Ltd. It draws on the results of an investigative geophysical survey undertaken at a site of proposed development for the construction of forty-two dwellings and associated infrastructure on land adjacent to Laugharne Primary School, Laugharne, Carmarthenshire SA33 4SQ (henceforth – the site), centred on NGR SN 29676 10500 (Figures 1 &2). Planning application Number is W/35450.

The aim of the geophysical survey was to determine the nature and extent of any buried archaeological features within the proposed development area. The work was undertaken using a Bartington Grad601 dual fluxgate gradiometer.

The survey identified two sets of geophysical anomalies that are likely to relate to sub-surface archaeological remains. The first co-incides with the site of a former barn and barnyard constructed prior to 1842 and demolished c. 1970 located in the southern corner of the site. The second was a linear anomaly that is interpreted as the silted-up ditch of a former field boundary, also present prior to 1842 and removed c. 1970. All other anomalies were interpreted as either magnetic trends arising due to natural geology, or modern disturbance resulting from modern on-site features and activities.

The work was carried out to the Standard and Guidance set out by the Chartered Institute for Archaeologists for archaeological geophysical survey (ClfA 2015) and completed in accordance with EAC Guidelines for the Use of Geophysics in Archaeology (Historic England 2016).

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Mae'r adroddiad hwn yn deillio o waith a wnaed gan Archaeology Wales Ltd (AW) ar gyfer Sancler 3 Ltd. Mae'n defnyddio canlyniadau arolwg geoffisegol ymchwiliol a gynhaliwyd ar safle o ddatblygiad arfaethedig ar gyfer adeiladu deugain o anheddau a seilwaith cysylltiedig ar dir sy'n gyfagos i Ysgol Gynradd Talacharn, Talacharn, Sir Gaerfyrddin SA33 4SQ (o hyn ymlaen – y safle), yn canolbwyntio ar NGRN 29676 10500 (Ffigurau 1 a 2). Rhif y cais cynllunio yw W/35450.

Nod yr arolwg geoffisegol oedd pennu natur a graddau unrhyw nodweddion archeolegol claddedig yn yr ardal ddatblygu arfaethedig. Cafodd y gwaith ei wneud gan ddefnyddio radiomedr llyngyr deuol Bartington Grad601.

Nododd yr arolwg ddwy set o anomaleddau geoffisegol sy'n debygol o ymwneud ag olion archeolegol is-arwyneb. Mae'r cyntaf yn cyd-fynd â safle hen ysgubor a barnyard a adeiladwyd cyn 1842 ac a ddymchwelwyd c. 1970 yng nghornel ddeheuol y safle. Roedd yr ail yn anomaledd llinellog sy'n cael ei ddehongli fel ffos silted hen ffin cae, a oedd hefyd yn bresennol cyn 1842 ac a ddilëwyd c. 1970. Dehonglwyd yr holl anghysondebau eraill naill ai fel tueddiadau magnetig sy'n codi oherwydd daeareg naturiol, neu aflonyddwch modern yn deillio o nodweddion a gweithgareddau modern ar y safle.

Cynhaliwyd y gwaith i'r Safon a'r Canllawiau a nodwyd gan Sefydliad Siartredig Archaeolegwyr ar gyfer arolwg geoffisegol archeolegol (CIfA 2015) ac fe'i cwblhawyd yn unol â Chanllawiau'r Pwyllgor ar gyfer Defnyddio Geoffiseg mewn Archaeoleg (Historic England 2016).

1. Introduction

1.1 Location and scope of work

On 5 and 6 May 2021, Archaeology Wales Ltd (AW) carried out a geophysical survey within a 2.4ha field adjacent to the Laugharne Primary School. The survey was undertaken in advance of the proposed development of forty-two dwellings and associated infrastructure within a single field of improved pasture, centred on NGR SN 29676 10500 (Figures 1 & 2). The local planning authority is the Carmarthenshire County Council (henceforth – CCC), and the planning application number is W/35450.

The recommendations for a geophysical survey on the site have been proposed by Dyfed Archaeological Trust – Development Management (henceforth – DAT-DM), in their capacity as archaeological advisors to CCC. These recommendations are stated in a letter dated 5th May 2017 from DAT-DM to CCC in response to the planning application. Within this letter DAT-DM recommend a pre-determination evaluation of the site is undertaken, in the first instance comprising a Geophysical Survey of the application site. As a result, a Condition was attached to the outline planning permission for the development which states:

No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the Local Planning Authority. The written scheme of investigation shall be undertaken by a qualified archaeological contractor and shall include details on how the developer intents to mitigate against any adverse effects on the historic environment and shall include a phased archaeological investigation commencing with a geophysics survey of the site. The development shall be carried out in accordance with the approved scheme.

A Written Scheme of Investigation (WSI) was prepared by Philip Poucher and revised by John Davey MCIfA, Archaeology Wales Ltd (henceforth - AW). It provided information on the methodology to be employed during a geophysical survey of the site. The WSI was submitted to, and approved, by DAT-DM prior to the survey being undertaken.

The work was managed by Dr John Davey PhD, etc*, Project Manager*, and the site work was undertaken by Jennifer Muller MA and Daniel Moore MA.

