

**BLAEN BOWI SOLAR PARK,
CARMARTHENSHIRE:
GEOPHYSICAL SURVEY 2015
(NGR SN 32790 35510)**



Prepared by DAT Archaeological Services
For: Corylus Planning



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BLAEN BOWI SOLAR FARM, CARMARTHENSHIRE: GEOPHYSICAL 2015

Gan / By

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**BLAEN BOWI SOLAR FARM, CARMARTHENSHIRE:
GEOPHYSICAL SURVEY**

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**BLAEN BOWI SOLAR FARM, CARMARTHENSHIRE:
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SUMMARY

DAT Archaeological Services were commissioned by Corylus Planning to undertake a geophysical survey of land at Blaen Bowi, Carmarthenshire. The geophysical survey was recommended following a condition placed upon planning permission (application No. W/28837) for the development of a proposed solar farm.

The solar farm site is located on the gradual slopes between two prominent hills with known Prehistoric activity recorded on Moelfre which rises to the north of the site, this includes a Bronze Age barrow cemetery (CM107). Overall the site potential could be highest for Prehistoric activity, specifically Bronze Age remains associated with the barrow cemetery atop of Moelfre Hill.

The geophysical survey was conducted in April 2015 and included an area approximately 12.3ha in size. The survey was conducted using a fluxgate gradiometer which detects variations in the earth's magnetic field.

The survey results demonstrate that gradiometer survey does work successfully on the geology of the site area. Overall the survey has shown up few anomalies which could be interpreted as being of archaeological origin. Old field boundaries and former track ways do show up clearly, as well as a few service trenches (possibly water pipes) and geological anomalies. Features representative of moorland clearance when the area was turned to improved pasture have also been identified.

Further archaeological mitigation may be required at the site, and specifically in areas where the few identified anomalies of potential archaeological origin were identified across the development site. Due to the limited nature of disturbance anticipated by the development, an archaeological watching brief may be considered suitable as the extent of groundworks proposed would probably be limited to those associated with cable trenching and the footprints of the substation and metering cabinets. Existing track ways will be used to access the site and no further excavation of tracks is to be carried out across the development site.

The geophysical survey has indicated no archaeological remains that could preclude the proposed development.

1. INTRODUCTION

1.1 Project Commission

- 1.1.1 DAT Archaeological Services were commissioned by Corylus Planning to undertake a geophysical survey at the site of a consented solar park at Blaen Bowi, Carmarthenshire (NGR SN 32790 35510; Figure 1) for which planning permission has been granted.
- 1.1.2 Following consultation on the planning application submitted for the solar park (Planning application No. W/28837), the archaeological advisors¹ to the planning authority recommended the following condition should be placed on planning permission:
- '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 and approved in writing by the Local Planning Authority.'*
- 1.1.3 Through consultation with the archaeological advisors to the planning authority, it was determined that the written scheme of investigation should include a geophysical survey of the site area as a minimum.
- 1.1.4 The results of the geophysical survey should provide a better indication of the archaeological potential of the site and enable targeting of any further archaeological mitigation requirements before or during the development programme. Such mitigation could range from a watching brief to a full excavation, depending on what is or is not revealed.
- 1.1.5 The planning application for the proposed solar park was submitted by Dulas Ltd, for which they prepared an Environmental Statement prepared in support of the application. This included a chapter on 'Archaeology and Cultural Heritage'².

1.2 Scope of the project

- 1.2.1 A Written Scheme of Investigation (WSI) for a geophysical survey was prepared by DAT Archaeological Services prior to the commencement of works. The WSI was drawn up following initial consultation with the archaeological advisors to Carmarthenshire County Council:
- Provision of a written scheme of investigation to outline the methodology for the geophysical survey which DAT Archaeological Services will undertake.
 - To identify the presence/absence of any potential archaeological deposits through gradiometer survey.
 - To establish the character, extent and date range (where possible) for any archaeological deposits to be affected by the proposed works; and
 - To use the information to determine the scope of any further archaeological mitigation which might be required at the proposed site of the solar park.

¹ Dyfed Archaeological Trust Planning Services – Heritage Management.

² Dulas Ltd, July 2013, Blaen Bowi Solar Park Environmental Report, Archaeology and Cultural Heritage chapter pp60 - 70

1.3 Report outline

- 1.3.1 This report provides a summary and discussion of the geophysical survey and its results.

1.4 Abbreviations

- 1.4.1 Sites recorded on the Regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Gradiometer readings are measured in nanoTesla (nT).

1.5 Illustrations

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

1.6 Timeline

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

Period	Approximate date	
Palaeolithic –	c.450,000 – 10,000 BC	Prehistoric
Mesolithic –	c. 10,000 – 4400 BC	
Neolithic –	c.4400 – 2300 BC	
Bronze Age –	c.2300 – 700 BC	
Iron Age –	c.700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – c. AD 410	Historic
Post-Roman / Early Medieval Period –	c. AD 410 – AD 1086	
Medieval Period –	1086 – 1536	
Post-Medieval Period ³ –	1536 – 1750	
Industrial Period –	1750 – 1899	
Modern –	20 th century onwards	

Table 1: Archaeological and Historical Timeline for Wales.

³ The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust



Figure 1: Location map based on the Ordnance Survey. Proposed development location outlined in red

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2. THE SITE

2.1 Location

2.1.1 The proposed development site covers an area of approximately 12.3ha covering two fields to the west of the B4333 from Hermon to Newcastle Emlyn, Carmarthenshire. The two fields are labelled as B & C on Figure 2.

