

# *Archaeology Wales*

## **Crugmore Farm, Penparc, Cardigan, Ceredigion**

Geophysical Survey



By  
**Dr Iestyn Jones**

**Report No. 1250**



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# Archaeology Wales

## Crugmore Farm, Penparc, Cardigan, Ceredigion

Geophysical Survey

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## Summary

*Archaeology Wales carried out a geophysical survey on fields at Crugmore Farm, Penparc, Ceredigion. It has been proposed that a solar farm is located on these fields. At the time of the survey only two of the five fields were suitable for geophysical survey due to the height of vegetation, marshy ground and obstacles. The two largest fields were relatively clear and were surveyed within the footprint of the proposed solar farm. A considerable amount of metal waste was scattered throughout the fields and only one feature, a possible former field boundary, was discovered.*

## 1. Introduction

In June 2014 Archaeology Wales was commissioned by Asbri Planning to carry out a geophysical survey on land at Crugmore Farm, Penparc Ceredigion (centred on NGR SN 2040 4710; fig. 1). This work was carried out as part of a planning condition imposed by Ceredigion County Council (planning application number: A130807) associated with the construction of a solar power farm with photovoltaic panels.

Dyfed Archaeological Trust Heritage Management (DAT - HM), in its capacity as the archaeological adviser to the local authority, recommended that a geophysical survey be carried out the land prior to the commencement of groundworks on the site because of the possibility that buried archaeological remains may be present in the area.

The aim of the survey was to detect, identify, describe and record any buried archaeological features that may be located within the proposed development area. The work was carried out by Hywel Keen and Andy Shobbrook for Archaeology Wales between the 14<sup>th</sup> and 18<sup>th</sup> of July, 2014 (AW Project Number: 2149). This report summarizes the survey's findings following completion of the work.

## 2. Site Description

### Location, Topography, Geology

The application site is located on farmland to the south of Crugmore Farm. The proposed solar farm is centred at NGR SN 2040 4710. The development site lies over 500m to the south and north of the villages of Penparc and Llangoedmor, respectively (fig.2). The proposed site area covers approximately 30 acres (approximately 12.5 hectares) of agricultural land. The development area consists of five pasture fields, the boundaries of which are defined by established hedgerows and belts of deciduous woodland. The proposed scheme lies within a shallow

valley, the fields to the east and south of Crugmore Farm are located at approximately 100m and 70m above Ordnance Datum (OD), respectively.

The local geology is characterized by Ordovician Sandstone of the Nantmel Mudstones Formation underlying slightly acid sandy soils composed of glacial Devensian clays, silts and sands (BGS 2014; Soilscales 2014).

### 3. Historical Background

A Bronze Age round Barrow is listed within the HER and is present 80m west of the northern boundary of Field E (PRN 5837) (Archwilio 2014). Later prehistoric activity may have been focused on two sites as Crugmore Farm is located near two Iron Age and Romano-British enclosures. Banc-y-Warren (NPRN 405527), a sand hill with a distinct scrap terrace which was used as a defended enclosure during the Iron Age and is located 380m to the north of the site (Driver 2006). The site's name may derive from the ideal rabbit habitat created by this natural glacial groll. Pen parc (NPRN 308515), a possible Romano-British square defended enclosure is located 800m to the north-east of the site (Wiles 2004). In terms of the medieval period the area is also reputedly the location of a battle between Gruffudd ap Rhys and an Anglo-Norman force in 1136 (NPRN 40232) (Malaws 2005). No evidence was found for this battle during a watching brief associated with the construction of a fishing pond and boating lake in 2009 (Poucher 2009).

## 4. Geophysical Survey

### 4.1 Objectives, Methodology and Strategy

The primary objective of the work was to locate and describe, by means of a geophysical survey, archaeological features that may be present within the development area. The proposed survey attempted to elucidate the presence or absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance. This work was undertaken in July 2014.

The on-site survey was undertaken in a single phase lasting five days using a Bartington Grad601 Magnetometers. This detects variations in the earth's magnetic field. Each survey area was divided into 30m square grids along a common north – south alignment.

Within each grid a zig-zag pattern was walked, as any linear features which are on the same alignment are more difficult to see when compared to those which are at a right angle to the traverses. Instrument readings were 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 were completed using the “dummy log” key.