1.2 Site Description and Geology

The site comprises a single field of improved pasture, bounded by a mix of hedge banks and modern post and wire fencing. The Laugharne to Pendine Road (A4066) borders the site to the southeast, bounded by a modern post-and-wire fence (plate 1). A block of modern urban development lies immediately to the east, built in the 1990s, beyond which lies the mid-20th century Orchard Park residential development and Laugharne Primary

School. To the northeast lies the playing fields of Laugharne Primary School, bounded by a modern fence line. To the northwest the site is bounded by a steep-sided valley, and to the southwest lies further agricultural land, bounded by a hedge bank (plate 2), with the small village of Broadway beyond.

The field encloses an irregular parcel of land, approximately 2.4 hectares in area. The ground slopes gently down from approximately 41m aOD at the north-western end to 38m AOD along the south-eastern edge.

The underlying bedrock of the area comprises argillaceous rocks with subordinate interbedded sandstone and conglomerate of the Milford Haven Group. Overlying superficial deposits of Devensian Diamicton (BGS 2020).

1.3 Archaeological and Historical Background

The site has been subject to an Archaeological Appraisal, undertaken by Archaeology Wales in 2017 (Izquierdo Zamora 2017). In summary some prehistoric activity is recorded in the vicinity. To the west a Neolithic worked stone axe was discovered and a flint working site is also recorded to the west (PRN 3916) in an area known as 'The Hugden'. To the east a Bronze Age cist burial (PRN 2171) has been recorded at Orchard Park, which has subsequently been developed. Further afield Iron Age defended enclosures have also been recorded.

To the west of the site there is extensive evidence of former medieval field systems at The Hugden, and medieval activity and possible settlement around the site of Roche Castle (PRN 5070) to the southwest. The settlement of Laugharne, which lies to the east, has possible early medieval origins, but largely developed from the 12th century onwards, with the establishment of Laugharne castle and spread of settlement to the north. These two areas of medieval activity were linked by the road that forms the southeast boundary to the site.

Laugharne appears to have changed little into the post-medieval period. During the early 19th century, the town became a fashionable resort town, but declined again by the late 19th century. The site lies in a former agricultural area, although post-medieval local industrial activity is also a feature of the local landscape. In the post-war period and later 20th century the town has seen some development expansion, including development up to the borders of the current development site.

Map regression indicates that a barn and barn yard occupied the southern tip of the site, close to the current A4066 main road from at least the early 19th century until c. 1970 when it was demolished. This barn appears to have been contemporary with a former field boundary that bisected the site in a NE-SW direction, running approximately NE from the northern edge of the former barn, parallel to the main road. The A4066 main road itself

was known as Stony Way on historic maps and the former field closest to it was known as Road Park on the Laugharne Tithe Map.

2. Aims and Objectives

2.1 Geophysical Survey

The geophysical survey was undertaken in order to:

- locate and describe archaeological features that may be present within the survey area. The work attempts to elucidate the presence or absence of archaeological material that might be affected by the scheme, its character, distribution, extent and relative significance, providing sub-surface data to inform any future on-site works.
- It is the aim of this report to provide information which is sufficiently detailed to allow the archaeological resource to be better understood. The information could then be used to help inform further archaeological work undertaken in association with the proposed development.

3. Methodology

3.1 Geophysical Survey

The survey was carried out using a Bartington Grad601-2 dual sensor fluxgate gradiometer. This instrument has been chosen due to its proven efficient and effective method of locating sub-surface archaeological anomalies on greenfield sites. The machine consists of two high stability fluxgate sensors suspended on a single frame, accurately aligned, that can detect localised magnetic anomalies compared with the general magnetic background. When mapped in a systematic manner this allows changes in the magnetic field resulting from differing features in the soil to be plotted. Strong magnetic anomalies will be generated by iron-based objects or areas modified by heat, such as hearths and kilns. More subtle anomalies may be generated by changes, typically in the iron-oxide content, of underlying soils, compared to the natural subsoil. This enables the detection of material infilling sub-surface archaeological features such as ditches, pits and structural remains. Data from this may be mapped at closely spaced regular intervals, to produce an image that may be interpreted to locate buried archaeological features (Clark, 1997) (Aspinall *et al*, 2011).

Moreover, Fluxgate gradiometry has the advantage of being able to identify the broadest range of sub-surface archaeological feature types and can detect such anomalies at a range of soil depths (typically 0.3-1m).

The site was located by GPS. All survey points were located with the GPS and plotted onto an O.S. base map.

The on-site survey was undertaken in a single phase lasting two days. Detailed survey was carried out in grids of 30m x 30m along zigzag and parallel traverses spaced at 1m intervals, recording data points spaced at 0.25m intervals to a maximum instrument sensitivity of 0.1nT in accordance with Historic England Guidelines. The survey mode was set to bi-directional (traverses walked alternately northwest-southeast/southeast-northwest). Incomplete survey lines resulting from irregular area boundaries or obstacles were completed using the 'dummy log' key. At regular intervals the data was downloaded in the field onto a laptop computer for storage and assessment.

3.2 Data Processing and Presentation

Following the completion of the detailed survey, processing and analysis took place using the TerraSurveyor v.3 software package.