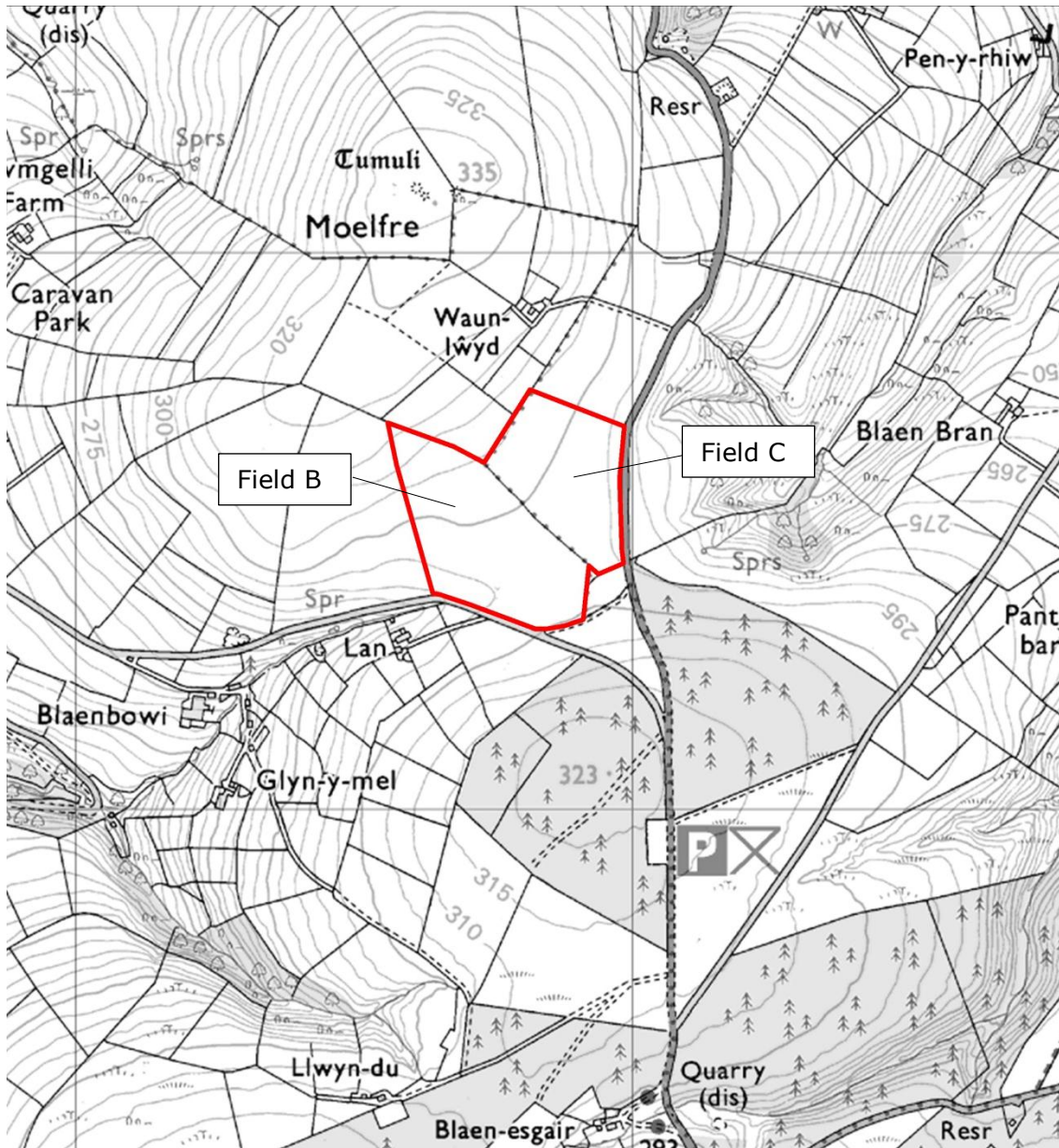


Figure 2: Fields B & C of consented Solar Farm

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2.1.2 The proposed solar farm site is located on land at Blaen Bowi, its eastern most boundary lies directly adjacent to the B4333 and approximately 6km southwest of Newcastle Emlyn in Carmarthenshire. It is situated on the gradual slopes between two prominent hills. Moelfre hill lies directly to the

north and has known Prehistoric activity recorded upon it in the form of Bronze Age round barrows.

- 2.1.3 The survey area consists of an enclosed field system primarily used for sheep grazing but has been ploughed in the past.

2.2 Archaeological Potential

- 2.2.1 As part of the original application for the solar park, an Archaeology and Cultural heritage chapter was prepared for the Environmental Statement by Dulas Ltd (2013). This includes a detailed archaeological and historic background and supporting plans and illustrations. As part of the preparation of this report the information included within the archaeology chapter has been reviewed, with an additional search of the regional Historic Environment Record (HER) held by the Dyfed Archaeological Trust and the RCAHMW Coflein database. A summary of all known archaeological sites within 2km of the proposed solar farm is included in Appendix 1.

- 2.2.2 There are four Scheduled Ancient Monuments located within a 2km radius of the proposed solar farm site. The nearest is the Moelfre round Barrow complex (CM107; PRNs 2274-6 and 42659) which is approximately 0.35km away on the hilltop to the north of the site. The complex comprises three Bronze Age round barrows all of which have been damaged by agricultural activities but which nonetheless are an important archaeological asset, hence their designated status.

- 2.2.3 Crug-y-Gorllwyn Round Barrow (CM108; PRN2293) lies approximately 0.76km south-southwest of the site on another hilltop. This is also of Bronze Age date.

- 2.2.4 Approximately 1.2km to the north of the site is the Tomen Seba medieval Motte (CM020; PRN2273). It was last surveyed in 1984 and the following notes were made –

"Tomen Seba Motte is in a good state of preservation. It stands 30 feet high from the bottom of the ditch to the top of the mound. There is a slight depression in the top of the mound and the mound is surrounded by a water-filled ditch about 20 feet wide. The mound stands in a field used for pasture and is itself covered with bracken and small trees."

- 2.2.5 There is no further information as to its age or origins but it would be safe to assume that it was constructed by the Normans in the latter part of the 11th century.

- 2.2.6 To the southeast of the site approximately 1.75km away is another Bronze Age barrow, the Nant Sais Round Barrow (CM106; 2295).

- 2.2.7 With the exception of the Tomen Seba Motte it can be seen that there was significant Bronze Age activity in the area. If one expanded the search radius beyond that specified for this report one would see a host of sites frequently, as with the ones mentioned above, occupying prominent positions on hilltops. The Scheduled Ancient Monuments should be viewed in this context – as components in a wider cultural complex spanning much of southwest Wales.

- 2.2.8 At its northeast corner the proposed solar farm site is immediately adjacent to the Drefach and Felindre Historic Landscape Character area. This area was important for textiles production from the medieval period until the 19th century.

- 2.2.9 There are 80 Historic Environment Records within a 2km radius of the proposed solar farm site (Appendix 1). These will be briefly outlined in chronological order and a complete list has been included in Appendix 1.
- 2.2.10 There is one Neolithic site (PRN47618) – a miniature stone axe was found some 1.5km to the west of the proposed solar farm. Find spots such as this are rare and are frequently indicative of long-range trade in artefacts between localities.
- 2.2.11 There is an array of Bronze Age sites nearby of which Moelfre (PRN42569) and Cefn Hiraeth (PRN10594) are barrow complexes. Five more are single barrows (e.g. Crug-y-Gorllwyn, PRN 2293; Nant Sais PRN 2295), and there is also a single standing stone, Cae Carreg Fawr (PRN7314). The barrows are part of the funerary practises of the local Bronze Age people and occupy many of the surrounding hilltops. Their abundance suggests there was a thriving population in the local area during the Bronze Age with a highly developed culture and structured society. It is distinctly possible that similar features might be encountered within the boundaries of the proposed solar farm site.
- 2.2.12 There are no known structures or features associated with the Iron Age and Roman periods within 2km of the site.
- 2.2.13 There are no known sites of early medieval date within 2km of the site. There is one definite and one possible Norman structure. The former is the scheduled motte site discussed above, Tomen Seba (PRN2273) which lies just to the north of the proposed solar farm site. The latter is a place name reference Llwyn Beili (PRN12167) which translates as Bush Bailey. It is possible that this refers to a structure which has subsequently been destroyed.
- 2.2.14 The majority of the archaeological sites in the area date from the post-medieval period. These can be subdivided into industrial, residential, religious and other sites.
- 2.2.15 There are twelve quarries scattered around the proposed solar farm site. There are two woollen mills, Esgair Mill (PRN15785) and Esger View (PRN35590), and two mill races (PRNs 35588 and 35589).
- 2.2.16 There are a variety of dwellings some of which are quite substantial but the majority of which are small cottages. Of these several are dual purpose premises with Penyparc (PRN35480) and Pantbach (PRN35487) being hosiery workshops, and Cilcraig (PRN35482) and Bryn (PRN35496) being weaving workshops. These lie within the Drefach and Felindre Historic Characterisation Area and contribute to its designation.
- 2.2.17 As is typical of rural Wales, the area is well served by a range of chapels there being five in total within the 2km search radius. These are Capel Pen'r Heol (PRN15713), Capel Tan-glwst (PRN15894), Capel Pant-y-bwlch (PRN15894), Clawddcoch Baptist Church (NPRN6259) and Pantybwllch Chapel (NPRN6613). There is also one cemetery, Llain Ddineu (PRN5260) which possibly goes back to the early medieval period.
- 2.2.18 There are two public houses in the area – Clyn Gosen (PRN3378) and The Eden Arms (PRN22471).
- 2.2.19 The only modern structure noted in the archaeological records is Blaen Bowi Wind Farm (NPRN412096). This is located directly adjacent to the proposed solar farm, comprising three large turbines.
- 2.2.20 As a general overview there is evidence of the area being inhabited since the Neolithic period, with funerary and ritual monuments dating from

the Bronze Age. There is then a hiatus during the Iron Age/Roman period, then continuous usage until the present day.