All data was downloaded in the field into a laptop computer. The location of the grid corners was recorded using a Topcon GRS 1 GPS surveyor so that the results could be accurately placed onto an OS map (see fig. 3).

A composite of each detailed survey area was created and processed using the software package Terrasurveyor. A variety of processing tools were used to enhance any potential archaeology. The results are outlined and discussed on a field-by-field basis. For field numbering see Figure 2 and 3.

## 4.2 Survey Results

### **Obstacles and obstructions (figs. 7-10)**

A number of fields could not be surveyed due to various obstacles. Field C and D, originally a single field, has been divided by a vehicle track way that runs north to south from the farm buildings towards a recently constructed boating and fishing lake in the field to the east of Field B. Dumped spoil either side of the trackway had been left in situ and grassed over (fig. 7). The field was overgrown and had metal waste, tyres and old farm machinery scattered on the ground surface. Green waste dumps also covered areas to the east of the track (fig. 7). A significant area of field E (105m by 65m) had been enclosed by wire and post fencing and contained high marsh vegetation (fig.8). Several vehicle tyre dumps, scattered and half buried tyres and overgrown spoil-heaps were located within other areas of the field (fig. 9). Sheep were also grazing within this field. No significant areas of these fields were sufficiently clear to be surveyed and the survey was confined to relatively clear areas within Fields A and B.

### **Field A (fig. 4)**

The proposed solar farm site within this field comprises 3.3 Hectares (8.10 acres) within the central area of the field. The grid was laid out with 30m squares. No partial squares were used. The extent of the grid was limited to the east by large waste heaps.

Field A has a uniform low background on which are large amounts of higher magnetic responses scattered at random. The majority of these are metal spikes which are typically seen as possessing a dark centre with a white halo surrounding it. The area highlighted (fig. 4a) is a very large example of this. Many of these were filtered out during data processing as they can obfuscate genuine archaeological features, although some remain. The area indicated in fig. 4b shows a dark response which is close to where a large metal flat-bed truck had been left at the edge of the field. The flat bed was approximately 6m from the edge of the grid and the disturbance is indicative of how metal can affect the survey work.

There is a concentration of metal spikes (fig. 4a) in the south-western area of Field A, as these are lying in a natural hollow where a spring feeds into the stream dividing fields A and B. It is likely that a large amount of material has been recently laid in this field which has then been grassed over, obscuring any possible buried archaeological features. Due to this process it was not possible to observe any significant features within this field.

#### Field B (figs. 5,6,10)

Field B, located to the south of Field A and separated by a drain and marshy woodland, is one of the largest areas within the proposed solar farm. The grid was laid out with 30m squares, one partial grid was used to the extreme north of east of the field. Much of the field around the edges could not be surveyed to high grass, brambles and thistles, particularly the south east of the field, which had acted as the drainage area for the dam to the east (fig. 10).

The red line (fig. 6) marks a ploughed out field boundary and the yellow line marks where the material deposited on the field went from very thick to relatively thinner. The amount of weathered plastic contaminants embedded in the soil makes it likely that the entire field topsoil has recently been significantly disturbed. Old tyres poking through the surface and large metal spikes were especially notable where the green and red lines meet. As a result the only feature visible within the surveyed area of this field is a north to south aligned field boundary observable on Ordnance Survey maps as recently as 1993.

### 5. Discussion and Conclusions

The amount of disturbance within the upper deposits in the surveyed fields (A and B) made it difficult to discover any significant buried archaeological features. A significant amount of metal and plastic within the soil of fields A and B produced anomalies that obscured any meaningful readings. The only feature that emerged from the survey within Field B is the north to south field boundary that was extant in the 1990s but has since been removed. The amount of obstacles, including dumped material, marshland and vegetation within the other fields (C, D and E) prevented further survey work.