A composite of each detailed survey area has been created and processed using Terrasurveyor v.3. The report includes raw and unclipped data in both greyscale, colour, and x-y trace plots. Every effort has been made to reduce the instrument directional sensitivity in the field rather than reliance on post data-collection processing.

The final results have been presented at an appropriate scale tied to the Ordnance Survey National Grid.

The most typical method of visualising the data is as a greyscale image (Figure 3). In a greyscale plot, each data point is represented as a shade of grey, from black to white at either extreme of the data range. A limited number of standard operations can be carried out to process the data, including clipping and graduated shade. The data was analysed using a variety of parameters and styles and the most useful of these were saved as *TIF images and displayed (Figures 4 & 5) using Adobe Illustrator software. The results of the survey were then overlaid onto a digital map of the study area. This was then used to produce interpretation figures (Figure 6).

All works were undertaken in accordance with the standard required by The Chartered Institute for Archaeologist's *Standard and Guidance for Archaeological Geophysical Survey* (2014) and current Health and Safety legislation.

4. Geophysical Survey Results (Figures 3-5)

The survey was undertaken during a period of cold, partly cloudy weather with spots of rain.

4.1 Limitations

The site contained a few obstacles, though these were generally on the edges of the site. These consisted of mounds of earth, which could not be traversed, in the south corner and the southeast edge (plate 3); and metal manholes and electrical poles in the eastern edge (plate 4) which were surrounded by overgrown vegetation including brambles. These areas were avoided, and some resulted in incomplete survey transects, completed using 'dummy log' key. A portion of the northern edge of the survey could not be accessed because it was on a steep slope.

4.2 Results and Interpretation (Figure 6)

The survey identified two potential features of archaeological origin; the area of a former barn and barnyard in the southern part of the site; and a former field boundary running in a NE direction from the northern edge of the former barn. Both features are present on the Laugharne tithe map and both were removed c. 1970.

There were several areas of magnetic debris, which is defined as numerous dipolar responses within a specific area. These anomalies are positive points with a negative response and depending on the strength of the response will indicate different causes. Magnetic debris corresponding with the former barn and barnyard was noted in the southern corner, but also along the northern-northwestern edges of the site, the northeastern edge, and in the southeastern edge. The amplitude of the responses was generally low, staying around +/-3, which usually indicates ground disturbance such as dug or mixed-up earth (plate 5). One small part of the furthest northwest section of debris had a high amplitude, which could indicate ferrous material on or just under the surface such as modern field boundary fences.

Magnetic disturbance in two areas of the site (the southeast edge and the northeast edge) were due to cars parked on the gravel drive and the metal fence, respectively (plate 6).

Faint, linear or curvilnear, approximately parallel, anomalies, aligned approximately NE-SW, in the centre of the site are more likely to represent natural features arising from geological variations. The geology of the site is recorded as interbedded argillaceous rocks, sandstone and conglomerate. These varied beds could certainly result in parallel linear variations in magnetic response. The Geology of Britain Viewer (BGS, 2021) indicates that these beds are aligned in the same direction as the parallel magnetic anomalies.

One linear anomaly, however, is most likely to represent the silted-up ditch associated with a former 19th century field boundary identified on historic maps of the site. This anomaly

lies parallel and west of the A4066 main road. This field boundary was already in existence at the time of the 1842 Laugharne Tithe Map and was removed to create the current single large field c. 1970. The linear anomaly associated with this former field boundary was not continuous and appears to have been truncated in recent years. There is evidence that the ground has previously been graded in this part of the site, perhaps when the former barn was demolished. The mound of earth associated with these soil movements is still visible close to the southern boundary of the site (plate 3).

Other, single dipolar anomalies throughout the site could be comprised of either ferrous objects in or on the ground, or individual pieces of fired building material.

5. Conclusions

The survey has confirmed the presence of sub-surface archaeological remains relating to a former barn and field boundary both in existence on historic mapping by 1842 and both removed c. 1970. The date of origin of these features is not known.

The presence of areas of disturbed and graded ground with associated mounds in various parts of the site (plates 3 & 5) indicates that the field has been disturbed in the recent past and the identified archaeological features are likely to have been partially truncated in places.

6. Bibliography and References

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British Geological Society, 2020. Online map resource (http://mapapps.bgs.ac.uk/geologyofbritain/home.html)

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Old-maps.co.uk: https://www.old-maps.co.uk/#/Map/230500/210500
Welsh Tithe Maps: https://places.library.wales/

Historic Maps consulted

Tithe map of Laugharne (parish), Carmarthenshire. 1842. National Archives ref: IR 18/14185; Tithe apportionment: IR 29/47/21
OS County Series Carmarthenshire. 1889. Originally Printed at 1:2,500
OS County Series Carmarthenshire. 1891. Originally Printed at 1:10,560
OS County Series Carmarthenshire. 1906. Originally Printed at 1:2,500
OS County Series Carmarthenshire. 1907-8. Originally Printed at 1: 10,560
OS County Series Carmarthenshire. 1953. Originally Printed at 1: 10,560
OS Plan. 1964. Originally Printed at 1: 10,560
OS Plan. 1970. Originally Printed at 1: 2,500
OS Plan. 1972-3. Originally Printed at 1: 10,000