- 2.2.21 It is most likely that the area would initially have been used for rough grazing during the Bronze Age, where there was a pastoral society. Burial mounds and standing stones are also present in the region attesting to the occupation and usage of the general area.
- 2.2.22 This pattern of agriculture is likely to have continued for millennia bearing in mind the exposed position of the hilltops and poor quality of the soil.
- 2.2.23 The Normans did have a military presence here for presumably during the 12th and 13th centuries, and it is possible that the current road follows an earlier route way across the hills, which the motte and bailey was guarding.
- 2.2.24 During the post-medieval period industries established themselves in the area. The woollen industry becomes established in the valleys nearby which undoubtedly relied on wool from the local flocks for its raw material.
- 2.2.25 The fields of the proposed solar park are presently improved pastureland, improved in the latter part of the 20th century. The Blaen Bowi wind farm directly adjacent to the site is a more recent development.
- 2.2.26 Overall the site potential is highest for prehistoric activity specifically Bronze Age remains associated with the barrow cemetery on the hill. Recent work on sites in similar topographic locations, fairly close by in Ceredigion, have revealed evidence for round barrows to be present on lower slopes of hills, as opposed to merely being located on their summits. Later Iron Age activity, potentially focussing on these earlier barrow sites has also been found, including occupation activity. Such features include ring ditches for round barrows – or potentially for hut circles; ditches for enclosures; or hearths or pyres.

3. METHODOLOGY

3.1 Geophysical Survey Methodology

- 3.1.1 A fluxgate gradiometer with a DL601 data logger was used to conduct the detailed survey, which detects variations in the earth's magnetic field. A sample interval of 0.25m (four readings per metre) was used with 1m wide traverses across 30m x 30m grids using the zigzag traverse method of collecting data. The gradiometers sensitivity was set to detect a magnetic variation in the order of 0.1 nanoTesla.
- 3.1.2 The survey grid was tied in to the local Ordnance Survey grid using a Trimble Total Station (TST).
- 3.1.4 The data was processed using *Terrasurveyor 3.0* and is presented with a minimum of processing. The presence of high values caused by ferrous objects, which tend to hide fine details and obscure archaeological features, have been 'clipped' to remove the extreme values allowing the finer details to show through.
- 3.1.5 The processed data has been presented as a grey-scale plot, overlaid on local topographical features. The main magnetic anomalies have been identified and an interpretation of those results is also given.
- 3.1.6 The resulting survey results and interpretation diagrams should not be seen as a definitive model of what lies beneath the ground surface, not all buried features will provide a magnetic response that can be identified by the gradiometer. In interpreting those features that are recorded the shape is the principal diagnostic tool, along with comparison with known features from other surveys. The intensity of the magnetic response could provide further information, a strong response for example indicates burning, high ferric content or thermoremnancy in geology. The context may provide further clues but the interpretation of many of these features is still largely subjective.
- 3.1.7 All measurements given will be approximate as accurate measurements are difficult to determine from fluxgate gradiometer surveys. The width and length of identified features can be affected by its relative depth and magnetic strength.

4. RESULTS

4.1 Introduction

- 4.1.1 The site was surveyed in March and April 2015. In total an area approximately 11.4ha in size was surveyed of the 12.3ha site, covering all areas suitable for geophysical survey.
- 4.1.2 The two fields of the consented solar farm were surveyed (Figures 2 - 6)
- 4.1.3 The areas will be discussed below individually with a conclusion given for the site as a whole, however certain elements of the surveys are best dealt with en masse to save repetition. In the geophysical interpretation images, dipolar features are represented in red, positive features are represented in green, and negative features appear in blue.
- 4.1.4 Numerous small dipolar features can be seen to cover the areas surveyed. These are likely to represent small ferrous objects such as horseshoes or nails, which are commonly found distributed across sites. Unless these features form a pattern or a part of a larger geophysical feature, they will not be discussed further.
- 4.1.5 Where a field boundary contains ferrous material such as wire-fencing, a dipolar effect can be seen where the survey encroaches near to it. This dipolar 'shadow' is visible in nearly all instances where the survey meets the field boundaries.

4.2 Field B

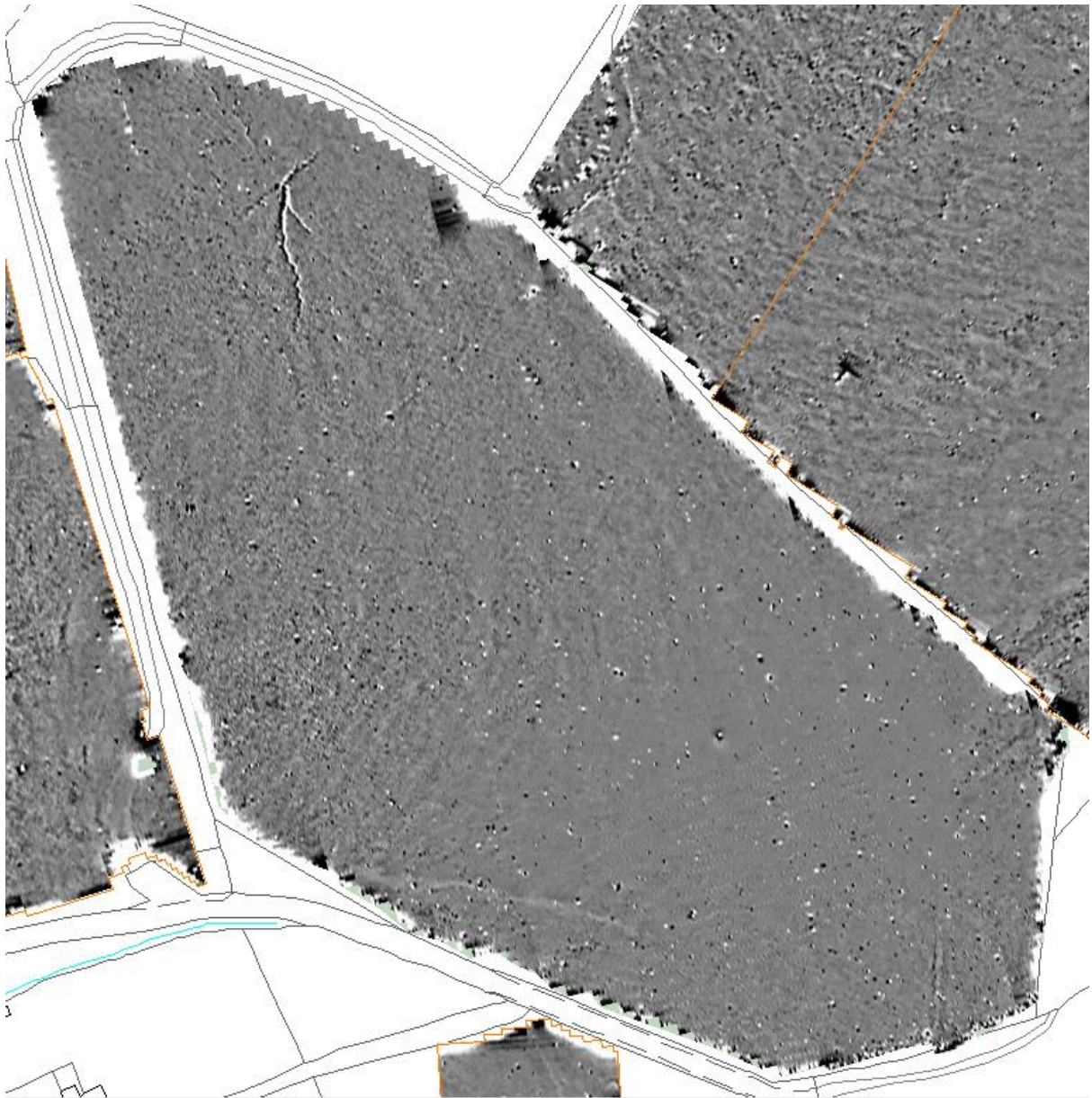
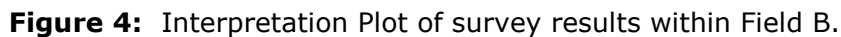