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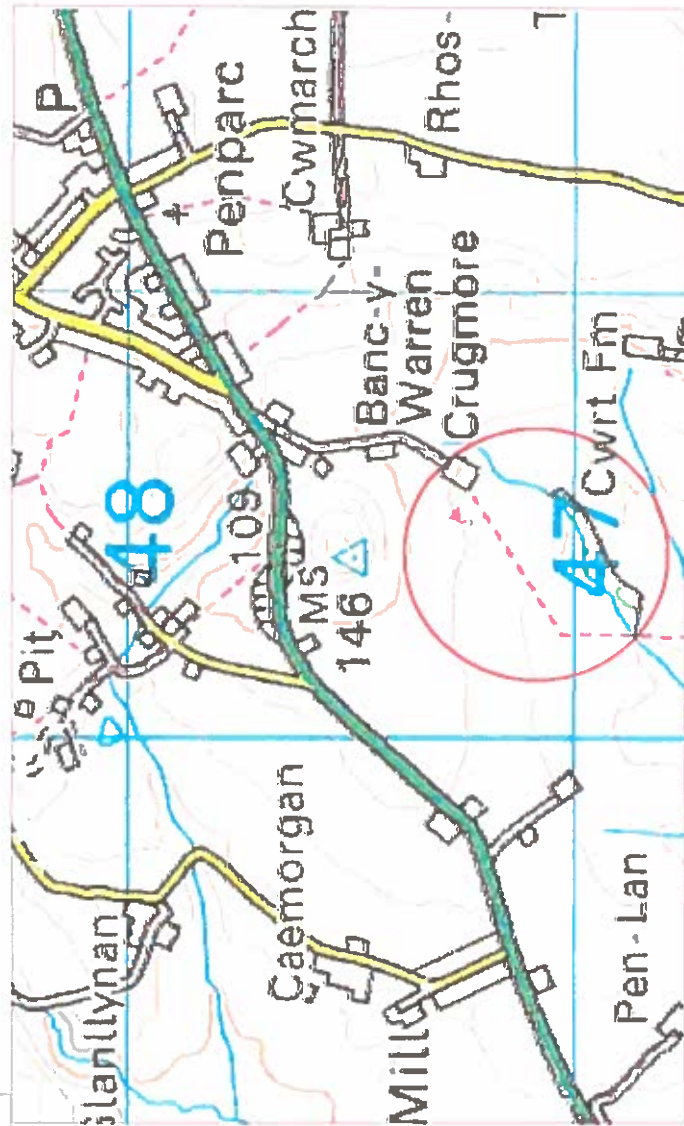
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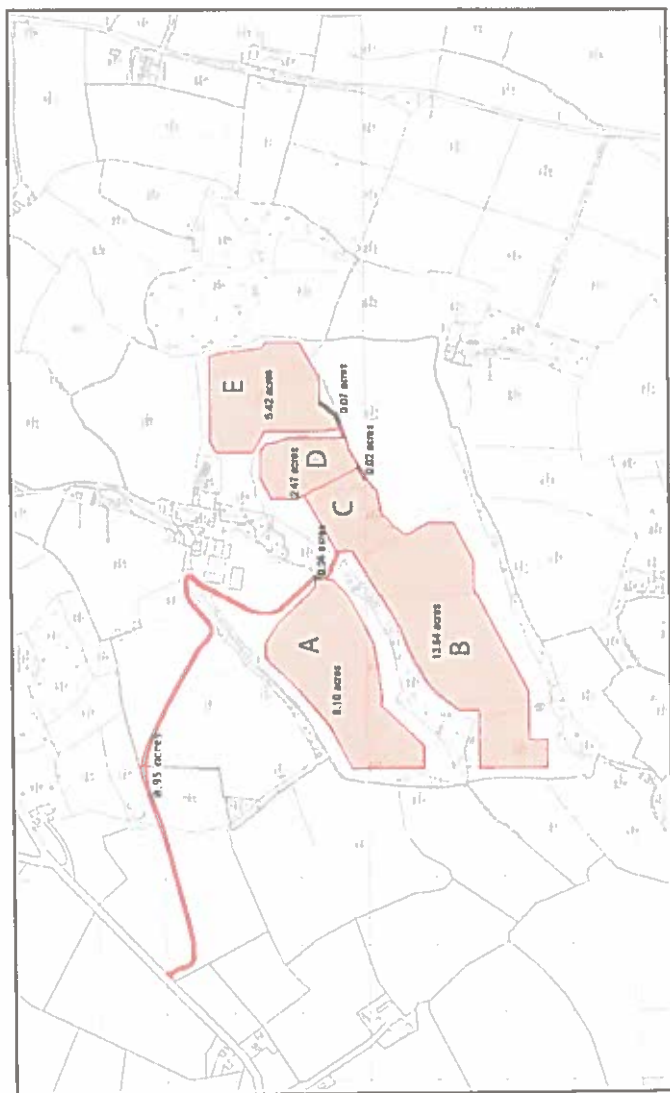