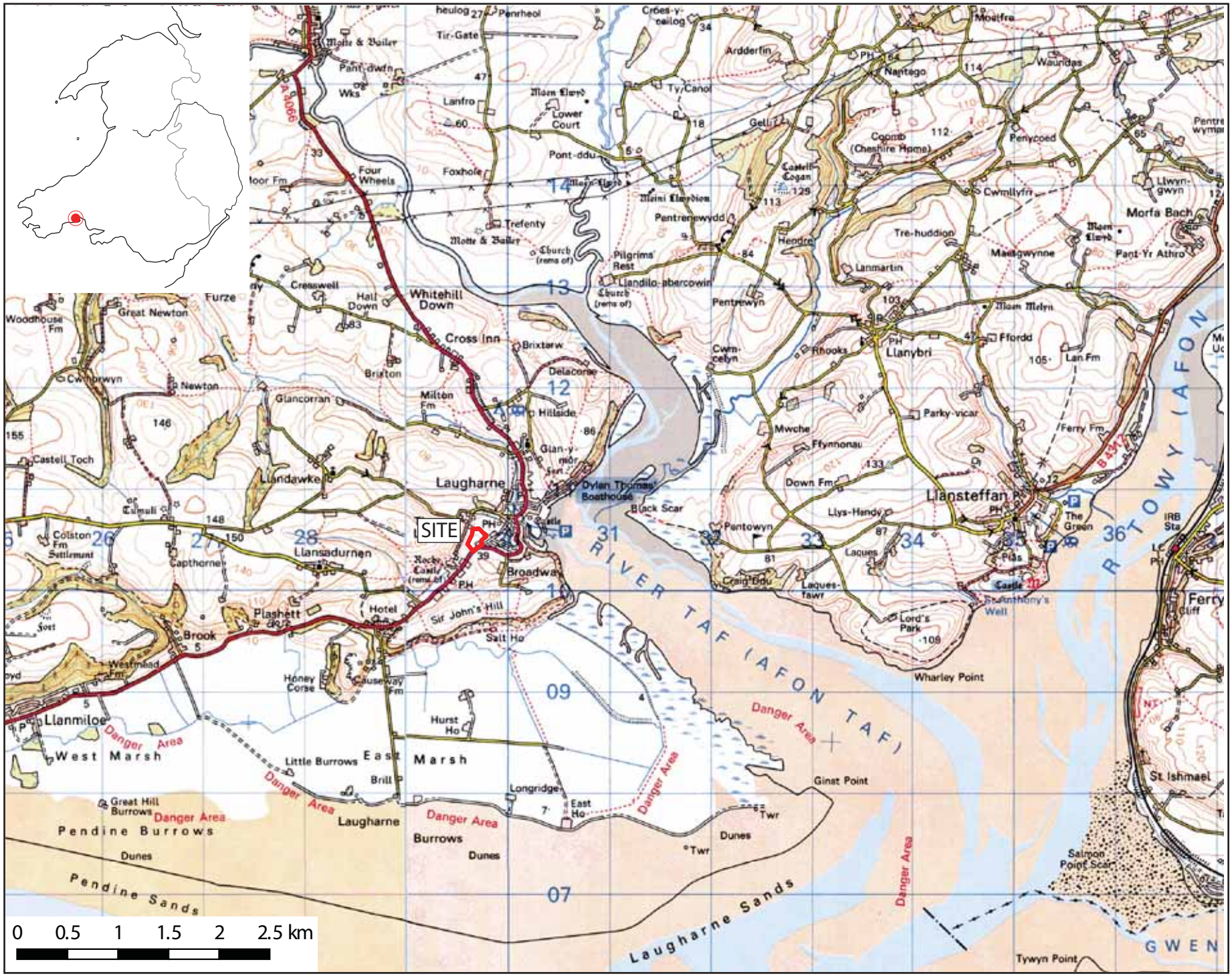

Figure 1: Location map, 1:50,000 @ A4

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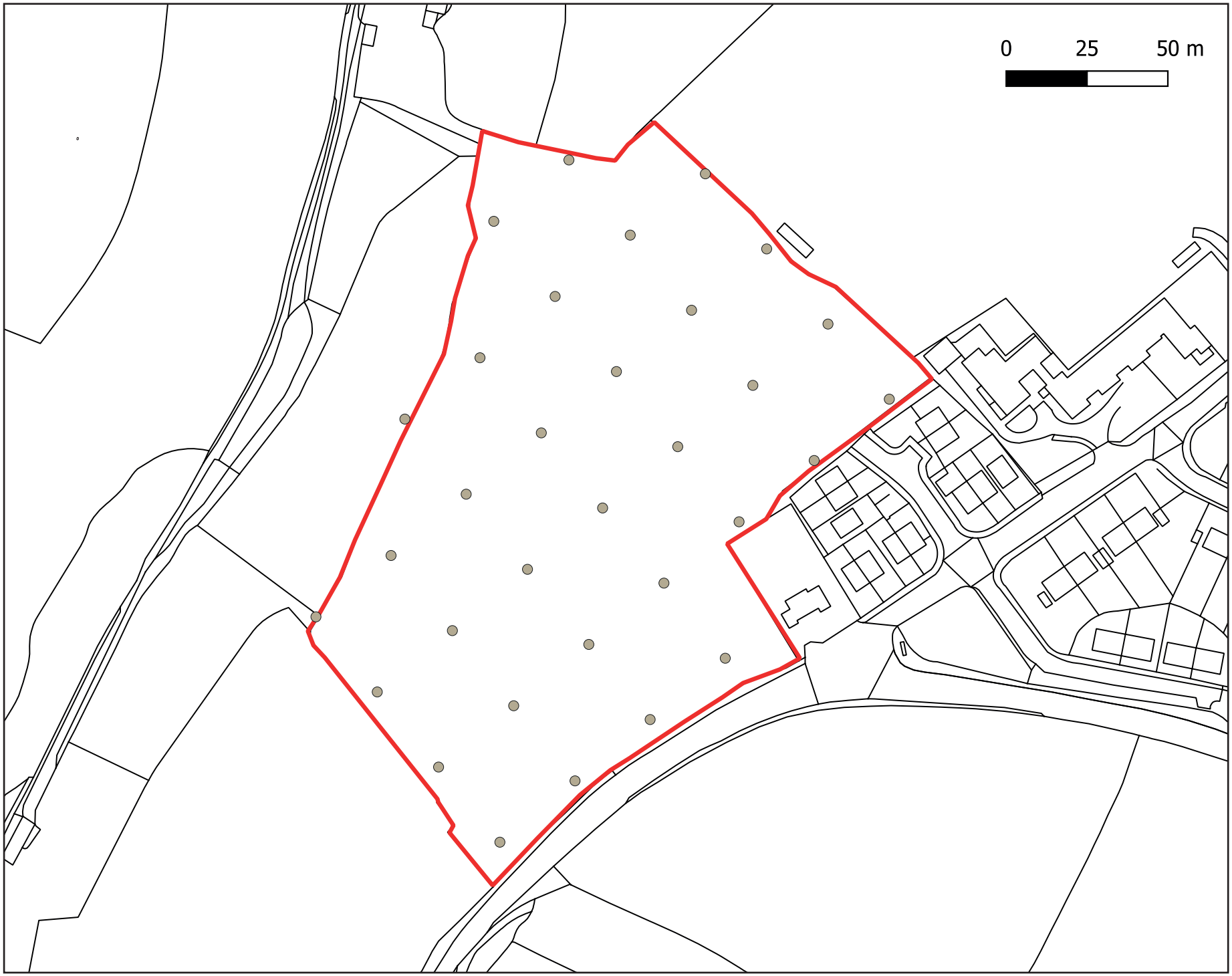

Figure 2: Geophysical survey area (in red).