Figure 3: Processed data as grey-scale plot overlaid on local topographical features for Field B

- 4.2.1 The field covered an area of 6.63ha and was gently sloping from north to south.
- 4.2.2 The results are presented at $\pm 10\text{nt}$ (Figure 3) and an interpretation plot of the results is also provided (Figure 4).
- 4.2.3 A faint dipolar linear (a) can be seen running from northeast to southwest across the site. This linear coincides with the known location of a BT cable.
- 4.2.4 An irregularly shaped dipole feature (b) can be seen in the middle of the northern end of the site. From studying historic mapping (OS 1st edition



4.2.5 Feature (c) is a faint linear dipolar and is likely to reflect a former trackway related to former field divisions as seen on the OS 1st edition (1889).

4.2.7 Numerous small roughly circular positive features are scattered through the results, with a concentration at the extreme northern and eastern ends

of the field. These are likely to reflect tree and shrub boles associated with former land use.

4.3 Field C

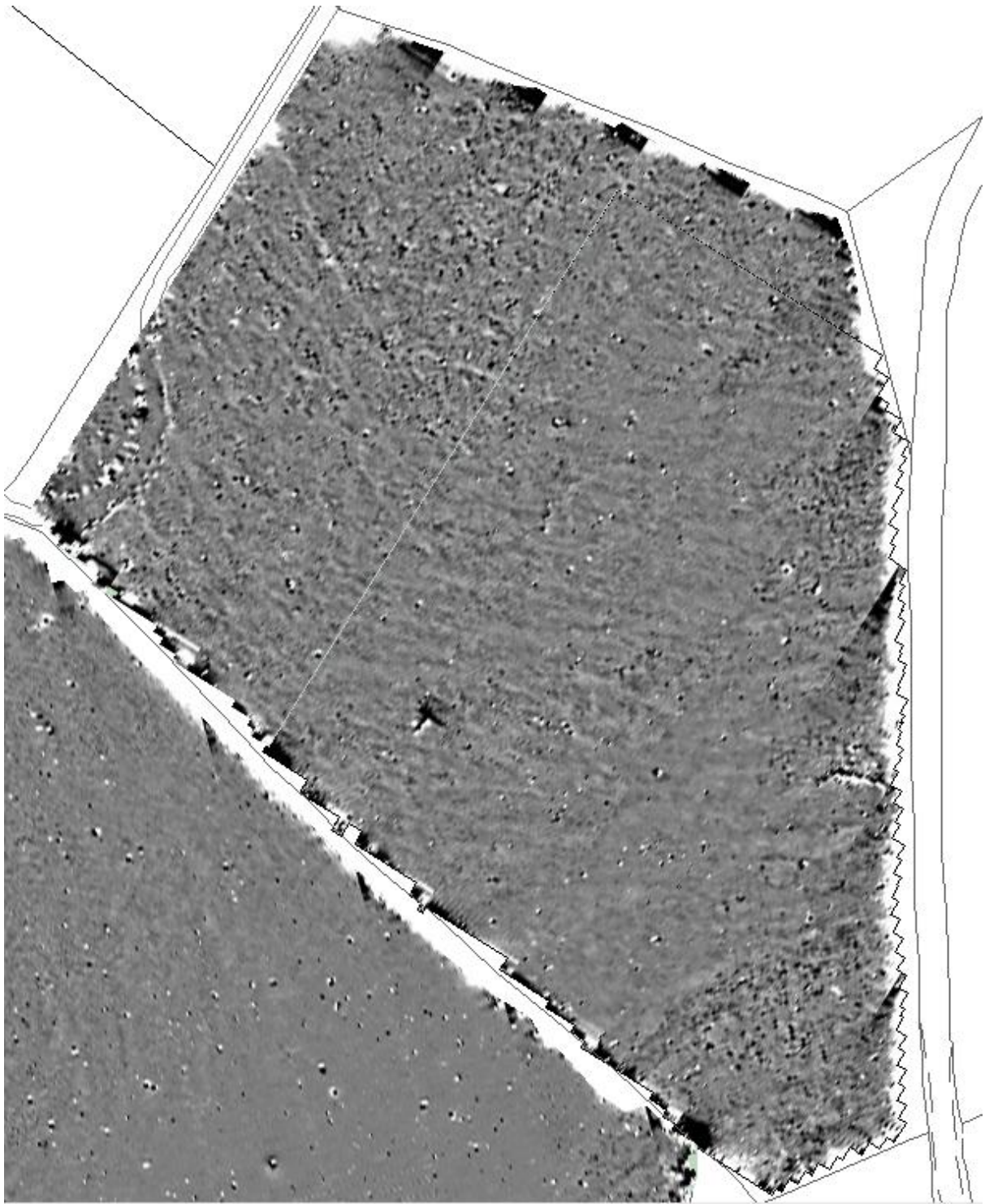


Figure 5: Processed data as grey-scale plot overlaid on local topographical features for Field C

- 4.3.1 The field covered an area of 4.78ha and was gently sloping from north to south.
- 4.3.2 The results are presented at $\pm 5\text{nt}$ (Figure 5) and an interpretation plot of the results is also provided (Figure 6).