OS Map data is taken from Ordnance Survey. Copyright © 2004 OS. 100045111

Fig. 1  
Location of  
site

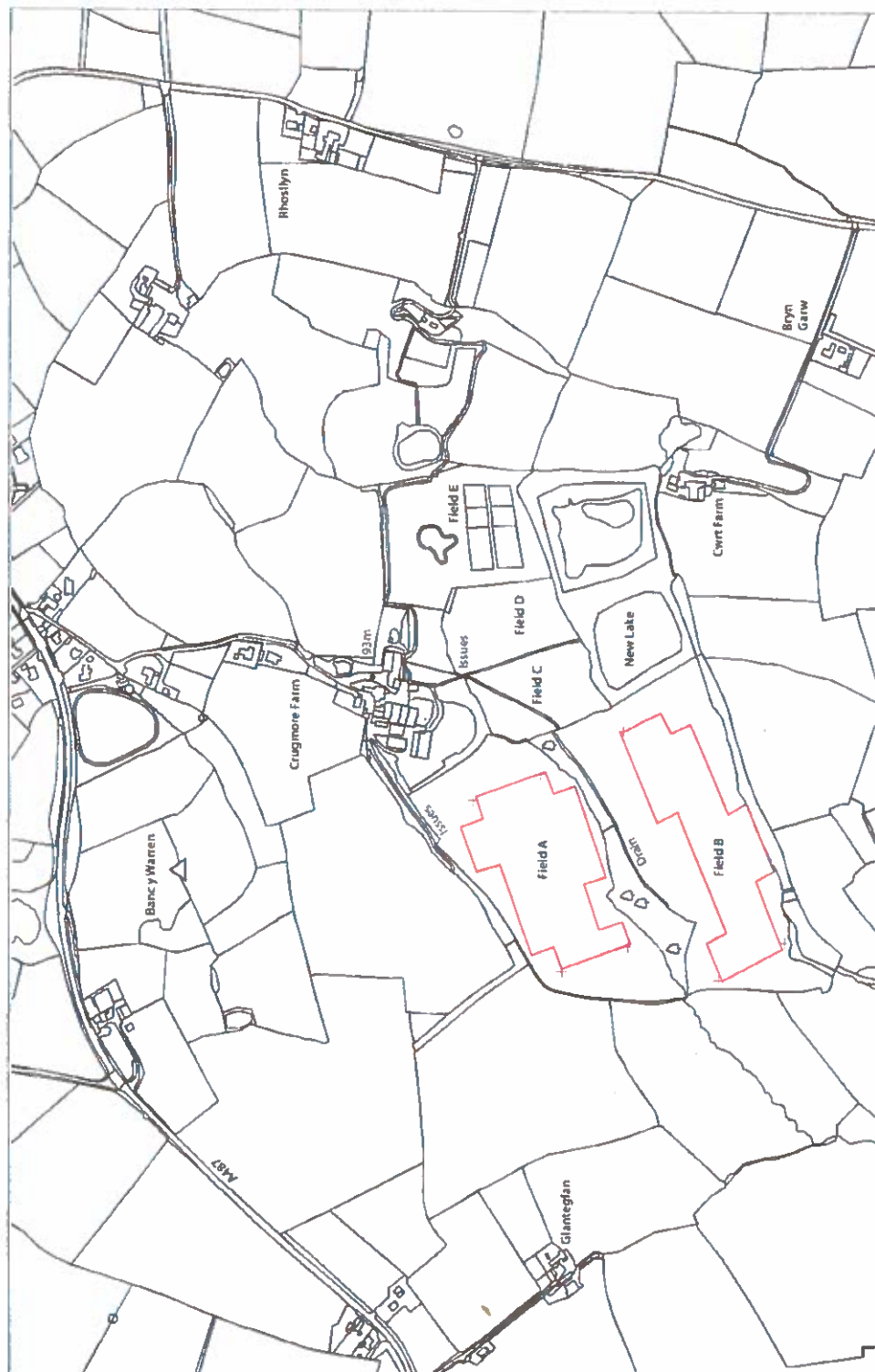




0 500m

Fig. 2

Field plan



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Fig.3  
Location of  
survey grids  
(red outline)