Figure 3
SurveyResults
unprocessed

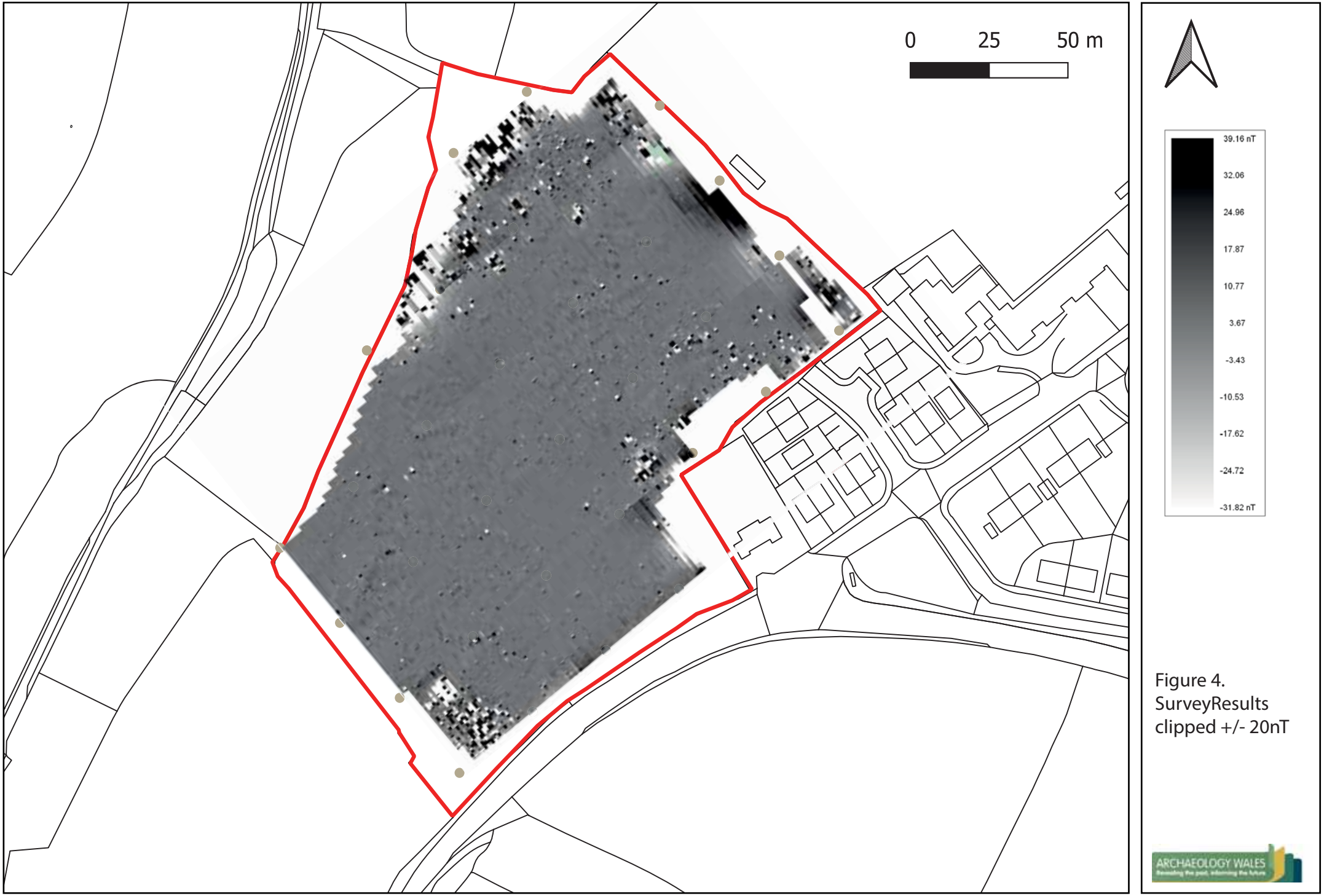

Figure 4.
SurveyResults
clipped +/- 20nT

Figure 5
Survey Results
x-y trace plot
clipped +/- 5nT

Figure 6. Interpretation (clipped +/- 20nT)

Plate 1: View of the southeastern edge of the site, along the A4066 towards Laugharne, looking NE.

Plate 2: View of the northwestern edge of the site, looking N.

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Plate 3: Mound of earth, southern edge of the site. looking W.

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Plate 4: View along the northern edge of the survey area towards Laugharne, looking SE.

Plate 5: View of disturbed ground along the eastern edge of the site. Looking WSW.

Plate 6: View of parked cars in the eastern part of the site. Looking SSE.

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APPENDIX I: Written Scheme of Investigation

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Revealing the past, informing the future

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Written Scheme of Investigation

For a Geophysical Survey:

Land adjacent to Laugharne Primary School, Laugharne, Carmarthenshire, SA33 4SQ

Prepared for:
SanCler 3 Ltd

Project No: 2727

April 2021

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NON TECHNICAL SUMMARY

This Written Scheme of Investigation (WSI) details the methodology for geophysical survey on land adjacent to Laugharne Primary School, Laugharne, Carmarthenshire SA33 4SQ. It has been prepared by Archaeology Wales Limited for Sancler 3 Ltd.

1. Introduction

This Written Scheme of Investigation (WSI) details the methodology for a programme of archaeological mitigation (geophysical survey) to be undertaken at the site. The proposed development comprises plans for the construction of 42 dwellings and associated infrastructure on land adjacent to Laugharne Primary School, Laugharne, Carmarthenshire SA33 4SQ (henceforth – the site), centred on NGR SN 29676 10500 (Figures 1 & 2). The local planning authority is the Carmarthenshire County Council (henceforth – CCC), and the planning application number is W/35450.