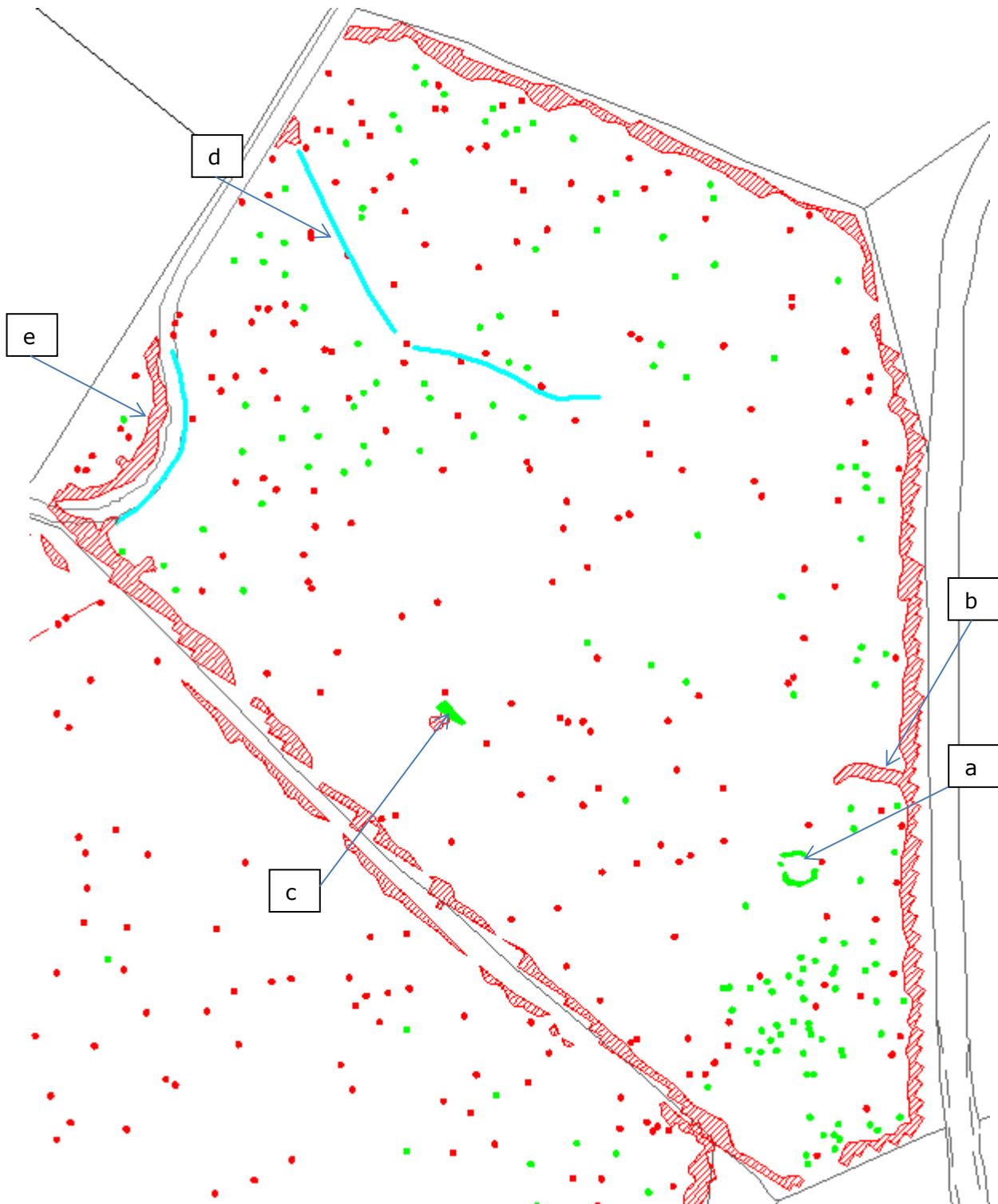


Figure 6: Interpretation Plot of survey results within Field B.

Dipolar features are represented in red; positive features are represented in green: and negative features appear in blue.

- 4.3.3 A faint D-shaped positive feature (a) can be seen in the southeast of the field. This feature is roughly 10m in size and may represent the location of an enclosure feature of unknown date, but may be associated with the quarrying activities that can be seen to the north east of the field.
- 4.3.4 A curvilinear dipole feature (b) can be seen extending from the hedge to the north east of feature (a). It is likely to represent a former track way and may be associated with the quarrying activity to the northeast of the field.
- 4.3.5 A wedge shaped positive feature adjacent to a medium sized dipole area (c) can be seen to the middle of the field. The nature of the positive feature is uncertain and may simply be a magnetic response related to the dipole area, and therefore represent an error made during survey. It may also be a short ditch in which a large ferrous object resides.
- 4.3.6 A negative curvilinear can be seen running to the southeast (d). This may represent a buried service given how it emanates from a large dipolar area in the field boundary and where it is broken by a dipolar dot, there is a significant turn in its route. These are characteristics associated with buried services.
- 4.3.7 In the northwestern part of the field a clear double curving feature is present, visible partly as a dipolar reading (northern arc) and negative feature (southern arc). These features follow the line of an existing track way which can be seen on the underlying base map showing topographic features.

5. CONCLUSION

- 5.1 The gradiometer survey undertaken at the site of the consented Blaen Bowi solar farm has been successful in demonstrating the presence of a number of buried features within the area. The geology of the site area is evidently well suited to gradiometer survey.
- 5.2 A range of different features were identified within the survey area of Fields B & C. A number of these are likely to be post-medieval or modern representing former or existing farm tracks. Some of these features may be associated with former quarrying in the area (such as feature (b)).
- 5.3 Other features identified may represent buried services.
- 5.4 Although very few notable features were found during the survey, it is possible for some archaeological features to remain undetected due to lack of variations in the magnetic susceptibility of the feature from the surrounding natural.
- 5.5 Overall the survey does not indicate intensive archaeological activity as might have been expected from the potential for the site to contain ring ditches associated with Bronze Age round barrows or Iron Age hut circles. There do not appear to be any features representing hearths or other activity which could be associated with settlement.
- 5.6 The results would tend to suggest that the area has been used for pastoral farming possibly since the Bronze Age. The numerous small circular features are thought to represent clearance of scrubland plants or small trees to create larger open fields. The area is shown as moor land on 19th century plans, and potentially the clearance may have occurred when the fields were turned to improved pasture in more recent years.
- 5.7 Through discussions with the client it is understood that the solar farm does not require soils to be stripped in order to install the frames on which solar panels are mounted. Frames are erected by piling. This will involve similar machinery to farm vehicles which will drive on the topsoil (eg through the use of tractors and power take-off to drive the piles in to the ground).
- 5.8 No new roads are proposed on the site as existing access tracks will be used. Track matting will be used if a track surface is required for vehicles.
- 5.9 The only aspects involving intrusive groundworks that could have an impact on buried archaeological remains are the excavation of cable trenches, and for footings of electrical equipment housings and substation. These items of equipment are small and few – for example a substation will have a 6x3m footprint (and only one is required for the solar park), and metering cabinet is c. 2x2m (with around 4 needed for the approved solar park area). If the locations of these small items coincide with an area identified by geophysical survey as of possible interest, an intensive watching brief can be adopted in these areas. Alternatively, the areas may be avoided by amending the design.
- 5.10 Once the equipment is installed and operational, the land will continue in (sheep) grazing use. The solar equipment requires only minimal maintenance and this would not involve either heavy equipment or trafficking. Maintenance of the land therefore continues in essentially the same way as at present.

Appendix 1

Summary of known archaeological sites located within 2km of proposed solar farm

PRN	Name	Type	Period	NGR
2273	Tomen Seba NPRN303737	Motte: Thought to be a medieval castle motte: a steep-sided, ditched circular mound, some 32m in diameter & rising 6.4m to a level summit, some 12.5m in diameter, where foundations are said to have been encountered; the ditch is partially water-filled: there are no indications of any further works. Scheduled Ancient Monument CM020	Medieval	SN32553702
2274	Crugiau Moelvre NPRN303736	Round Barrow: One of three round barrows at the top of Moelvre. Part of Scheduled Ancient Monument CM107	Bronze Age	SN3261636127
2275	Crugiau Moelvre NPRN309236	Round Barrow: One of three round barrows at the top of Moelvre 1.6m high barrow severely mutilated by field walls built upon its summit. The western end of the mound is intact, the NE end is partly ploughed, and the southeastern end is flattened completely. Part of Scheduled Ancient Monument CM107	Bronze Age	SN3267636121
2276	Crugiau Moelvre NPRN309235	Round Barrow: One of three round barrows situated at the top of Moelvre barrow 1.6m high with a large mutilation upon its summit (Probably due to quarrying). Slight erosion and cattle treading at its base. Part of Scheduled Ancient Monument CM107	Bronze Age	SN3263636094
2293	Crug Y Gorllwyn NPRN303757	Round Barrow: Round barrow c.2.0m high, 17.0m in diameter in a pasture field (rotovated + reseeded 5 years ago). OS trig point on top of mound slightly to the north area of mutilation on top with paths leading to it. Telegraph pole on SW side, shed recently erected between to the fence + close up against barrow (E side). This is being used as a shelter for cattle and causing trampling particularly on the north-east side. Scheduled Ancient Monument CM108	Bronze Age	SN32183408
2294	Crug Moch NPRN303759	Round Barrow: Crug moch round barrow stands c.0.6m high and measures c17.0m in diameter. It lies at the edge of a level pasture field. A farm track cuts along the Northeast side and a modern hedge line runs parallel to the track along the top of the mound. There is no evidence for a ditch and there are quartz pebbles on the surface on the mound. The mound itself is covered with bracken + bushes.	Bronze Age	SN3342433362
2295	Nant Sais NPRN303760	Round Barrow: Round barrow c.1.2m high, 18.0m in diameter on the west facing slope so higher on downslope side than upslope side. A central depression is being made worse by animal trampling - the hollow is being used as a windbreak - and there are several paths to the hollow. The barrow itself lies in an area of heathland and has a cover of rough grass + gorse. However, the rest of the field to the south has obviously been ploughed and seeded + is much better quality pasture. There is no	Bronze Age	SN34353397