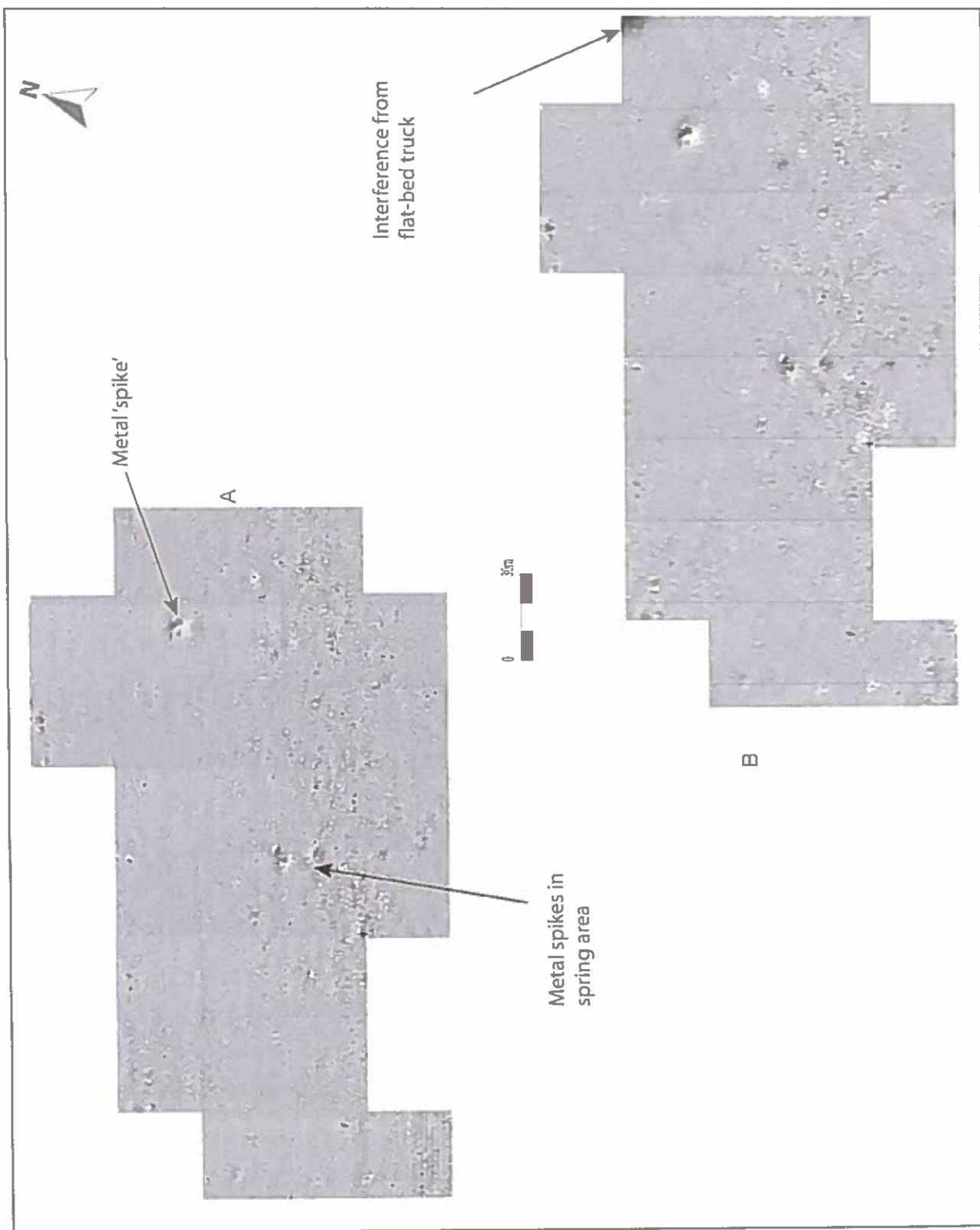


Fig. 4

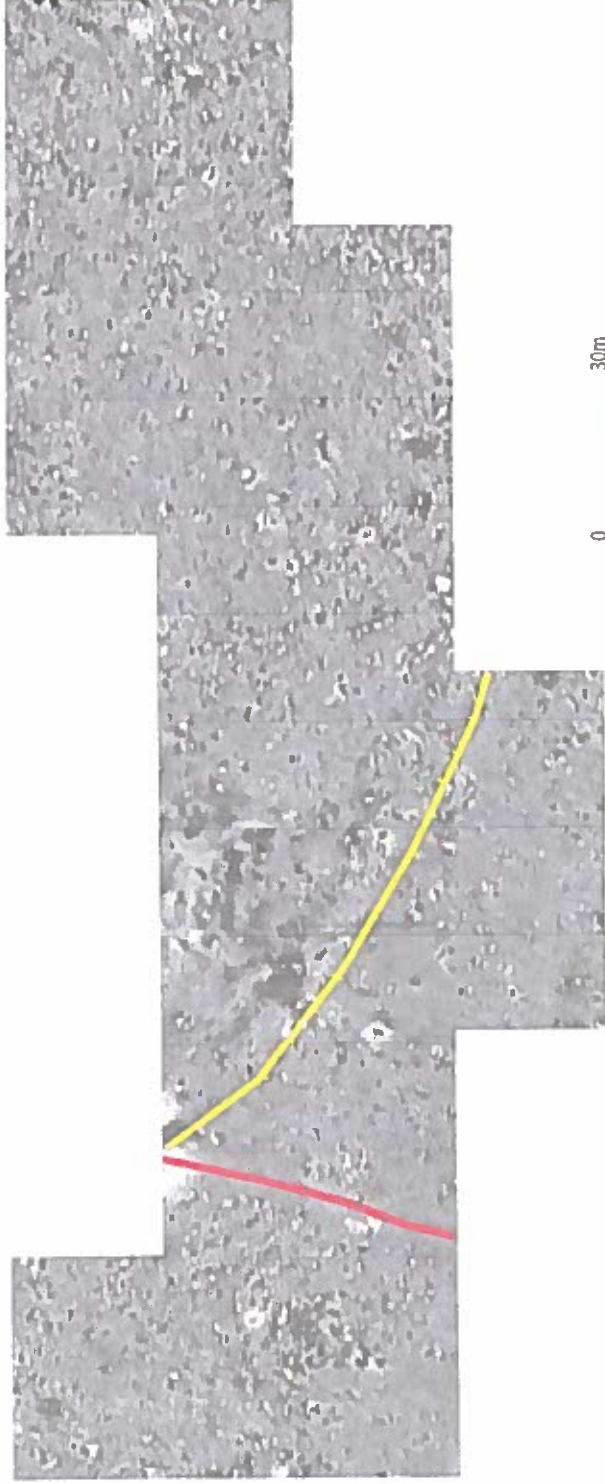
Field A shadeplot

a: High pass

b: Low pass

Fig. 5  
Field B  
shadeplot





0 30m

Ploughed out field  
boundary

Disturbed upper  
deposit anomaly

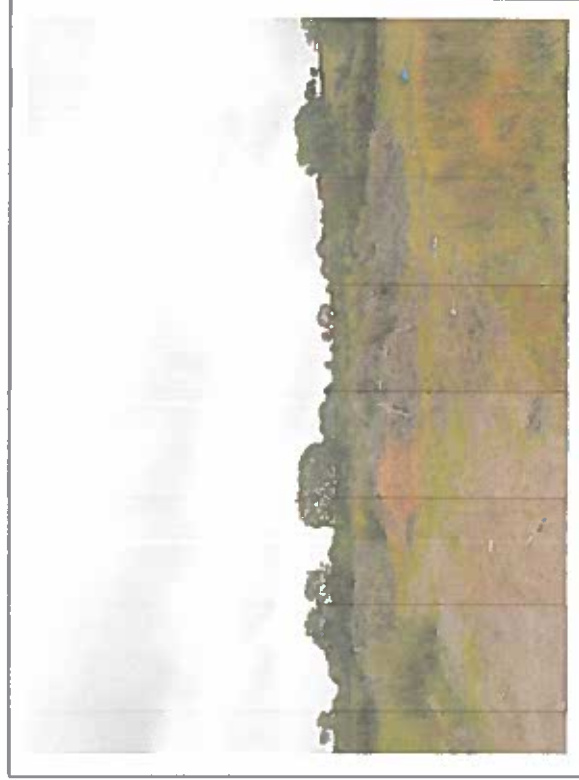
Fig. 6

Field B:  
Shadeplot with  
highlighted  
anomalies





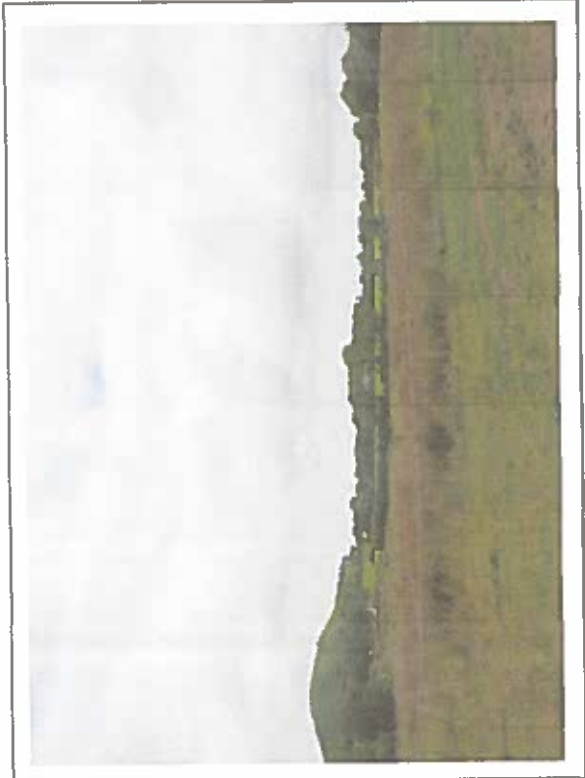
View of track separating Fields C and D with  
spoil heaps and farm machinery (looking  
north-east)



Green waste in Field D  
(looking north-west)

Fig. 7

Field C and D  
obstructions



View of fenced enclosure containing long grasses (looking north-northeast)



Close view of fenced enclosure containing long grasses (looking north-northeast)

Fig. 8

Field E  
obstructions





View of tyre dumps and long vegetation  
(looking north-northwest)

View of tyre dumps and long vegetation  
(looking north-northwest)



Fig. 9  
Field E  
obstructions



View of marshland in south-east corner of  
Field B (looking south-east)



Survey under way in eastern end of Field B  
(looking south-southeast)

Fig. 10

Field B images

# *Archaeology Wales*

## **APPENDIX I:**

Copy of WSI

**Written Scheme of Investigation**  
**for a geophysical survey**  
**at**  
**Crugmore Farm, Penparc, Ceredigion**

**Prepared for:**  
**Asbri Planning Ltd**

Project No. 2149