The recommendations for a geophysical survey on the site have been proposed by Dyfed Archaeological Trust – Development Management (henceforth – DAT-DM), in their capacity as archaeological advisors to CCC. These recommendations are stated in a letter dated 5th May 2017 from DAT-DM to CCC in response to the planning application. Within this letter DAT-DM recommend a pre-determination evaluation of the site is undertaken, in the first instance comprising a Geophysical Survey of the application site. As a result a Condition was attached to the outline planning permission for the development which states:

> *9) No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the Local Planning Authority. The written scheme of investigation shall be undertaken by a qualified archaeological contractor and shall include details on how the developer intents to mitigate against any adverse effects on the historic environment and shall include a phased archaeological investigation commencing with a geophysics survey of the site. The development shall be carried out in accordance with the approved scheme.*

This WSI has been prepared by Philip Poucher, and revised by John Davey, Archaeology Wales Ltd (Henceforth - AW) at the request of Sancler 3 Ltd. It provides information on the methodology that will be employed by AW during a geophysical survey of the site. This WSI is to be approved by DAT-DM, on behalf of CCC, prior to the survey being undertaken. The purpose of the archaeological mitigation (geophysical survey) is to provide CCC with sufficient information regarding the nature of archaeological remains on the site of the development, the requirements for which are set out in Planning Policy (revised edition 10, 2018), Section 6.1 and Technical Advice Note (TAN) 24: The Historic Environment (2017).

All work will conform to the Standard and Guidance for Geophysical Survey (CIfA December 2020) and be undertaken by suitably qualified staff to the highest professional standards.

2 Site Description & Archaeological Background

The site comprises a single field of improved pasture, bounded by a mix of hedge banks and modern post and wire fencing. The Laugharne to Pendine Road (A4066) forms the southeast boundary, bounded by a modern post-and-wire fence. A block of modern urban development lies immediately to the southeast, built in the 1990s, beyond which lies the mid-20th century Orchard Park residential development and Laugharne School. To the northeast lies the playing fields of Laugharne School, bounded by a fence line. To the northwest the site is bounded by a steep-sided valley, and to the southwest lies further agricultural land, bounded by a hedge bank, with the small village of Broadway beyond.