		fence or hedge dividing these two areas and the pasture is only c. 2.0m away from the barrow. Scheduled Ancient Monument CM106		
3377	Blaen Nant-Llin	Findspot: No further information concerning find: no other discoveries.	Post-Medieval	SN313357
3378	Clyn-Gosen	Public House, Cottage: Ruined cottage recorded in 1985 and said by a local inhabitant to have been in use as a public house within his lifetime, with 14 acres of land. An inscribed stone is set into the front of the cottage, bearing the inscription "J I E GLYNN COSEN WIGG VIAND CANTICKO" possibly dated ??64.	Post-Medieval	SN3146136392
5259	Parc Pen Y Garn	Round Barrow: The field surface is irregular with banks and hillslope to the S. It overlooks a valley to the S. The field name Parc Pen Garn is no longer used. It has been ploughed in the past but the owner has not noticed anything unusual.	Bronze Age	SN30953633
5260	Llain Ddineu; Llain Ddimeu	Cemetery: Early medieval D site, ie. possible early medieval origins. The RCAHM record that a field named 'Llain ddineu' or 'Llain ddimeu' ('halfpenny patch') lay on Penrallt Farm in Penboyrr parish (now Llangeler parish), and that there was a local tradition that the field was a 'burial ground' (RCAHM 1917, 227 no.670). The Penboyrr tithe schedule records no field name 'Llain ddineu/ddimeu' on Penrallt Farm or in its environs. In conclusion, it is not known for certain which field the RCAHM are referring to. Might there be an association with the possible barrow cemetery PRN 10594, which lies in the vicinity, but similarly without a precise location?	Unknown, Post-Medieval, Medieval, Early Medieval	SN343368
5261	Parc Y Fyddin NPRN404744	Battle Site: The name is not in use: The owner calls the field Parc Newydd. It has not been ploughed for at least 20 years but nothing has ever been found to the owners knowledge. There are no local tales concerning the field or general area.	Unknown	SN30873543
5262	Parc Yr Arian Tryalau	Unknown	Unknown	SN33443618
7314	Cae Garreg Fawr Clun Gosen	Standing Stone	Bronze Age	SN31393641
7454	Crugiau Moelvre	Finds	Bronze Age	SN327361
7729	Crugynfarch	Round Barrow	Bronze Age	SN34243615
9798	Gwastad	Finds	Prehistoric	SN3318434305
10594	Cefn Hiraeth; Cefn Areth	Round Barrow Cemetery	Bronze Age	SN3437
12167	Llwyn-Beili	No information. re. the place name.	Unknown	SN3435
13736	Rhiwin Coch	Common Land	Post-Medieval, Medieval	SN319341
13768	Rhosblaen Esgair	Common Land	Post-Medieval, Medieval	SN322338

13773	Rhosblaenesgair	Common Land	Post-Medieval, Medieval	SN321344
14387	Grug Y Gorllwyn	An enclosure, partially obscured by the reservoir and radar station, has been identified from aerial photographs. The enclosure appears to be a circular ditch with two parallel linear ditches radiating from the north west side. It surrounds a (possibly earlier) Bronze Age round barrow (PRN 2293, SAM CM108).	Prehistoric	SN32183408
14880	Cropmarks	Natural Feature?: Cropmarks in the north part of field form uncertain possibly geological.	Unknown	SN31453555
14911	Cropmark / Earthwork	Field called Bank war Ffordd in 1840-1 on tithe map. Feature appears as a curving length of cropmark or earthwork on AP's.	Unknown	SN3177134901
15712	Quarry	Quarry	Post-Medieval	SN3130434503
15713	Capel Pen'r Heol	Chapel: Capel y bedyddwyr, Clawddgoch: Built 1870. Extended 1921.	Post-Medieval	SN31293421
15714	Capel Tan-Glwst	Chapel: Branch of Capel Iwan (A): Built 1870: Restored 1954.	Post-Medieval	SN31003397
15740	Quarry	Quarry	Post-Medieval	SN3334
15741	Quarry	Quarry	Post-Medieval	SN32183374
15785	Esgair Mill; Cwmpengraig Mill NPRN40873	Woollen Mill: Large isolated mill building in bottom of deep wooded valley - a "factory" type. Visited due to planning application for conversion to private house. Floors of first floor in too bad a condition to allow more than external and ground floor examination. CMG Feb 1985	Post-Medieval	SN34643652
15894	Capel Pant-Y-Bwlch	Pantybwllch Chapel was built in 1835 and rebuilt in 1888. The present chapel, dated 1888, was built in the Simple Round-Headed style of the long-wall entry type.	Post-Medieval	SN32483683
15895	Gravel Pit	Gravel Pit	Post-Medieval	SN3229635297
15896	Quarry	Quarry	Post-Medieval	SN3388735063
15900	Ffynnon Wen	Quarry	Post-Medieval	SN30853694
15901	Quarry	Quarry	Post-Medieval	SN3187336475
15902	Quarry	Quarry	Post-Medieval	SN3314436783
15903	Quarry	Quarry	Post-Medieval	SN3136635693
15904	Quarry	Quarry	Post-Medieval	SN3243735292
15905	Quarry	Quarry	Post-Medieval	SN32773697
15906	Quarry	Quarry	Post-Medieval	SN3354235271
16126	Ffynnon Wen	Well	Post-Medieval	SN309369
16189	Ffynnon-Wen	Well	Post-Medieval	SN324374
19336	Blaen-Waun-Fach	Cottage: Marked as a cottage on the tithe map	Post-Medieval	SN30483570
19342	Cwtteri	Cottage: Not named on the tithe map.	Post-Medieval	SN30953565
19432	Cottage	Cottage: Not named on the tithe map	Post-Medieval	SN3131235564
19603	Cottage	Cottage: Not named on the tithe map.	Post-Medieval	SN3182135180
19664	Park Y Fynon	Well: Field called Park y Fynon on tithe map.	Unknown	SN31203560