**July 2014**

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## NON TECHNICAL SUMMARY

*This Written Scheme of Investigations details a proposal for a geophysical survey on land around Crugmore Farm, Penparc, Ceredigion, prior to the proposed construction of a solar farm (planning reference A130807) on the site. It has been prepared by Archaeology Wales for Asbri Planning Ltd.*

### 1. Introduction

The proposed development is for a solar power farm (photovoltaic panels) on land at Crugmore Farm, Penparc, Ceredigion (Henceforth – the site). The development proposal has been submitted by Asbri Planning. The local planning authority is Ceredigion County Council and the planning application number is A130807. The site is located at NGR SN 2040 4710 (fig. 1)

This specification has been prepared by Dr Iestyn Jones, Project Officer at Archaeology Wales Ltd (Henceforth - AW) at the request of Asbri Planning. It provides information on the methodology which will be employed by AW during the geophysical survey.

The archaeological work has been recommended by Dyfed Trust (DAT) in its capacity as archaeological adviser to the planning authority.

AW is a Registered Organisation with the Institute for Archaeologists (IfA). All work will be managed by Dr Iestyn Jones and undertaken by suitably qualified staff, in accordance with the standards and guidelines of the IfA.

### 2. Site description and background

The application site is located on farmland to the south of Crugmore Farm. The proposed solar farm is centred at NGR SN 2040 4710. The development site lies over 500m to the south and north of the villages of Penparc and Llangoedmor, respectively (fig.2). The site area will comprise approximately 30 acres (approximately 12.5 hectares) of agricultural land. The development area consists of five pasture fields

the boundaries of which are defined by established hedgerows and belts of deciduous woodland. The proposed scheme lies within a shallow valley, the fields to the east and south of Crugmore Farm are located at approximately 100m and 70m above Ordnance Datum (OD), respectively.

The archaeological monuments reported within the study area include a group of Bronze Age burial mounds located some 500m south-east of the development area. There is also a high concentration Bronze Age, Iron Age and Roman sites within the surrounding landscape. The topography of the development site suggests there is a low to moderate potential for archaeological remains within the development area.