The field encloses an irregular parcel of land, approximately 2.4 hectares in area. The ground slopes gently down from approximately 41maOD at the north-western end to 38m AOD along the south-eastern edge.

The underlying bedrock of the area comprises argillaceous rocks with subordinate interbedded sandstone and conglomerate of the Milford Haven Group. Overlying superficial deposits of Devensian Diamicton (BGS 2020).

The site has been subject to an Archaeological Appraisal, undertaken by Archaeology Wales in 2017 (Izquierdo Zamora 2017). In summary some prehistoric activity is recorded in the vicinity. To the west a Neolithic worked stone axe was discovered and a flint working site is also recorded to the west (PRN 3916) in an area known as 'The Hugden'. To the east a Bronze Age cist burial (PRN 2171) has been recorded at Orchard Park, although it appears little information about this site has been recorded, which has subsequently been developed upon. Further afield Iron Age defended enclosures have also been recorded.

To the west of the site there is extensive evidence of former medieval field systems at The Hugden, and medieval activity and possible settlement around the site of Roche Castle (PRN 5070) to the southwest. Laugharne itself which lies to the east has potential early-medieval origins, but largely development from the 12th century onwards, with the establishment of Laugharne castle and spread of settlement to the north. These two areas of medieval activity were linked by the road that forms the southeast boundary to the site.

Laugharne appears to have changed little into the post-medieval period. During the early 19th century the town became a fashionable resort town, but declined again by the late 19th century. The site lies in a former agricultural area, although post-medieval local industrial activity is also a feature of the local landscape. In the post-war period and later 20th century the town has seen some development expansion, including development up to the borders of the current development site.

3 Objectives

This WSI sets out the methodology to ensure that the geophysical survey will meet the standard required by The Chartered Institute for Archaeologist's *Standard and Guidance for archaeological geophysical survey (2020)*.

The primary objective of the work will be to locate and describe, by means of geophysical

survey, archaeological features that may be present within the development area. The proposed archaeological work will attempt to elucidate the presence of absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance.

A report will be produced that will provide information which is sufficiently detailed to allow informed planning decisions to be made that can safeguard the archaeological resource. The information could then be used to determine further archaeological investigation or appropriate mitigation strategies for any archaeological remains within the area to be implemented prior to or during the proposed development.

4 Methodology for geophysical survey

The area to be surveyed will include all of the accessible development area (see the attached plan, Figure 2). On-site adjustments may be required to avoid areas of magnetic interference or inaccessibility, for example wire fencing, areas of dense undergrowth and steeper slopes which may prove unsuitable for survey.

The site will be located by GPS. All survey points will be located with a total station or similar survey equipment and plotted onto an O.S. base map.

The on-site survey will be undertaken in a single phase lasting approximately three days. This will be followed by report production.

The survey will be carried out using a Bartington Grad601 Magnetometer. This is chosen as an efficient and effective method of locating archaeological anomalies on this type of site. The machine consists of two high stability fluxgates gradiometers suspended on a single frame, accurately aligned, that can detect localised magnetic anomalies compared with the general magnetic background. When mapped in a systematic manner this allows changes in the magnetic field resulting from differing features in the soil to be plotted. Strong magnetic anomalies will be generated by iron-based objects or areas of heat-activity, such as hearths and kilns. More subtle anomalies may be generated by changes, typically in the iron-oxide content, of underlying soils, compared to the natural subsoil. This helps to detect infilling material of features such as ditches and pits, as well as overlying material such as wall lines.

Relatively level fields of low pasture provide good locations for this type of survey. The surface of the field appears relatively uniform allowing rapid traverses and readings to be taken at consistent heights above the ground surface, and the upper ploughsoil is generally both neither deep enough to mask features cutting into the underlying subsoil, and unlikely to contain a significance amount of material that could interfere with the magnetic readings. The underlying geology appears unlikely to provide a strong magnetic response that could distort the readings. Areas of significant slopes would preclude safe surveying, as would areas of dense vegetation, but previous site visits suggest the vast majority of the area should be open to survey.

Each survey area will be divided into 20m or 30m square grids along a common alignment. Within each grid, parallel traverses 1m apart will be walked at rapid pace along the same orientation. Instrument readings will be logged at 0.25m intervals, with an average cycle of 4 using an ST1 internal sample trigger. Incomplete survey lines resulting from irregular area boundaries or obstacles will be completed using the

"dummy log" key.

Further survey information will be completed on the relevant pro-forma sheet. All data will be downloaded in the field into a laptop computer.

Data processing and presentation

Following completion of the detailed survey, a composite of the survey area will be created and processed using the software package *Terrasurveyor v.3*. After downloading, the results will be plotted in 2D.

The most typical method of visualizing the date is as a greyscale image. In a greyscale, each data point is represented as a shade of grey, from black to white at either extreme of the data range. A variety of processing tools (including destriping and possibly despiking) will be used to enhance any potential archaeology. The mean level of each traverse of data will be reduced to zero and all grids matched so that there will be no differences between background levels. The data will be analysed using a variety of parameters and styles and the most useful of these will be saved a JPEG/TIFF images and displayed using Adobe Illustrator software.

The final results will be presented at an appropriate scale tied to the Ordnance Survey National Grid. A level of interpretation of these results will also be displayed.