22258	Pant-Y-Bwlch	Site of ruined cottage, reduced to wall bases.	Post-Medieval	SN3232236848
22468	Aber-Gelerch	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN30893616
22469	Ty-Parc	Cottage shown on 1907 6" OS map. Still standing and occupied in 1994.	Post-Medieval	SN31283556
22470	Waun	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN3160235548
22471	Eden Arms; Cloglas	Public House	Post-Medieval	SN30483562
22590	Ty-Cefn	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN32163694
22591	Llain-Ty-Newydd	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN33233735
22592	Hen-Tryalou	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN3332536767
22594	Crossroad Cottage	Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN34243682
22595	Pen Pit; Brynhaulwen	Weavers Cottage: Cottage shown on 1907 6" OS map, present condition unknown.	Post-Medieval	SN34563660
22605	Tryal Bach	Cottage shown on 1907 OS 6" map. Present condition unknown.	Post-Medieval	SN32683458
22609	Ty-Newydd	Cottage shown on 1907 6" OS map. Present condition not known.	Post-Medieval	SN3369833538
25090	Lletty'r Gaib	Dwelling: Major dwelling described by Francis Jones in 1987.	Post-Medieval	SN31303668
25566	Pen-Yr-Allt; Penrallt	Dwelling: Historic home described by Francis Jones in 1987.	Post-Medieval	SN33953635
35480	Penyparc	Hosiers Cottage, Farmstead: Present condition unknown. Stocking knitters mentioned as working here in the 1871 census	Post-Medieval	SN34573559
35482	Cilcraig	Cottage which was once used as a weavers workshop.	Post-Medieval	SN34903600
35487	Pantbach	Hosiers Cottage: Home to stocking knitters on 1871 census.	Post-Medieval	SN34243645
35493	Penrhiwfawr	Weavers Cottage: Cottage shown on 1889 6" OS map and associated with the local woollen industry.	Post-Medieval	SN33743637
35494	Plygyrhiw	Hosiers Cottage: Home to stocking knitters on 1871 Census.	Post-Medieval	SN33843634
35496	Bryn	Weavers Cottage: Home to a Handloom Weaver in 19th century.	Post-Medieval	SN34193688
35497	Peneralltfach	Weavers Cottage: Home to a domestic Handloom Weaver in 19th century.	Post-Medieval	SN33913604
35576	Bryn	Weavers Cottage: Handloom Weavers Workshop	Post-Medieval	SN34193688
35588	Mill Race	Mill race taken off the Nant Bargod near Twll-y-graig servicing the dwelling at Cil-graig	Post-Medieval	SN34903590
35589	Mill Race	Mill race for the Woollen Factory at Esger View, Taken off the Nant Esgair by sluice and joined by Aqueduct to the Factory	Post-Medieval	SN34523640
35590	Esger View	Woollen Mill: Woollen Factory in production 1899-1958	Post-Medieval	SN34643652
42510	Crugiau Moelvre	Round Barrow: 4 th Bronze Age Barrow on peak of Moelfre. For some reason not covered by PRN 42569. Part of Scheduled Ancient Monument CM107.	Bronze Age	SN3256936103
42569	Crugiau Moelvre	Round Barrow Cemetery: Group PRN for a group of barrows on top of Moelvre hill. The group consists of a triangular arrangement of three barrows at one end of the hilltop, with a fourth barrow, 42510, lying outside of the group c.50m to the W. A similar arrangement of barrows also occurs on top of the high plateau/local summit at Trychrug, directly	Bronze Age	SN32603610

		intervisible with this site to the SSW (group PRN 45276). Scheduled Ancient Monument CM107		
46544	Bwlchydomen	Toll Gate: Site of a mid-19th century tollgate, owned by the Newcastle Turnpike Trust.	Post-Medieval	SN32573690
47618	Findspot	Findspot for miniature stone axe manufactured from a light greenish coarse-grained igneous rock. The axe has a squat form and flares out towards the blade edge. The surface of the axe is worn, it is uncertain whether the axe is a specialist tool or a 'ritual' item. Length 70mm, width 47mm, thickness 30mm Found at Capel Iwan (NMGW identification)	Neolithic	SN310356
100163	Old Quarry	Quarry recorded on the 1889 1st edition Ordnance Survey map and named Old Quarry on the 1906 2nd edition OS. Marked as disused on modern mapping.	Post-Medieval	SN33153444
100164	Quarry	Quarry recorded on the 1889 1st edition and 1906 2nd edition Ordnance Survey maps. Not shown on modern mapping and presumed disused.	Post-Medieval	SN33183430
102946	Blaenfforest	Wheel Pit: Site of a 19th century waterwheel used to power a chaff-cutter and threshing-machine at Blaenfforest farmstead	Post-Medieval	SN31893761
	Clawddcoch Baptist Church, Clawddcoch NPRN6259	Chapel: Clawddcoch Baptist Church was built in 1905.	Post-medieval	SN31213442
	Tanglwys Independent Sunday School, Tanglwys NPRN6258	Chapel: In 1998 the building was still in Sunday School use.	Post-medieval	SN31003397
	Parc-Yr-Arian, Tryalau NPRN24286	Field name: Tithe Schedule 1476. No explanation of name.	Post-medieval	SN33443618
	Pantbywlch Chapel (Calvinistic Methodist), Pant-Y-Bwlch NPRN6613	Chapel: Pantbywlch Chapel was built in 1835 and rebuilt in 1888. The present chapel, dated 1888, was built in the Simple Round-Headed style of the long-wall entry type.	Post-medieval	SN32493686
	Pillbox, Cynwyl Elfed NPRN270506	Pill Box. No specification.	Post-medieval	SN334337
	Blaen Bowi Wind Farm NPRN412096	Wind Farm: Blaen Bowi wind farm comprises of three, 1.3 MW wind turbines on Moelfre Hill, 3 miles south of Newcastle Emlyn. In 1995 a 25 year lease was entered into by the owner of Blaen Bowi farm and Windjen Power Ltd. The turbines became operational in July 2002.	Modern	SN32443587
	Ffynnon-Wen Farm NPRN412097	Farm: Ffynnon-wen farm lies 2 miles south of Newcastle Emlyn.	Multiperiod	SN32403746

APPENDIX 2: WRITTEN SCHEME OF INVESTIGATION FOR AN ARCHAEOLOGICAL WATCHING BRIEF AT BLAEN BOWI SOLAR PARK, CARMARTHENSHIRE

1. INTRODUCTION

1.1 This Written Scheme of Investigation (WSI or specification) has been prepared by DAT Archaeological Services in response to a request from Corylus planning. The WSI provides details of a scheme of further mitigation deemed necessary at the site of the consented solar park (Planning Reference W/28837) during its construction.

1.2 A detailed historic background was included within the Environmental Impact Assessment submitted with the planning application for the site (prepared by Dulas Ltd).

1.3 Following consultation on the planning application submitted for the solar park, the archaeological advisors⁴ to the planning authority requested the following condition be placed on planning permission:

'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 and approved in writing by the Local Planning Authority.'

1.4 Through consultation with the archaeological advisors to the planning authority, it was determined that the written scheme of investigation should include a geophysical survey of the site area as a minimum. This was undertaken by DAT Archaeological Services in March and April 2015.

1.5 The results of the geophysical survey were successful in demonstrating the presence of a number of buried features within the area. The geology of the site area was well suited to gradiometer survey. The conclusions of the survey can be summarised as follows:

- A range of different features were identified within the survey area, a number of which are likely to be post-medieval or modern representing former or existing farm tracks. Some of these features may be associated with post-medieval quarrying in the area and other features identified may represent buried services.
- Although very few notable features were found during the survey, it is possible for some archaeological features to remain undetected due to lack of variations in the magnetic susceptibility of the feature from the surrounding natural.
- Overall the survey does not indicate intensive archaeological activity as might have been expected from the potential for the site to contain ring ditches associated with Bronze Age round barrows or Iron Age hut circles. There do not appear to be any features representing hearths or other activity which could be associated with settlement.
- The results would tend to suggest that the area has been used for pastoral farming possibly since the Bronze Age. The numerous small circular features are thought to represent clearance of scrubland plants or small trees to create larger open fields.
- The area is shown as moor land on 19th century plans, and potentially the clearance may have occurred when the fields were turned to

⁴ Dyfed Archaeological Trust Planning Services – Heritage Management.

improved pasture in more recent years. (Davies, Enright & Kemp 2015)