### **3 Site Specific Objectives**

The primary objectives will be to locate and describe, by means of geophysical survey, all sub-surface archaeological features that may be present within the development area. The proposed work will attempt to elucidate the presence or 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 Method statement for geophysical survey (Stage 1)**

The area to be surveyed will comprise most of the available development area (Fig. 2). DAT will be kept informed of any potential changes to the on site survey coverage as work progresses. All work will be undertaken in accordance with both the IFA's Standards and Guidance: for an archaeological geophysical survey and current Health and Safety legislation.

A previous archaeological appraisal (Hadley 2014) appears to show that Field B, comprising rough grazing, has areas of potentially marshy land with reeds. Areas of this field may not respond effectively to the survey. It is assumed that only less marshy areas of this field are included. Field D was largely covered in 'green waste' in January and any covered ground surfaces will clearly not be included if the waste material remains.

A 20m grid will be laid out across the survey area along a common alignment. All grid points will be located with a total station and plotted onto an O.S. base map.

It is proposed that the on-site survey will be undertaken in a single phase lasting approximately 1 to 2 weeks. This will be followed by report production.

The survey will be carried out using a Bartington 601 Gradiometer.

Within each grid, parallel traverses 2m apart will be walked along the same orientation. Instrument readings will be logged at 0.25m intervals. 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. The location of the grid corners will be recorded using a total station so that results can be accurately placed onto an OS map.

Following the completion of the on-site survey, processing and analysis of the survey data using the Geoplot V.3 software package. The most typical method of visualising the data 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 number of standard operations will be carried out to process the data.

The data will be analysed using a variety of parameters and styles and the most useful of these will be saved as JPEG images and displayed using Adobe Illustrator software.

The results of the survey will then be overlaid onto an appropriately scaled map tied into the Ordnance Survey National Grid

## **5 Monitoring**

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

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

## **6 Stage 2 - Archiving and Reporting**

### *Site archive*

An ordered and integrated site archive will be prepared in accordance with: Management of Research Projects in the Historic Environment (MoRPHE) English Heritage 2006 upon completion of the work on site. It will include:

- All site records (fully cross-checked and catalogued)
- All digital survey data
- Digitised copies of all site plans
- An interim or summary report on the above.

A copy of the site archive will be supplied to Asbri Planning and DAT. The requirements for archive storage will be agreed with the appropriate organisation.

### *Final reporting*

A draft report will be submitted to Asbri Planning and to DAT for comments within 4 weeks of the survey being completed.

A full client report of the results of the archaeological work will be prepared within 6 months of the end of the project. Copies of the report will be sent to Asbri Planning, DAT and for inclusion in the regional HER (Llandeilo). Digital copies will also be provided in pdf format.

Terminology will be consistent with the English Heritage Thesaurus.

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

- Concise English non-technical summary of the results
- Detailed plans of the site
- Survey results, related to Ordnance Datum
- Written description
- Interpretations
- Conclusions as appropriate
- Bibliography



- A copy of the AW Written Scheme of Investigations

A summary of the work will be published in a national journal (i.e. *Archaeology In Wales*) no later than a year after its completion.

#### ***Final archive***

Although there may be a period during which client confidentiality will be maintained, the report and the final (project) archive will be deposited in the appropriate repository not later than six months after completion of the work. The contents and location of the archive will be agreed with DAT beforehand.

## **7 Resources and timetable**

### **Standards**

The fieldwork will be undertaken by AW staff using current best practice.

### **Staff**

The project will be undertaken by suitably qualified AW staff. Overall management of will be undertaken by Dr Iestyn Jones

### **Equipment**

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

### **Timetable of archaeological works**

A provisional date for the survey of Mid July has been agreed between AW and the client.

### **Insurance**

Archaeology Wales Limited (AW) is an affiliated member of the CBA, and holds Insurance through the CBA insurance service.

### **Health and safety**

All members of staff will adhere to the requirements of the *Health & Safety at Work Act*, 1974, and the AW Health and Safety Policy.

AW will produce a detailed Risk Assessment for approval by the client before any work is undertaken.

## **References**

Hadley, A. 2014. Crugmore Farm, Penparc, Ceredigion: Archaeological Appraisal prepared for Asbri Planning Ltd (Archaeology Wales report 1187), January 2014.



Fig 1: Map showing location of assessment area



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