5 Monitoring

DAT-DM will be contacted approximately one week prior to the commencement of site works, and subsequently once the work is underway.

Any changes to this WSI that AW may wish to make after approval will be communicated to DAT-DM for approval on behalf of the Planning Authority.

DAT-DM will be given access to the site so that they can monitor the progress of the work, they will be kept regularly informed about developments, both during the site works and subsequently during the post-fieldwork programme.

6 Post-fieldwork programme

Final reporting

The client report will contain, as a minimum, the following elements:

- Concise non-technical summary of the results
- Description of, and reasoning behind, geophysical survey technique
- Detailed plans of the site and survey results
- Site illustrations, related to Ordnance Datum
- Written description
- Written interpretation of results along with illustrated interpreted site plan
- Statement of local and regional context
- Conclusions as appropriate
- Bibliography
- A copy of the AW Specification

Copies of the report will be sent to the Client, and a copy of the report will be sent to DAT-DM for approval. Following approval, a copy will also be sent to CCC and the regional Historic Environment Record. Digital copies will be provided in pdf format if required.

The report and all relevant information will be submitted to the Historic Environment Record following the guidelines and procedures laid out in the *Guidance for the Submission of Data to the Welsh Historic Environment Records* (WAT 2018).

A summary report of the work will be submitted for publication to a national journal no later than one year after the completion of the work.

Site archive

An ordered and integrated project archive will be prepared in accordance with *The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017* (National Panel for Archaeological Archives in Wales) and the guidelines of the Chartered Institute for Archaeologists upon completion of the project.

7 Resources and timetable

Standards

AW works to the standards and guidance provided by the *Chartered Institute for Archaeologists*. AW fully recognise and endorse the Chartered Institute for Archaeologists' *Code of Conduct*, *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* and the *Standard and Guidance for archaeological geophysical survey* currently in force. All employees of AW, whether corporate members of the Chartered Institute for Archaeologists or not, are expected to adhere to these Codes and Standards during their employment.

Staff

The project will be undertaken by suitably qualified AW staff. Overall management of the project will be undertaken by John Davey MCIfA, AW Project Manager.

Equipment

The project will use a Bartington Grad601 set to standard specifications.

Timetable of archaeological works

The work will be undertaken at the convenience of the client. No start date has yet been agreed, but this it is anticipated to start soon after approval of this WSI.

Insurance

AW is fully insured for this type of work, and holds Insurance with Aviva Insurance Ltd and Hiscox Insurance Company Limited through Towergate Insurance. Full details of these and other relevant policies can be supplied on request.

Arbitration

Disputes or differences arising in relation to this work shall be referred for a decision in accordance with the Rules of the Chartered Institute of Arbitrators' *Arbitration Scheme for the Institute for Archaeologists* applying at the date of the agreement.

Health and safety

Prior to the commencement of work AW will carry out and produce a formal Health and Safety Risk Assessment in accordance with *The Management of Health and Safety Regulations* 1992. A copy of the risk assessment is attached, and a copy will be kept on site and be available for inspection on request. A copy will be sent to the client (or their agent as necessary) for their information. All members of AW staff will adhere to the content of this document.

AW will adhere to best practice with regard to Health and Safety in Archaeology as set out in the FAME (Federation of Archaeological Managers and Employers) health and safety manual *Health and Safety in Field Archaeology (2002)*.

Covid-19 Specific Considerations

If a Staff member believes they are at an increased risk from the virus they are to contact management.

If anyone is showing symptoms of Covid-19 they are to go home immediately and notify the appropriate people.

Staff will drive to site in a private vehicle alone or with someone from their household only. If sites require multiple staff members to attend, they will travel separately and will try to avoid the use of public transport (walking, cycling etc)

Staff will stay at least 2m away from any person, who does not live within their own household, AT ALL TIMES. This includes on site, within office space, in the canteen and all other parts of the compound.

Staff will wash hands regularly and thoroughly, especially on arriving to site, leaving site and before eating.

The staff members should take their own food and drink to site.

Once returning home, appropriate care should be taken to ensure that contamination does not spread (change clothes, shower etc)

Staff will avoid touching surfaces if possible. If they have to touch a surface, such as a door handle or toilet seat, staff must either wear gloves or wash their hands/ relevant body part with sterilising hand wash immediately afterwards. DO NOT touch your face after touching any surface. Staff should also disinfect surfaces before and after touching. Staff must bring their own sterilising handwash, wipes and gloves and dispose of them safely after use.

All staff will read, sign, and adhere to the separate Site Operating Procedures and work in accordance with them.

If any staff, contractor, or any other persons on site are not abiding by these rules, the staff member will remove themselves from the risk and contact the Project Manager immediately.

References

British Geological Survey. 2020. British Geological Survey Maps. Accessed at www.bgs.ac.uk on 21/04/21

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Chartered Institute for Archaeologists. 2020. *Standards and Guidance for Geophysical Surveys.*

Izquierdo Zamora, A. 2017. *Land adjacent to Laugharne School, Laugharne, Carmarthenshire, Dyfed; Archaeological Appraisal and Site Visit.* Archaeology Wales Report No. 1566.

The Welsh Archaeological Trusts (WAT). July 2018. *Guidance for the Submission of Data to the Welsh Historic Environment Record.*

Archaeology Wales

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