- 1.6 Through discussions with the client it is understood that the proposed methodology for the construction of the solar farm will require minimal ground disturbance. The mounting of the solar panels does not require soils to be stripped in order to install the frames on which they are mounted. Frames are erected by piling involving similar machinery to farm vehicles which will drive on the unstripped topsoil (eg through the use of tractors and power take-off to drive the piles in to the ground).
- 1.7 No new roads are proposed on the site as existing access tracks will be used. Track matting will be used if a track surface is required for vehicles.
- 1.8 The only aspects involving intrusive groundworks that could have an impact on buried archaeological remains are the excavation of cable trenches, and for footings of electrical equipment housings and substation. These items of equipment are small and few – for example a substation will have a 6x3m footprint (and only one is required for the solar park), and metering cabinet is c. 2x2m (with around 4 needed for the approved solar park area).
- 1.9 Based on this information it is considered that an archaeological watching brief will be an appropriate form of archaeological mitigation during groundworks associated with the solar park construction. The watching brief will only be needed during groundworks where the ground surface will be excavated.
- 1.10 This written scheme of investigation outlines the methodology through which DAT Archaeological Services would undertake an archaeological watching brief during ground works at the site, which have the potential to expose, damage or destroy archaeological remains. This document has been prepared for the client and is specifically prepared for DAT Archaeological Services to undertake the required archaeological works. The WSI cannot be used by any third party.
- 1.11 This specification is in accordance with the *Standard and Guidance for Archaeological Watching Briefs* (CIfA⁵, 1994, revised 2001 & 2008) and is designed to satisfy a condition recommended on this development (Planning Application No. W/28837) by the archaeological advisors⁶ to Carmarthenshire County Council (CCC).
- 1.12 DAT Archaeological Services has considerable experience of this type of project and always operates to best professional practice. DAT Archaeological Services is the contractual arm of Dyfed Archaeological Trust that has its own Health and Safety Policy, and all works are covered by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.
- 1.13 ***Dyfed Archaeological Trust is a CIfA Registered Organisation.***
- 1.14 ***All permanent staff of DAT Archaeological Services are CSCS registered.***

⁵ Chartered Institute for Archaeologists.

⁶ Dyfed Archaeological Trust Planning Services – Heritage Management.

2. WATCHING BRIEF

- 2.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (CIfA S&G: AWB) is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.
- 2.2 The purpose of a watching brief, as laid down in the IFA S&G AWB is:
- to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;
 - to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment.
- 2.3 This document provides a scheme of works for:
- **Archaeological attendance and recording during groundworks associated with the construction of the Blaen Bowi Solar park. An archaeologist will be needed on site during all groundworks which have the potential to expose, damage or destroy archaeological remains. A report shall be prepared on the results of the watching brief, and an archive created of all finds, records, photographs and plans created by this mitigation strategy.**

3. PROJECT OBJECTIVES

- 3.1 Provision of a WSI to outline the methodology by which DAT Archaeological Services will undertake the watching brief.
- 3.2 To identify the presence/absence of any archaeological deposits.
- 3.3 To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works.
- 3.4 To appropriately investigate and record any archaeological deposits to be affected by the ground works.
- 3.5 To produce an archive and report of any results.

4. FIELDWORK

- 4.1 An archaeologist will be present during any topsoil stripping needed for sub stations or metering cabinets. Where cable trenches are being excavated, these may be observed if they lie in areas where potential archaeological features were identified on the geophysical survey.
- 4.2 The attending archaeologist will observe the surface of the stripped areas (and spoil heaps) for features and finds. Should areas of archaeology be identified, these will be hand cleaned and an assessment of the remains

made. Any archaeological features or deposits revealed during the watching brief will be examined and recorded to an appropriate level⁷.

- 4.3 The archaeologist will have the power to stop earth moving machines if potential archaeological remains are revealed. Such areas should then be defined and investigated by the archaeologist, either by hand or through use of machines under full archaeological supervision. These areas must not be tracked over or further disturbed until archaeological recording has been completed. It will be possible for the development to continue in those areas where no archaeological remains have been revealed. It may be necessary to demarcate such areas, and prevent vehicles moving across them until the archaeology has been appropriately dealt with. Additional archaeologists may be required to assist with the recording depending on the significance of the remains identified.
- 4.4 All groundworks where there is a potential to expose, damage or destroy archaeological remains should be undertaken using a toothless ditching bucket to create as level and clean a surface as possible, to enable quick archaeological reconnaissance of the excavated areas to determine if any significant archaeological remains are present.
- 4.5 Recording of all archaeological features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual⁸ used by DAT Archaeological Services. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.
- 4.6 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by DAT Archaeological Services in stable conditions. All finds, except those deemed to be Treasure, will remain the property of the landowner.
- 4.7 Under the 1996 Treasure Act, "treasure" can be summarised as:
 - Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
 - Any prehistoric assemblage of base metal;
 - Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
 - Any object found associated with treasure except unworked natural objects; and
 - Any object which would have been Treasure Trove before the 1996 Act but not covered above.
- 4.8 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, DAT Archaeological Services shall have the power to halt any ground works and shall inform the site agent/project manager and the curatorial officer, and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains by the curatorial officer, DAT Archaeological Services shall, if

⁷ It is important that to ensure professional and appropriate recording adequate time must be made available to the visiting archaeologist to record any archaeological features or deposits exposed following the topsoil strip.

⁸ DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features. In these instances it would be necessary to employ extra resources to record such features to an appropriate standard.

- 4.9 Should any human remains be encountered the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

5. POST-FIELDWORK REPORTING AND ARCHIVING

- 5.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with the specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2007), and the procedures recommended by the National Monuments Record, Aberystwyth.
- 5.2 The results of the fieldwork will be assessed in local, regional and wider contexts. The report will include a desk-based research element to ensure that the site is placed within its wider archaeological context.
- 5.3 A report that is fully representative of the results of the fieldwork will be prepared and four copies will be sent to the client for dissemination to all relevant parties.
- 5.4 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).
- 5.5 The project archive, including all artefacts and ecofacts (excepting those which may be deemed to be Treasure Trove) will be deposited with an appropriate body following agreement with the landowner.
- 5.6 A copy of the final report will be deposited with the regional HER within six months of the completion of the project.

6. STAFF

- 6.1 This project will be managed by James Meek, Head of DAT Archaeological Services.
- 6.2 The fieldwork will be undertaken by members of DAT Archaeological Services, with support of other members of the team if surveying or further archaeological assistance is needed.

7. MONITORING

- 7.1 The fieldwork may need to be monitored by the archaeological advisors to the planning authority and the Head of DAT Archaeological Services, who should be provided access to the site at any time during the watching brief works.

8. HEALTH AND SAFETY

- 8.1 All DAT Archaeological Services permanent staff are CSCS registered.
- 8.2 DAT Archaeological Services will carry out a health and safety risk assessment to ensure that all potential risks are minimised.

- 8.2 All relevant health and safety regulations must be followed.
- 8.3 All site inductions, H&S procedures, H&S constraints and site rules of the site contractor will be made known to DAT Archaeological Services staff at the start of the works.
- 8.4 Safety helmets, high visibility vests and boots are to be used by all site personnel as necessary. The site contractors will make all site staff aware of any other PPE⁹ that may be required.
- 8.5 DAT Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially machine operators.

⁹ *Personal Protection Equipment*

BLAEN BOWI SOLAR FARM, CARMARTHENSHIRE: GEOPHYSICAL 2015

RHIF YR ADRODDIAD / REPORT NO. 2015/21
RHIF Y DIGWYLLIAD / EVENT RECORD NO. 108468

Paratowyd yr adroddiad hwn gan / This report has been prepared by
Ed Davies, Charlie Enright & Rhod Kemp

Swydd / Position: **Archaeologists**

Llofnod / Signature Dyddiad / Date 08/05/2015

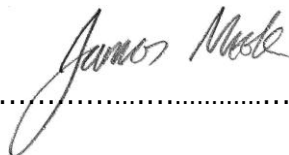

R.S. Kemp

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by
James Meek

ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.
on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: Head of DAT Archaeological Services

Llofnod / Signature Dyddiad / Date 08/05/2015



Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau
sydd gennych ar gynnwys neu strwythur yr adroddiad hwn

As part of our desire to provide a quality service we would welcome any
comments you may have on the content or presentation of this report

